1.	**What the report is looking at**	A review of the quality of care provided to adults with acute limb ischaemia	
2.	**Countries are covered**	England, Wales and Northern Ireland	
3.	**The date the data are related to**	Adults over the age of 18 years who were admitted to a vascular hub as an emergency between 1st January 2023 and 31st March 2023 for the treatment of ALI	
No.	**Recommendation**	**Evidence in the report which underpins the recommendation**	**Guidance available**
1	**Raise awareness of acute limb ischaemia, how to recognise it and what actions to take to reduce delays in the treatment pathway.** ▪ **Raise awareness with patients and the public about the symptoms and who to contact** ▪ **Raise awareness with healthcare professionals in primary care, community care and all emergency departments (vascular hubs and spoke hospitals)** *Note: younger people and those without all of the defined six symptoms of ALI (Pain, Pallor, Paraesthesia, Paralysis, Perishingly cold, Pulselessness - the '6Ps') can still have ALI.* **For action by:** **PATIENT AND PUBLIC AWARENESS** The Office for Health Improvement and Disparities (previously Public Health England), Public Health Wales, Public Health Agency Northern Ireland, Public Health Jersey. **CLINICAL AWARENESS** Commissioners (including NHSE Vascular Services clinical reference group) and integrated care boards in discussion with their trusts/health boards.	**CHAPTER 4 PAGE 16** Delays to presentation were common, with 144/283 (50.9%) patients presenting more than 24 hours after the onset of their symptoms. **CHAPTER 4 PAGE 16** There were missed opportunities to recognise ALI prior to admission, most commonly due to a lack of patient awareness (82/115; 71.3%) and/or recognition in primary care (24/115; 20.8%). The reviewers noted that there was also a missed opportunity to recognise ALI by NHS 111. **CHAPTER 4 PAGE 16** Patients with ALI who self-presented to a spoke emergency department also had shorter median times to presentation (23.5 hours) than those who presented to a vascular hub emergency department (1.3 days) or primary care (6.14 days) (F4.4). **CHAPTER 4 PAGE 16** When patient factors delayed presentation the reviewers considered the outcome was more than likely affected for 11/60 patients. **CHAPTER 5 PAGE 17** Of the 249 patients who had a procedure (revascularisation and/or amputation), the majority presented to a hospital, contacted their GP or called 999 (188/249; 75.5%). Those who presented directly to a hospital had a median time to procedure of 1.2 days compared with those patients who went to primary care first. Their median time to procedure was longer at 2.3 days (F5.1). **CHAPTER 5 PAGE 17** Detailed local written guidance to assist in the recognition and initial management of ALI was available in 36/111 (32.4%) primary care organisations. It was noteworthy that in 41/111 (36.9%) this was unknown.	NHSE: PERIPHERAL ARTERIAL DISEASE, AN OVERVIEW NHSE: COMPLICATIONS OF TYPE 2 DIABETES PATIENT INFO: PERIPHERAL ARTERIAL DISEASE ROYAL COLLEGE OF EMERGENCY MEDICINE: ACUTE LIMB ISCHAEMIA LEGS MATTER: ACT NOW TO SAVE LIMBS AND LIVES

