

The Royal College of Emergency Medicine
Clinical Audits

**VTE Risk in Lower Limb Immobilisation in
Plaster Cast
Clinical Audit 2015-16**

National Report

Published: 31 May 2016



Contents

Foreword.....	3
Executive summary	4
Introduction	6
RCEM Standards.....	7
Understanding the different types of standards.....	7
Audit history	7
Format of this report.....	8
Feedback.....	8
Summary of national findings	9
Notes about the results	9
Understanding the charts	10
SECTION 1: Casemix	11
SECTION 2: Audit results	13
Assessment.....	13
Treatment.....	15
Patient information	16
Analysis.....	17
Limitations.....	17
Summary of recommendations.....	18
Using the results of this audit to improve patient care	18
Further Information.....	19
Useful Resources.....	19
Report authors and contributors.....	19
Reference	21
Appendix 1: Audit questions	22
Appendix 2: Participating Emergency Departments	24
Appendix 3: Standards definitions.....	26
Appendix 4: Calculations	27



Foreword



Dr Clifford Mann, President



Dr Taj Hassan, President Elect

In the course of the last 30 years, we have seen venous thromboembolism evolve from being a 'silent killer', largely the product of misfortune, to recognition that our own actions can both promote and diminish the risk substantially. This audit supports and builds upon previous work of the Quality Emergency Care Committee who produced the GEMNET guideline 'Thromboprophylaxis in ambulatory trauma patients requiring temporary limb immobilisation' in 2012.

We know that patients with lower limb fractures are particularly vulnerable to thromboembolism and we know that the vast majority of these patients present initially to the Emergency Department. Initiation of prophylactic therapy may or may not be appropriate at this time but we do have a responsibility to ensure that the risk of harm from the treatment we provide – the plaster cast – is minimised.

Preventing venous thromboembolism is a good example of pro-active emergency care. Reducing harms to patients before they occur, rather than reacting to consequential emergencies - in this case pulmonary embolus, is an excellent example of best practice. This additional work incurs a cost in clinical time, and this must be recognised by the necessary resource allocation.

Embedding such best practice into the patient's emergency care pathway is a powerful marker of quality that we strongly recommend to you.

Co-signed:

Dr Adrian Boyle, Chair of Quality in Emergency Care Committee

Dr Jeff Keep, Chair of Standards & Audit Subcommittee



Executive summary

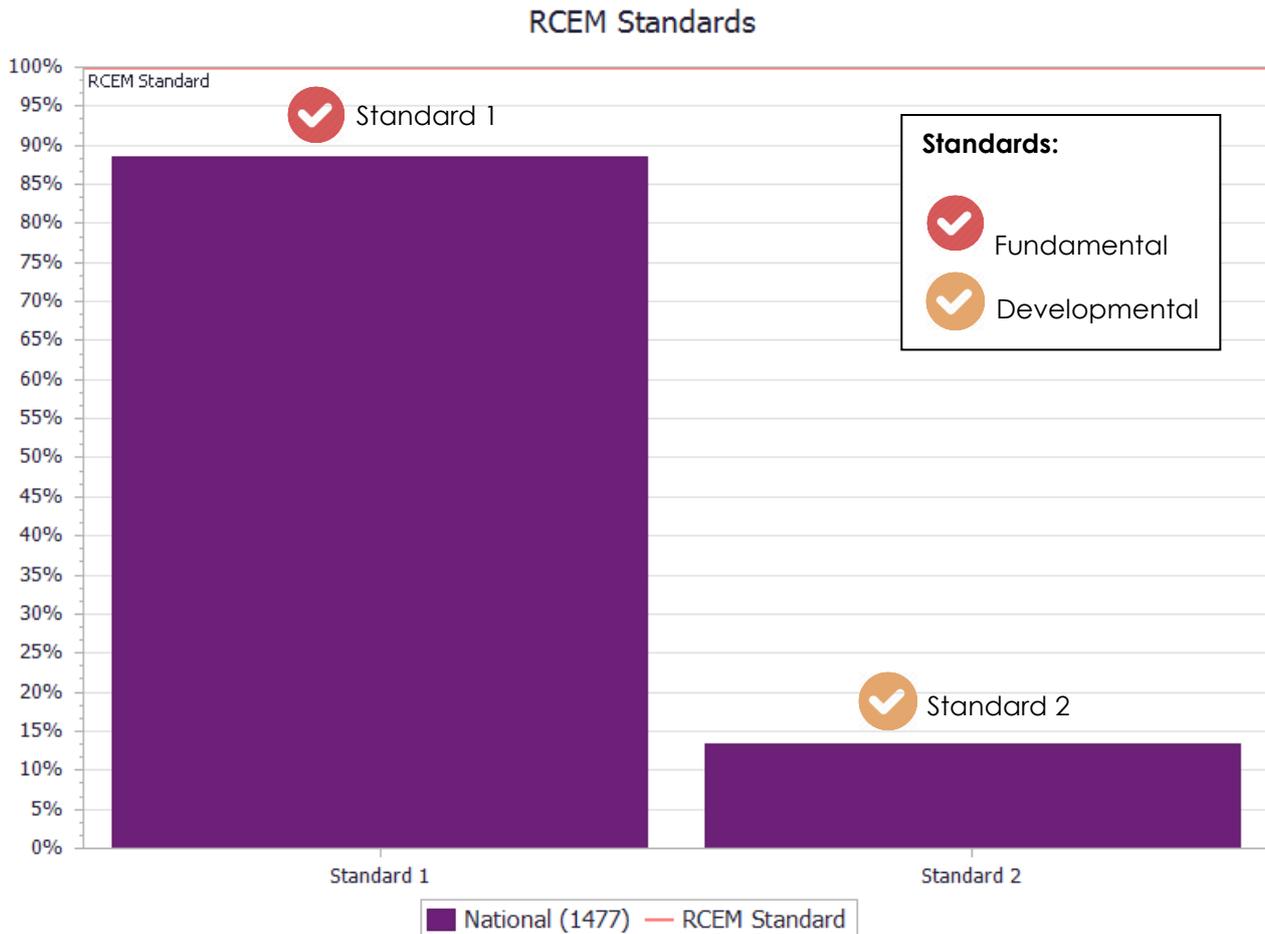
A total of 9916 adults presenting to 167 Emergency Departments were included in this audit. This was the first time this audit has been conducted. The chart on the following page is a summary of the performance against standards.

The purpose of the audit is to monitor documented care against the standards, and is as such formative, not summative. The audit is designed to drive clinical practice forward by helping clinicians examine the work they do day-to-day and benchmark against their peers but also recognise excellence. There is much good practice occurring and we believe that this audit is an important component in sharing this and ensuring patient safety.

The results of this audit show that where patients have prophylaxis indicated, very high proportions were either receiving this or being referred for treatment. However, only a small minority of patients are receiving written information outlining the risks of VTE whilst their lower limbs are immobilised. This is clearly an issue that needs addressing.



This graph shows the national performance on all standards for this audit.



↑ **Higher scores (e.g. 100%)** indicate higher compliance with the standards and better performance.

↓ **Lower scores (e.g. 0%)** indicate that your ED is not meeting the standards and may wish to investigate the reasons.

Standard 1 – If a need for thromboprophylaxis is indicated, there should be written evidence of the patient receiving or being referred for treatment.

Standard 2 - Evidence that a patient information leaflet outlining the risk and need to seek medical attention if they develop symptoms for VTE has been given to all patients with temporary lower limb immobilisation.



Introduction

This report shows the results from an audit in adults who presented at Emergency Departments (EDs) with a condition requiring a lower limb to be immobilised with plaster cast (or backslab) and who were discharged from the ED to be treated as an outpatient (e.g. at a fracture clinic).

A significant number of patients attend EDs with lower limb injuries each year. Many of these are discharged with the leg immobilised, either in a plaster cast or other forms of splintage. All these patients, although their limb is immobilised, are deemed to be ambulant and the concept for prescribing thromboprophylaxis to ambulatory patients with temporary immobilisation is not new.

The report compares the national returns and the clinical standards published by the Royal College of Emergency Medicine (RCEM) Quality in Emergency Care Committee (QECC).

Nationally, **9916** cases from **167** EDs were included in the audit.

Country	Number of relevant EDs	Number of cases
National total	167/233 (72%)	9916
England	148/182 (81%)	8804
Scotland	4/26 (15%)	249
Wales	10/13 (77%)	600
Northern Ireland	4/9 (44%)	226
Isle of Man /Channel Islands	1/3 (33%)	37



RCEM Standards

The audit asked questions against standards published by the College in June 2015:

Standard	Standard type
1. If a need for thromboprophylaxis is indicated, there should be written evidence of the patient receiving or being referred for treatment.	 Fundamental
2. Evidence that a patient information leaflet outlining the risk and need to seek medical attention if they develop symptoms for VTE has been given to all patients with temporary lower limb immobilisation.	 Developmental

Understanding the different types of standards

 **Fundamental:** need to be applied by all those who work and serve in the healthcare system. Behaviour at all levels and service provision need to be in accordance with at least these fundamental standards. No provider should provide any service that does not comply with these fundamental standards, in relation to which there should be zero tolerance of breaches.

 **Developmental:** set requirements over and above the fundamental standards.

 **Aspirational:** setting longer term goals.

For definitions on the standards, refer to appendix.

Audit history

All EDs in the UK were invited to participate in June 2015. Data were collected using an online data collection tool. This is the first time this audit has been conducted. The audit is included in the NHS England Quality Accounts for 2015/2016.

Participants were asked to collect data from ED patient records on consecutive cases of adults (17 years old and above) who presented to the ED or a Minor Injuries Unit that is part of the ED with a condition requiring lower limb immobilisation but who were safe to be discharged to outpatient management between 1st January 2015 and 31st December 2015.



Sample size

RCEM recommended auditing a different number of cases depending on the number of the patients seen within the data collection period. If this was an area of concern, EDs were able to submit data for more cases for an in depth look at their performance.

Expected number of cases	Recommended audit sample
< 50	All eligible cases
50-250	50 consecutive cases
>250	100 consecutive cases

Format of this report

The table overleaf shows the overall results of all participating trusts in the UK and the Isle of Man. The table indicates the variations in performance between departments as displayed through the lower and upper quartiles of performance as well as the median values. More detailed information about the distribution of audit results can be obtained from the charts on subsequent pages of the report. Please bear in mind the comparatively small sample sizes when interpreting the charts and results.

Feedback

We would like to know your views about this report and participating in this audit. Please let us know what you think by completing our feedback survey:

www.surveymonkey.co.uk/r/RCEMAudit15

We will use your comments to help us improve our future audits and reports.



Summary of national findings

	RCEM Standard	National Results (9916 cases)		
		Lower quartile	Median*	Upper quartile
Assessment				
VTE risk assessment carried out		0%	11%	40%
VTE risk level documented		50%	84%	98%
Thromboprophylaxis indicated		0%	6%	22%
Treatment				
 STANDARD 1: If a need for thromboprophylaxis is indicated, there should be written evidence of the patient receiving or being referred for treatment.	100%	89%	100%	100%
Patient information				
 STANDARD 2: Evidence that a patient information leaflet outlining the risk and need to seek medical attention if they develop symptoms for VTE has been given to all patients with temporary lower limb immobilisation.	100%	0%	2%	17%

Notes about the results

*The median value of each indicator is that where equal numbers of participating EDs had results above and below that value.