2	**Risk stratify and refer/transfer patients with symptoms of acute limb ischaemia and new sensory or motor impairment* directly to a vascular hub.** **These would be patients with a Rutherford IIb category, affecting more than the toes* *See also recommendation 3* **For action by:** Commissioners and integrated care boards in discussion with their trusts/health boards.	**CHAPTER 5 PAGE 17** A Rutherford category was not recorded for any patients in primary care. **CHAPTER 7 PAGE 19** All the patients in this study were admitted to a vascular hub. In 16/50 vascular hubs, at least one spoke hospital within the network was more than an hour away by blue light ambulance in working hours. The median time from arrival at the spoke hospital to arrival at the vascular hub was 8.16 hours, exceeding the recommended target for treatment of immediately threatened limbs (Rutherford IIb) from relevant sensory-motor symptom onset. **CHAPTER 7 PAGE 19** The Rutherford category was included in only 8/56 spoke hospital guidelines which may explain why it was so infrequently used. **CHAPTER 8 PAGE 20** In 15 patients there was a deterioration in their limb with 8/15 deteriorating to a Rutherford category IIb, an immediately threatened limb that required urgent revascularisation for salvage, and 3/15 to an unsalvageable limb requiring amputation (T8.4 and T8.5). **CHAPTER 9 PAGE 21** Of the 52 patients classified as having Rutherford category IIb ALI, only 5/52 (9.6%) achieved the six-hour target, with a median time of 3.1 days (F9.1).	NICE CLINICAL KNOWLEDGE SUMMARY: ACUTE LIMB ISCHAEMIA VASCULAR SOCIETY: PROVISION OF SERVICES FOR PEOPLE WITH VASCULAR DISEASE 2024 BRITISH SOCIETY OF INTERVENTIONAL RADIOLOGY: PROVISION OF INTERVENTIONAL RADIOLOGY SERVICES 2023
3	**Organise vascular networks to provide timely access to vascular specialists skilled in treating people with acute limb ischaemia.** **For action by:** Commissioners and integrated care boards in discussion with their trusts/health boards.	**CHAPTER 5 PAGE 17** Of the 249 patients who had a procedure (revascularisation and/or amputation) the majority presented to a hospital emergency department or clinic or called 999 with a median time to procedure of 1.2 days (188/244; 77.0%) (F5.1). The median time to procedure was longer at 3.3 days in the 56/244 (22.9%) patients who presented to primary care rather than secondary care. **CHAPTER 7 PAGE 19** In total, 7/78 spoke hospitals described a network where they referred to two or more vascular hubs. A more complicated picture emerged with the number of spoke hospitals from which the vascular hub received referrals. This ranged from 0-22, with a mean of 3.54 and mode of two. The total number of spoke hospitals	VASCULAR SOCIETY: PROVISION OF SERVICES FOR PEOPLE WITH VASCULAR DISEASE 2021 BRITISH SOCIETY OF INTERVENTIONAL RADIOLOGY: PROVISION OF INTERVENTIONAL RADIOLOGY SERVICES 2023

		this was based on was 170, suggesting that there are 36 spoke hospitals referring to more than one vascular hub. **CHAPTER 6 PAGE 18** In total, 138/330 (41.8%) patients had attended a spoke hospital before being transferred to a vascular hub. There were 72/138 (52.2%) patients taken by ambulance and ALI was mentioned on the patient report form (PRF), where it was available, for 29 patients. For 22 patients ALI was not mentioned on the PRF. This suggests that ambulance bypass protocols for ALI are not universal or that existing protocols are not being followed. National data monitoring could aim to reduce the number of avoidable transfers. **CHAPTER 6 PAGE 18** The Rutherford category for the patients attending the spoke hospital indicated that 30/106 (28.3%) required revascularisation within six hours of their development of sensory-motor symptoms, while 8/106 (7.5%) probably required a primary amputation (T6.2). At least 38/106 (35.8%) patients were in a hospital where the treatment they required could not be provided, suggesting that many vascular networks are not grasping the organisational opportunities to improve the care of ALI. **CHAPTER 7 PAGE 19** All the patients in this study were admitted to a vascular hub. In 16/50 vascular hubs, at least one spoke hospital within the network was more than an hour away by blue light ambulance in working hours. The median time from arrival at the spoke hospital to arrival at the vascular hub was 8.16 hours, exceeding the recommended target for treatment of immediately threatened limbs (Rutherford IIb) from relevant sensory-motor symptom onset. **CHAPTER 7 PAGE 19** For 34/138 (24.6%) patients the reviewers reported that the time spent at the spoke hospital was too long. Waiting for an ambulance was the most common reason for the delay (11/34) (T7.1). **CHAPTER 7 PAGE 19** There were 34/91 spoke hospitals in which medical records could be shared electronically and 56/91 in which images could be shared immediately (T7.3). All	