These median figures may differ from other results quoted in the body of this report which are mean (average) values calculated over all audited cases.

The lower quartile is the median of the lower half of the data values.

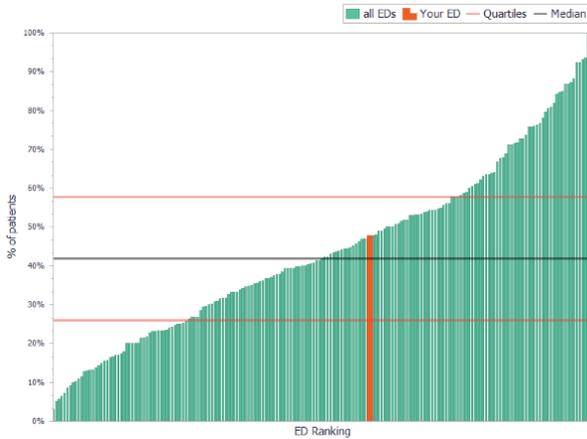
The upper quartile is the median of the upper half of the data values.



Understanding the charts

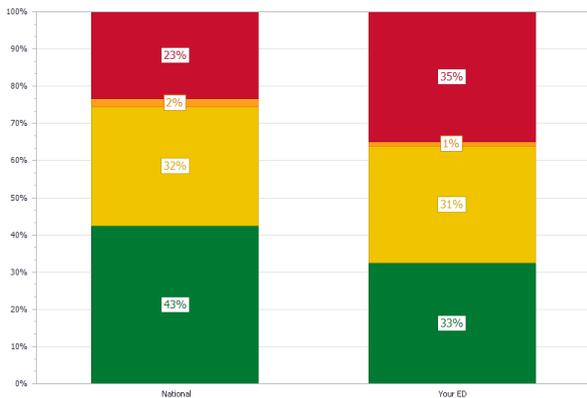
There are different types of charts within this report to present the data. The example graphs below show the type of charts you will encounter.

Sorted Bar Chart



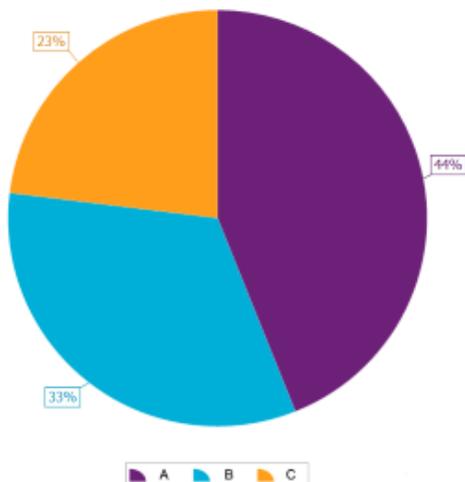
Sorted bar charts show the national performance, where each bar represents the performance of an individual ED. The horizontal lines represent the median and upper/lower quartiles.

Stacked Bar Chart



Stacked bar charts show the breakdown of a group nationally. These are used when it will be helpful to compare two groups side by side, for example comparing local data with the national data.

Pie Chart



Pie charts show the breakdown of a group nationally.

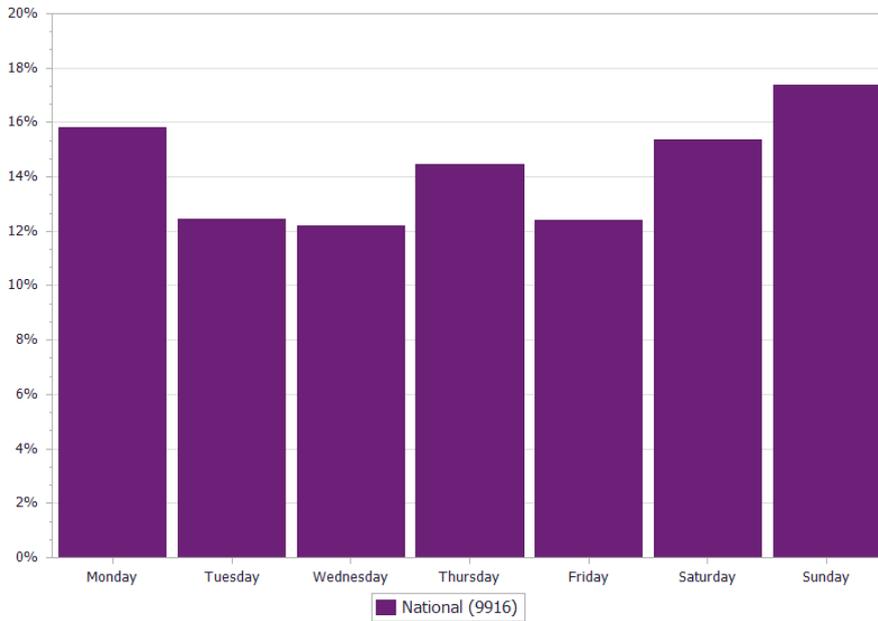


SECTION 1: Casemix

National case mix and demographics of patients.

Q1 Date of arrival

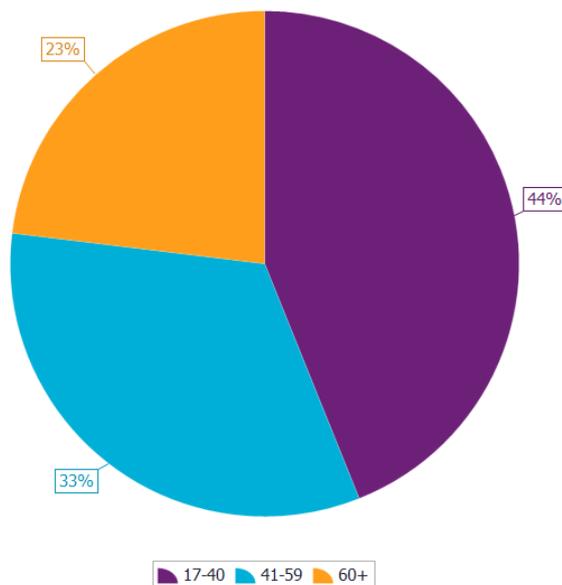
Summary of patient day of arrival



Sample: all patients

Q2 Patient age

Summary of age of patient on attendance

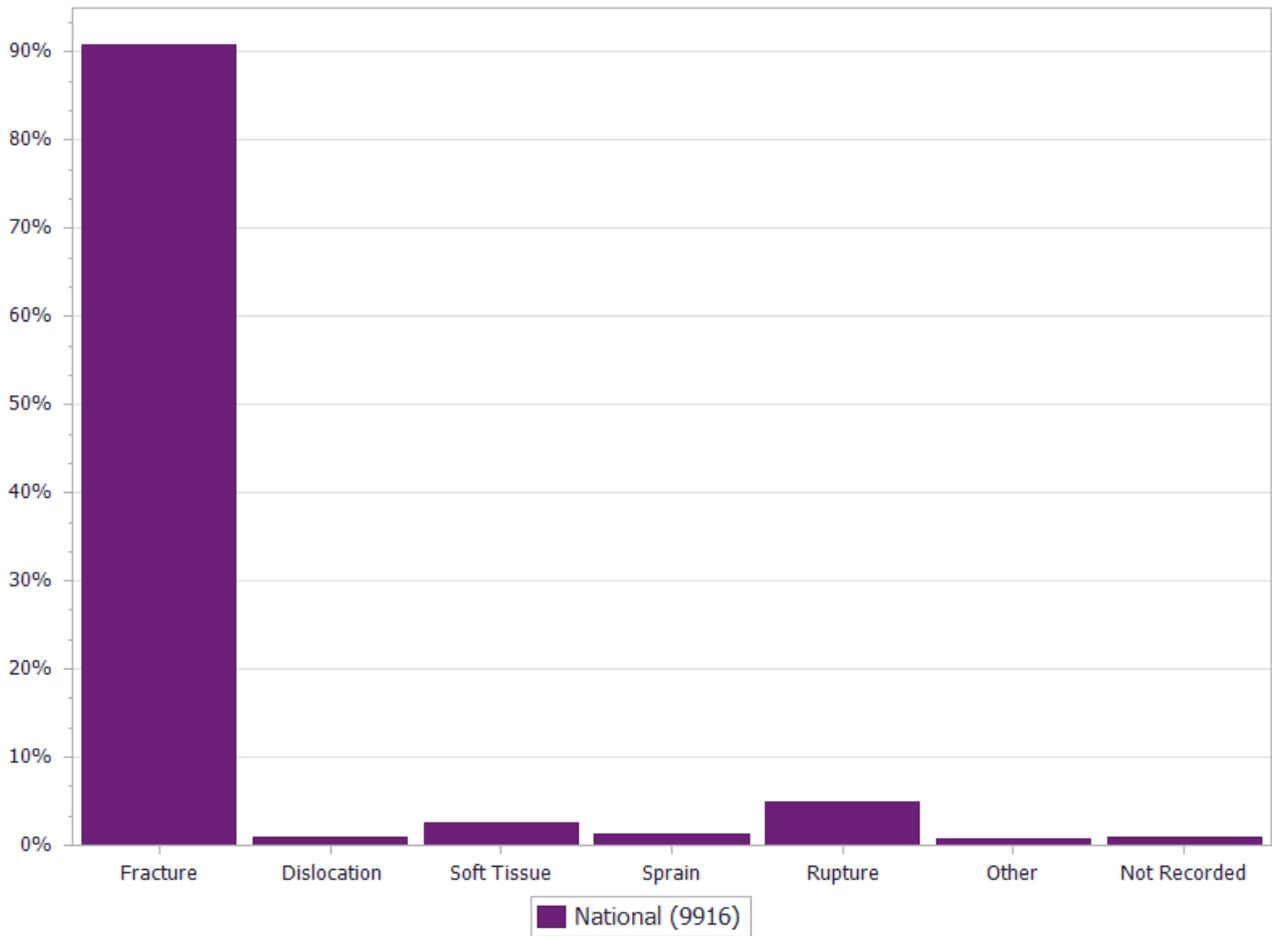


Sample: all patients

This is unlikely to be representative of all fractures presenting to ED. Older patients are more likely to have displaced/unstable fractures that may need internal fixation or be unsuitable for discharge and are therefore admitted to hospital.



Q3 Diagnosis



Sample: all patients

This confirms that the overwhelming indication for plaster cast (or backslab) immobilisation of a lower limb is fracture.

It should be noted that fractures may occur in combination with other injuries which may affect the clinical decision to immobilise.