		other systems that were described, such as email and paper copies, risk delays or other harm.	
4	**Develop a national guideline for the management of acute limb ischaemia.** **For action by:** The Vascular Society with the British Society of Interventional Radiology	**CHAPTER 7 PAGE 19** A well-organised vascular network should be able to reduce the issues that have been identified with presentations to spoke hospitals. Written guidance specific to the management of suspected ALI was available in only 56/91 spoke hospitals (T7.2), and where it existed key components were often missing. **CHAPTER 7 PAGE 19** The Rutherford category was included in only 8/56 spoke hospital guidelines which may explain why it was so infrequently used. **CHAPTER 8 PAGE 20** Using an ALI pathway in the vascular hub appeared to have a positive impact on care: 3/46 (6.5%) patients experienced a delay on an ALI pathway compared to 18/165 (10.9%) not on a pathway. **CHAPTER 9 PAGE 21** There was room for improvement in the postoperative monitoring/escalation plans with a complete plan documented in the notes for only 82/249 (32.9%) patients (T9.2). **CHAPTER 10 PAGE 22** Only 10/291 (3.4%) patients who survived were discharged back to a spoke hospital and 13/291 (4.5%) were transferred to a step-down or rehabilitation unit. **CHAPTER 10 PAGE 22** Only 18/58 vascular hubs returning an organisational questionnaire stated that they had a policy or standard operating procedure for repatriating patients to their referring hospital. **CHAPTER 10 PAGE 22** The reviewers identified a discharge summary for 262/291 (90.0%) patients who survived to discharge. Information was missing in 44/262 (16.8%), and the discharge planning was considered inadequate in 19/257 (7.4%) (T10.1). The most common omission was details of the vascular follow-up (27/44; 61.4%). **CHAPTER 10 PAGE 22**	NICE CLINICAL KNOWLEDGE SUMMARY: ACUTE LIMB ISCHAEMIA VASCULAR SOCIETY: PROVISION OF SERVICES FOR PEOPLE WITH VASCULAR DISEASE 2024

		Anticoagulants were prescribed in 148/291 (50.9%) patients and antiplatelet medication in 114/291 (39.2%) (F10.2). **CHAPTER 10 PAGE 22** No risk management was documented for 44/291 (15.1%) patients and where documentation existed, it was considered inadequate in 20/291 (6.9%) cases, including 15 patients who should have had smoking/vaping cessation advice. Smoking cessation advice was offered to 58/92 (63.0%) current smokers. **CHAPTER 11 PAGE 23** Delays were identified as a key area of concern in improving ALI care. Considering the data relating to delays in the pathway, 123/249 (49.4%) individual patients who had a procedure experienced a delay at some stage between their initial presentation and first procedure. Excluding the patient-related delays in presenting, there were 115/249 (46.2%) individual patients delayed at some point in the pathway. **CHAPTER 11 PAGE 23** Measuring performance is crucial for quality improvement. Only 22/47 vascular hubs stated that they recorded data on surgical procedures, while 19/42 collected data on interventional radiological revascularisation procedures for ALI. When asked about shared learning across the ALI network, the use of prospectively collected data was uncommon with most learning occurring in morbidity and mortality meetings or in response to reported adverse events.	
5	**Support the national vascular registry to capture focused data on acute limb ischaemia, and to report on procedures and outcomes for patients with ALI*** **ICD-11* *will be mandated in the UK in the next five years and has codes for upper and lower ALI that will allow data comparisons with the national vascular registry data and national patient episode data, unlike ICD-10 where ALI is coded with chronic limb-threatening ischaemia.*	**CHAPTER 1 PAGE 12** The incidence of ALI is unknown as there is no ICD-10 code for ALI. The identification of ALI was made more challenging by its many modes of presentation and breadth of treatment options, which are often used to treat chronic limb-threatening ischaemia. A local study contact (vascular surgeon or vascular radiologist) had to screen patient notes to identify those with acute limb ischaemia from those with chronic limb-threatening ischaemia. Patients were randomly selected from this sample. **CHAPTER 2 PAGE 13** It is widely believed that acute limb ischaemia (ALI) predominantly occurs in older people. However, in this study, 70/290 (24.1%) patients were 60 years or	EUROPEAN SOCIETY FOR VASCULAR SURGERY (ESVS) 2020 CLINICAL PRACTICE GUIDELINES ON THE MANAGEMENT OF ACUTE LIMB ISCHAEMIA