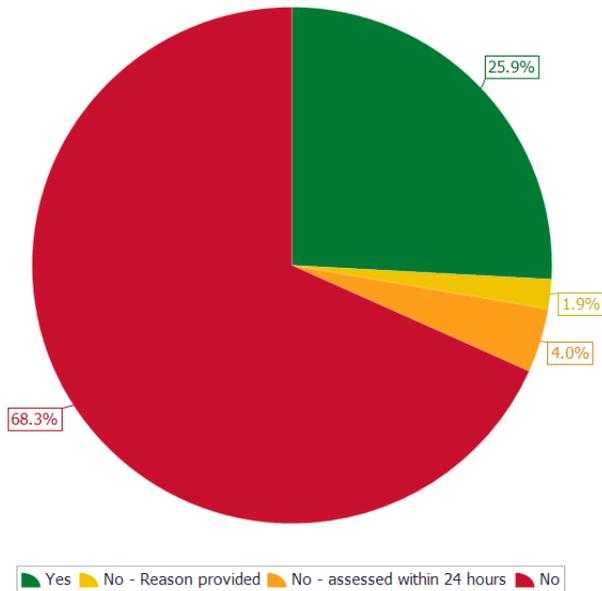


SECTION 2: Audit results

Assessment

This section gives details on the VTE risk assessment carried out.

Q4 Was a VTE risk assessment carried out in the ED prior to discharge?

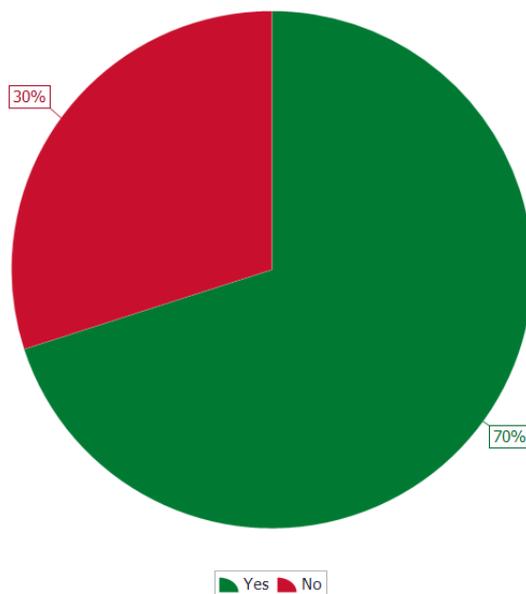


Sample: all patients

This shows that only a quarter of patients have a formal VTE assessment recorded in the ED.

A further 4 % were assessed at a review within 24 hours of ED attendance.

Q5 Was there any indication in the notes to show the patient's risk level of VTE?



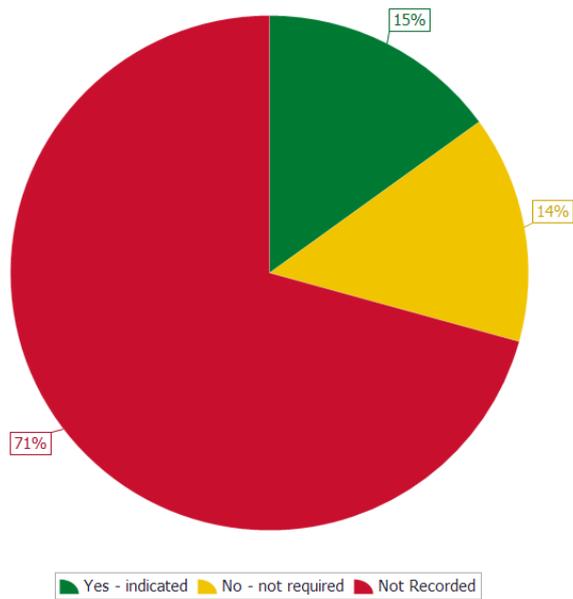
Sample: Q4=yes (n=2596)

In those patients where risk assessment was carried out in the ED prior to discharge, 70% of notes indicated their level of risk of VTE.

Although risk assessment was only carried out in a quarter of patients, the level of risk of VTE was noted in the majority of these cases.



Q6 Are there any notes on whether or not thromboprophylaxis is indicated?



Sample: all patients

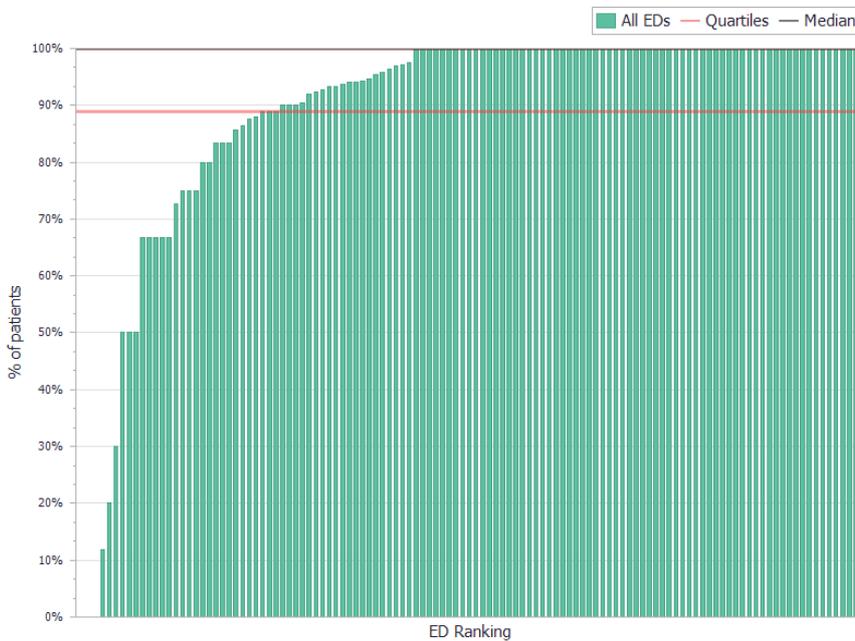
Thromboprophylaxis indication was not documented in 71% of cases. This is an area RCEM encourages improvements to be made. Where documented, thromboprophylaxis was definitively indicated for half of these patients.



Treatment

This section gives details of the thromboprophylaxis treatment.

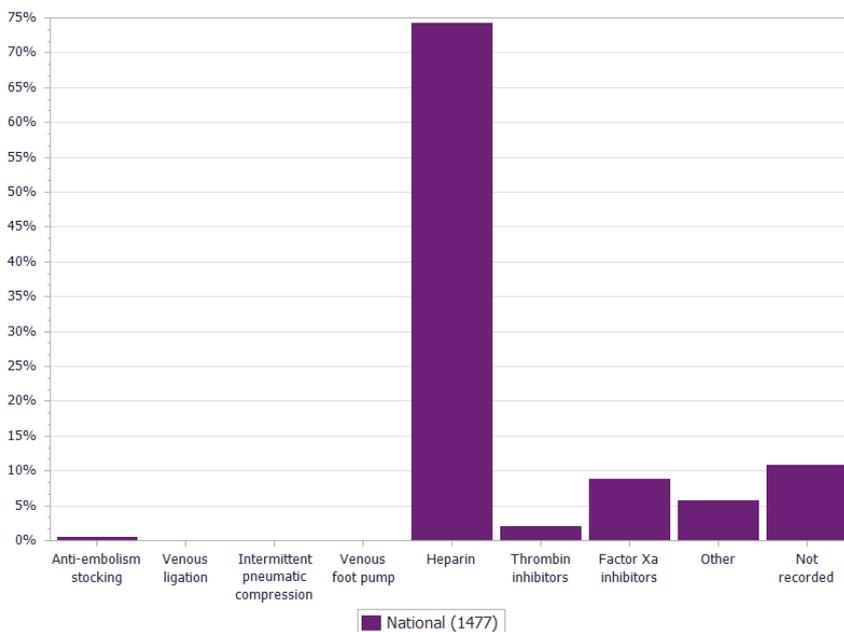
Q7 Is there written evidence of the patient receiving or being referred for thromboprophylaxis?



 **STANDARD 1:** If a need for thromboprophylaxis is indicated, there should be written evidence of the patient receiving or being referred for treatment.

Sample: Q6=yes - indicated (n=1477)

Q7 Is there written evidence of the patient receiving or being referred for the following type(s) of thromboprophylaxis?



Sample: Q6=Yes – indicated (n=1477)

Heparin is by far the most commonly used treatment.

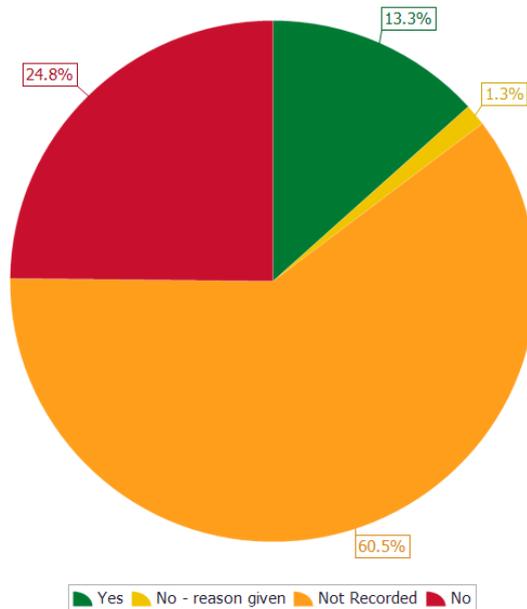
In 10% of patients, the type of thromboprophylaxis is not recorded. This may not necessarily indicate poor practice as there may be an alternative arrangement in place, e.g. patient is seen in a fracture clinic the following day, where VTE prophylaxis is conducted.



Patient information

This section gives details of the information given to the patient.

Q8 Was an information leaflet on the risk of VTE, symptoms and where to seek medical help provided to the patient?



STANDARD 2: Evidence that a patient information leaflet outlining the risk and need to seek medical attention if they develop symptoms for VTE has been given to all patients with temporary lower limb immobilisation.

Sample: all patients

There is a clear benefit to providing written information to patients as we know that verbal communication in the ED may not be retained for a variety of reasons.



Analysis

The headline figures in this audit show a clear need for improvement in the care of patients with lower limb immobilisation who may be at risk of developing VTE. The NICE guidance¹ states:

"Consider offering pharmacological VTE prophylaxis to patients with lower limb plaster casts after evaluating the risks (see section 1.1) and benefits based on clinical discussion with the patient. Offer LMWH (or UFH for patients with renal failure) until lower limb plaster cast removal" (paragraph 1.6.3).

It may be that some hospitals have developed alternative ways of handling this clinical challenge, e.g. a patient is seen at a fracture clinic the following day, where VTE prophylaxis is conducted. However, evidence of this practice should be documented.

The audit results show that most patients are not being risk assessed for VTE. However, when patients have been risk assessed, the need for prophylaxis is being recorded in most cases. Strong multidisciplinary working in the ED team is important for timely and effective monitoring of VTE risk analysis, prophylaxis and advice.

Patient records indicate that information leaflets on the risk of VTE, symptoms and where to seek medical help were only provided in 13% of all cases. However, in 60% of these cases, there was no record of whether a leaflet was given to the patient, therefore actual practice in this area remains unclear.

VTE prophylaxis should not rely on individual clinicians remembering to perform this. There must be a safe system that ensures that these patients are reliably identified and treated appropriately. This is particularly true in the environment of an ED. One of the potential benefits of an Electronic Patient Record system is the ability to offer decision support in care associated with lower limb immobilisation.