	For action by: Funders and commissioners of the national vascular registry, working with the Royal College of Surgeons of England and partners as the current contract holder for the registry.	younger and 92/290 (31.7%) were of working age (65 or younger) (F2.1). These data highlight that age should not be a factor to exclude ALI in any adult with an acutely painful limb and highlights the need for a national registry for ALI to better understand the population and their needs. **CHAPTER 2 PAGE 13** There were 260/268 (81.7%) patients in the study sample who were White. It is not believed that this dataset has under recorded the incidence of ALI in Black and ethnic minority patients (T2.1) but longer-term population data would confirm this. Ethnicity is not currently recorded in registries such as the National Vascular Registry nor in hospital episode statistics recorded in secondary care but is available from primary care datasets. **CHAPTER 2 PAGE 14** This admission was the first episode of ALI for 241/293 (82.3%) patients, but 25/293 (8.5%) had experienced an episode of ALI in the previous ten years (history of ALI was unknown for 27 patients). There were 60/293 (20.5%) patients who had undergone previous surgical or endovascular revascularisation procedures for ALI or peripheral artery disease (PAD) and 11/293 (3.75%) patients who had undergone a previous amputation. Monitoring ALI procedures and outcomes at a national level would provide a benchmark for assessing readmissions/recurrence of disease. **CHAPTER 4 PAGE 16** There were only 65/283 (22.9%) patients who presented within six hours of their symptoms starting. A further 38/283 (13.4%) patients presented between six and 12 hours and 36/283 (12.7%) between 12 and 24 hours (F4.2). Delays to presentation were common, with 144/283 (50.9%) patients presenting more than 24 hours after the onset of their symptoms. National data on delay to presentation would help target education and patient awareness campaigns. **CHAPTER 5 PAGE 31** Most GPs predicted that the patient would be referred to the nearest emergency department or vascular hub, but this occurred in 27/48 patients and 12/48 patients respectively, demonstrating some disconnection between expected standards and the reality of clinical practice (F5.2).	

		CHAPTER 6 PAGE 18 In total, 138/330 (41.8%) patients had attended a spoke hospital before being transferred to a vascular hub. There were 72/138 (52.2%) patients taken by ambulance and ALI was mentioned on the patient report form (PRF), where it was available, for 29 patients. For 22 patients ALI was not mentioned on the PRF. This suggests that ambulance bypass protocols for ALI are not universal or that existing protocols are not being followed. National data monitoring could aim to reduce the number of avoidable transfers. **CHAPTER 7 PAGE 19** For 34/138 (24.6%) patients the reviewers reported that the time spent at the spoke hospital was too long. Waiting for an ambulance was the most common reason for the delay (11/34) (T7.1). **CHAPTER 8 PAGE 20** In 15 patients there was a deterioration in their limb with 8/15 deteriorating to a Rutherford category IIb, an immediately threatened limb that required urgent revascularisation for salvage, and 3/15 to an unsalvageable limb requiring amputation (T8.4 and T8.5). **CHAPTER 9 PAGE 21** Delays to revascularisation or amputation were observed in 50/249 (20.1%) patients, including 11 with Rutherford category IIb ALI. The delay was considered to have altered the outcome in three patients. The reason for the delay was not recorded in 17/50 patients and not all the delays were within the control of the clinicians or the hospital (F9.2) National data would provide greater oversight of the delays impacting on patient outcome. **CHAPTER 10 PAGE 22** The median length of stay was 19 days for the whole study population and 28 days for patients who had an amputation (F10.1). **CHAPTER 10 PAGE 22** Only 10/291 (3.4%) patients who survived were discharged back to a spoke hospital and 13/291 (4.5%) were transferred to a step-down or rehabilitation unit. **CHAPTER 10 PAGE 22**	

		While the Rockwood frailty score for 141/255 (55.3%) patients was unchanged at discharge, a small number showed an improvement (18/255; 7.1%), and the reviewers identified a deterioration in functional status in 68/255 (26.7%) patients (T10.2). **CHAPTER 11 PAGE 23** Measuring performance is crucial for quality improvement. Only 22/47 vascular hubs stated that they recorded data on surgical procedures, while 19/42 collected data on interventional radiological revascularisation procedures for ALI. When asked about shared learning across the ALI network, the use of prospectively collected data was uncommon with most learning occurring in morbidity and mortality meetings or in response to reported adverse events. **CHAPTER 11 PAGE 23** Delays were identified as a key area of concern in improving ALI care. Considering the data relating to delays in the pathway, 123/249 (49.4%) individual patients who had a procedure experienced a delay at some stage between their initial presentation and first procedure. Excluding the patient-related delays in presenting, there were 115/249 (46.2%) individual patients delayed at some point in the pathway. National data collection for ALI would aid benchmarking and monitoring of the delays occurring thought the entire ALI pathway. This could focus resources as well as educational opportunities. **CHAPTER 11 PAGE 23** The vascular hubs identified delays in patient presentation, initial assessment, recognition of and imaging for ALI as areas requiring improvement, along with transfer delays between vascular hubs and spoke hospitals. Additional challenges included a limited number of vascular surgical beds, the lack of a hybrid theatre, and too few interventional radiologists, limiting the treatment options. Embedding this into a registry would ensure that these factors can be considered beyond this report alone.	