Limitations

This audit was limited in scope to only look at care provided in EDs and not at the wider services and systems that are in place for this patient population. RCEM recognises that some Trusts have developed well-functioning local systems linking the ED with other services, e.g. fracture clinics providing VTE risk assessment and prophylaxis.

For the purposes of this audit, the following patient populations were excluded:

- Any patient under the age of 17 years
- Patients who are admitted to a ward as an inpatient (excluding observation and short stay wards under the jurisdiction of the ED)
- Patients on warfarin, related Direct Oral Anticoagulants (DOACs) or heparin
- Patients with lower limbs immobilised by other means e.g. air cast boot, cricket splint etc



Summary of recommendations

1. ED clinicians should ensure that VTE risk assessment is conducted and clearly documented.
2. EDs should ensure that where risk assessment and prophylaxis is provided outside of the ED there is a safe system that documents this. EDs may wish to consider developing or modifying a plaster cast prescription form to include VTE prophylaxis.
3. Where thromboprophylaxis is indicated, ED clinicians should keep written evidence of patients receiving or being referred for treatment.
4. RCEM will develop a template patient information leaflet for ED clinicians to use or modify.
5. ED clinicians should document evidence of providing all patients with lower limb immobilisation information leaflets, outlining the risk and the need to seek medical attention if they develop symptoms of VTE.

Using the results of this audit to improve patient care

The results of this audit should be shared with all staff, including doctors and nurses, who have responsibility for looking after patients with temporary immobilisation of the lower limb and performing VTE risk assessment and thromboprophylaxis.

Discussing the results of this audit with colleagues is a good way of demonstrating the ED's commitment to improving care. Engaging staff in the action planning process will lead to more effective implementation of the plan.

EDs may wish to consider using a rapid cycle audit methodology, which can be used to track performance against standards, as a tool to implement the action plan. For further resources, please visit the [RCEM Quality Improvement webpage](#).



Further Information

Thank you for taking part in this audit. We hope that you find the results helpful.

If you have any queries about the report please e-mail audit@rcem.ac.uk or phone 020 7400 6108.

Feedback is welcome at:

www.surveymonkey.co.uk/r/RCEMAudit15

Details of the RCEM Clinical Audit Programme can be found under the [Current Audits section of the RCEM website](#).

Useful Resources

- Site-specific report – available to download to the [clinical audit website](#)
- Site-specific PowerPoint presentation – developed to help you disseminate your site-specific audit results easily and efficiently
- Data file – a spreadsheet that allows you to conduct additional local analysis using your site-specific data for this audit. This year you can also access data from other EDs to customise your peer analysis.
- Risk assessment for Venous Thromboembolism (VTE), 2010, VTE Prevention England
- Methods of Thromboprophylaxis, Department of Health E-learning for Healthcare, 2010
http://reception.e-lfh.org.uk/vte/content/VTE_02_01/d/ELFH_Session/417/overview.html

Report authors and contributors

This report is produced by the Standards and Audit Committee subgroup of the Quality in Emergency Care Committee, for the Royal College of Emergency Medicine.

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Pilot sites

We are grateful to contacts from the following trusts for helping with the development of the audit:

Airedale General Hospital
Forth Valley Royal Hospital
Huddersfield Royal Infirmary
Manchester Royal Infirmary
Northampton General Hospital
Queen Alexandra Hospital, Portsmouth
Queen Elizabeth Hospital (The), King's Lynn
Royal Berkshire Hospital
Royal Blackburn Hospital
Royal Gwent Hospital
Royal United Hospital, Bath
Stoke Mandeville Hospital
University Hospital of North Tees
Worthing Hospital



Reference

¹ NICE. Venous thromboembolism: reducing the risk. NICE clinical guideline 92. London; 2010.

www.nice.org.uk/guidance/cg92



Appendix 1: Audit questions

Casemix

Q1	Date of arrival (dd/mm/yyyy)	dd/mm/yyyy	
Q2	Age of patient on attendance	17-40	
		41-59	
		60 and over	

Diagnosis

Q3	What was the documented diagnosis for the lower limb injury? (tick all that apply)	Fracture	
		Dislocation	
		Soft tissue injury	
		Sprain	
		Rupture	
		Other	
		Not recorded	

Assessment

Q4	Was a VTE risk assessment carried out in the ED prior to discharge?	Yes	
		No	
		No - reason provided	
		No – assessed at review within 24 hrs of ED attendance	
Q5	(Only answer if YES to Q4) was there any indication in the notes to show the patient's risk level of VTE?	Yes	
		No	
Q6	Are there any notes on whether or not thromboprophylaxis is indicated?	Yes – indicated	
		No – not required	
		Not recorded	



Treatment

Q7	Is there written evidence of the patient receiving or being referred for the following type(s) of thromboprophylaxis? <i>(tick all that apply)</i>	Anti-embolism stocking	
		Venous ligation	
		Intermittent pneumatic compression	
		Venous foot pump	
		Heparin	
		Thrombin inhibitors	
		Factor Xa inhibitors	
		Other – please state	
	Not recorded		
Q7a	(If OTHER to Q7) Please state		

Patient information

Q8	Was an information leaflet on the risk of VTE, symptoms and where to seek medical help provided to the patient?	Yes	
		No - reason given	
		No	
		Not recorded	



Appendix 2: Participating Emergency Departments

Aberdeen Royal Infirmary
Addenbrooke's Hospital
Airedale General Hospital
Alexandra Hospital
Antrim Area Hospital
Arrowe Park Hospital
Barnet Hospital
Barnsley Hospital
Basildon University Hospital
Basingstoke North Hampshire Hospital
Bedford Hospital
Blackpool Victoria Hospital
Bradford Royal Infirmary
Bristol Royal Infirmary
Bronglais General Hospital
Broomfield Hospital
Calderdale Royal Hospital
Causeway Hospital
Chelsea and Westminster Hospital
Cheltenham General Hospital
Chesterfield Royal Hospital
Chorley and South Ribble Hospital
City Hospital
Colchester General Hospital
Conquest Hospital
Countess of Chester Hospital
County Hospital
Croydon University Hospital
Darent Valley Hospital
Darlington Memorial Hospital
Derriford Hospital
Diana, Princess of Wales Hospital
Dorset County Hospital
Dr Gray's Hospital
Ealing Hospital
East Surrey Hospital
Eastbourne District General Hospital
Epsom General Hospital
Fairfield General Hospital
Forth Valley Royal Hospital
Friarage Hospital
Frimley Park Hospital
George Eliot Hospital
Glan Clwyd Hospital
Glangwili General Hospital
Gloucestershire Royal Hospital
Good Hope Hospital
Grantham and District Hospital
Great Western Hospital (The)
Harrogate District Hospital
Heartlands Hospital
Hereford County Hospital
Hillingdon Hospital
Hinchingsbrooke Hospital
Homerton University Hospital
Horton Hospital
Huddersfield Royal Infirmary
Hull Royal Infirmary
James Cook University Hospital (The)
James Paget Hospital
John Radcliffe Hospital
Kettering General Hospital
King's College Hospital
Kings Mill Hospital
Kingston Hospital
Leeds General Infirmary
Leicester Royal Infirmary
Leighton Hospital
Lincoln County Hospital
Luton & Dunstable University Hospital
Maidstone District General Hospital
Manchester Royal Infirmary
Medway Maritime Hospital
Milton Keynes Hospital
Monklands Hospital
Morrison Hospital
Nevill Hall Hospital
Noble's Hospital
Norfolk and Norwich University Hospital
North Devon District Hospital
North Manchester General Hospital
Northampton General Hospital
Northumbria Specialist Emergency Care Hospital
Northwick Park Hospital
Peterborough City Hospital
Pilgrim Hospital
Pinderfields Hospital
Poole General Hospital
Princess Alexandra Hospital
Princess Royal University Hospital
Queen Alexandra Hospital
Queen Elizabeth Hospital (The), King's Lynn
Queen Elizabeth Hospital, Birmingham
Queen Elizabeth The Queen Mother Hospital
Queen's Hospital, Burton-on-Trent
Queen's Hospital, Romford
Queen's Medical Centre
Royal Albert Edward Infirmary



Royal Berkshire Hospital
Royal Bolton Hospital
Royal Bournemouth Hospital
Royal Cornwall Hospital
Royal Derby Hospital
Royal Devon and Exeter Hospital (Wonford)
Royal Free Hospital
Royal Gwent Hospital
Royal Hampshire County Hospital
Royal Lancaster Infirmary
Royal Liverpool University Hospital (The)
Royal London Hospital (The)
Royal Oldham Hospital
Royal Preston Hospital
Royal Stoke University Hospital
Royal Surrey County Hospital
Royal Sussex County Hospital
Royal Victoria Hospital
Royal Victoria Infirmary
Russells Hall Hospital
Salford Royal Hospital
Salisbury District Hospital
Sandwell General Hospital
Scarborough General Hospital
Scunthorpe General Hospital
Solihull Hospital
South Tyneside District General Hospital
Southampton General Hospital
Southend Hospital
Southmead Hospital
Southport and Formby District General Hospital
St George's Hospital
St Helier Hospital
St James's University Hospital
St Mary's Hospital, Newport
St Mary's Hospital, Paddington
St Peter's Hospital
St Richard's Hospital
St Thomas' Hospital
Stepping Hill Hospital
Stoke Mandeville Hospital
Tameside General Hospital
Torbay District General Hospital
Tunbridge Wells Hospital
Ulster Hospital
University College Hospital
University Hospital (Coventry)

University Hospital of North Durham
University Hospital of North Tees
University Hospital of Wales
Warrington Hospital
Warwick Hospital
Watford General Hospital
West Middlesex University Hospital
West Suffolk Hospital
Weston General Hospital
Wexham Park Hospital
Whiston Hospital
Whittington Hospital (The)
William Harvey Hospital
Withybush Hospital
Worcestershire Royal Hospital
Worthing Hospital
Wrexham Maelor Hospital
Yeovil District Hospital
York Hospital
Ysbyty Gwynedd

EDs reporting ineligibility due to not having a system in place or having <10 cases of eligible patients

Cumberland Infirmary (The)
Hairmyres Hospital
Lister Hospital
Manor Hospital
Musgrove Park Hospital
New Cross Hospital
Newham General Hospital
North Middlesex Hospital
Northern General Hospital
Queen Elizabeth Hospital, Woolwich
Rotherham District General Hospital
Royal United Hospital
West Cumberland Hospital
Whipps Cross University Hospital
Wishaw General Hospital



Appendix 3: Standards definitions

Standard 1

- The thromboprophylaxis treatment can occur at any time – it does not have to be administered before patient leaves ED.



Appendix 4: Calculations

This section is intended to explain how each standard is calculated, allowing you to repeat the audit locally.

Standard	Patient sample	Calculations
1	Q6 = Yes – indicated	Q7 = one or more of: Anti-embolism stocking Venous ligation Intermittent pneumatic compression Venous foot pump Heparin Thrombin inhibitors Factor Xa inhibitors Other – please state
2	All patients	Q8 = yes