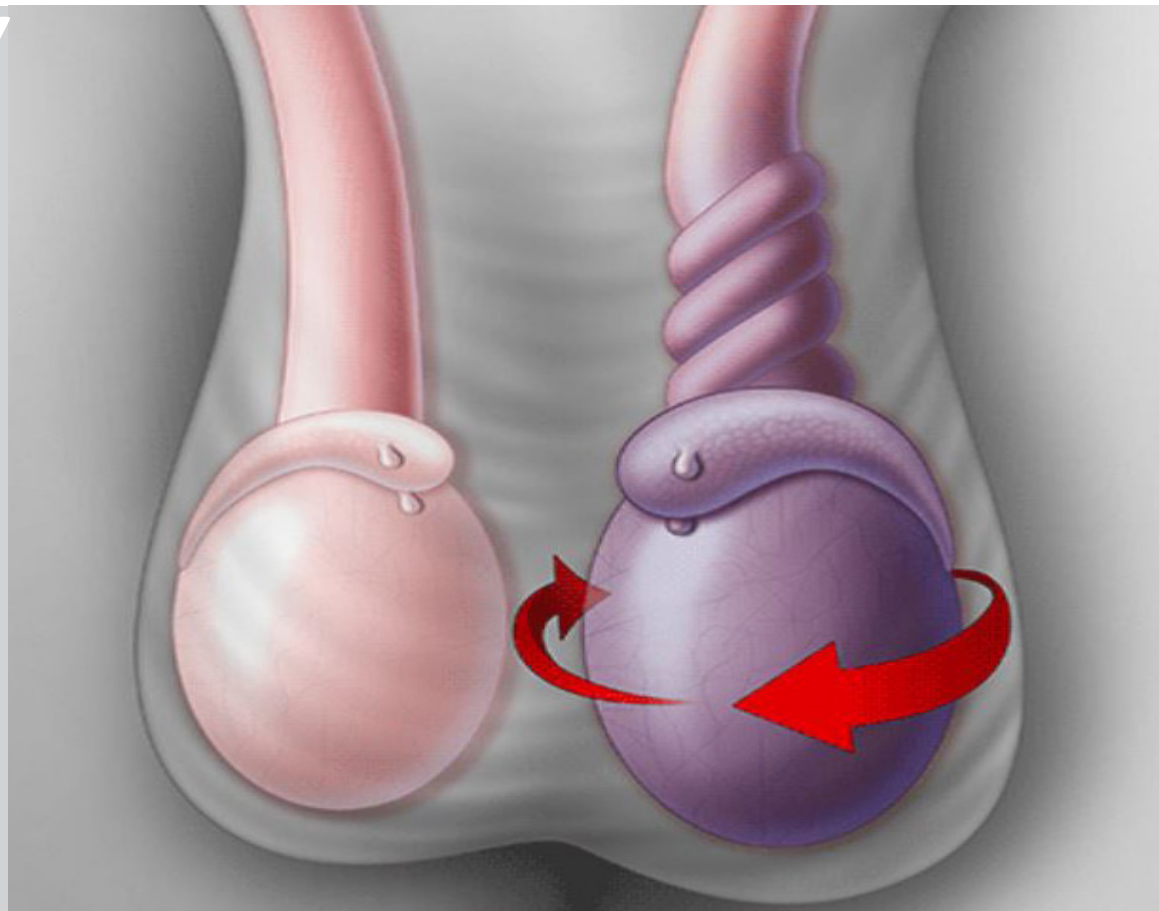


# Twist and Shout

A review of the pathway and quality of care provided to children and young people aged 2-24 years who presented to hospital with testicular torsion

## SUMMARY



# TWIST AND SHOUT

*A review of the pathway and quality of care provided to children and young people aged 2-24 years who presented to hospital with testicular torsion*

A report published by the National Confidential Enquiry into Patient Outcome and Death (2024)

The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) is an independent body to which a corporate commitment has been made by the medical and surgical royal colleges, associations and faculties related to its area of activity.

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*Cohort: 1st April 2021 to 31st March 2022*

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# EXECUTIVE SUMMARY

Testicular torsion occurs when the spermatic cord twists and cuts off the blood supply to the testicle. Testicular torsion is a surgical emergency requiring prompt diagnosis and surgical intervention to preserve the testicle. Delay in recognising testicular torsion and delay in presenting to hospital is known to lead to poorer outcomes.

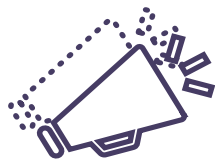
There needs to be greater public awareness about testicular torsion. Hospitals need to be equipped to deal with testicular torsion as an emergency operation, with senior clinicians able to decide whether surgery is needed and to be able to perform the surgery/anaesthetise the patient. If these services are not available, then there should be robust transfer arrangements in place to get the patient to theatre. Patients will need good information at discharge, and the option to return for further follow-up should they need psychological support or wish to discuss the use of a prosthesis.

## IN THIS STUDY

The pathway and quality of care provided to patients aged 2-24 years who presented to hospital with testicular torsion was reviewed. The sampling period of 1st April 2021 to 31st March 2022 was used and data were included from 574 clinician questionnaires, 143 organisational questionnaires and the assessment of 635 sets of case notes.

### 1. INCREASE PUBLIC AWARENESS

Increased awareness and education may reduce embarrassment and get people talking.

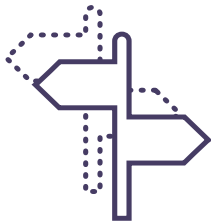


Testicular torsion was not recognised by 157/239 (65.7%) patients or 83/239 (34.7%) parents/carers.

Only 294/403 (73.0%) patients had contacted a healthcare professional within six hours of developing symptoms.

### 2. ENSURE PATHWAYS MINIMISE THE NEED FOR TRANSFERS

Directing patients to hospitals where surgery for testicular torsion can be undertaken will minimise the need for transfer and reduce the risk of delay to theatre.



60/475 (12.6%) patients were referred by a GP, 34/475 (7.2%) from an urgent treatment centre and 25/475 (5.3%) NHS 111.

91/143 (63.6%) hospitals reported that patients were transferred out of the hospital for treatment on occasions.

Patients not on a pathway were more likely to have their testicle removed (154/389; 39.6%) compared with those who were (16/67; 23.9%).

### 3. URGENT SENIOR REVIEW, DECISION-MAKING AND OPERATION

Urgent review by senior decision-makers and access to senior specialists in urology, paediatric surgery, or general surgery for urgent surgery is essential for prompt treatment.



136/435 (31.3%) patients had their first assessment on arrival at hospital performed by a junior specialist trainee.

113/422 (26.8%) patients had not had their first ST3+ surgical review within two hours of arrival and 40/422 (9.5%) patients waited more than four hours.

There was a delay in making a diagnosis in 116/635 (18.3%) patients which impacted their care in 69/116 (59.5%) cases.

### 4. EXTENDED FOLLOW-UP

Patient-initiated follow-up after surgery may encourage patients to seek psychological support and/or the use of prosthetic implants.



Information on prosthetic replacements could only be found in the case notes of 139/534 (26.0%) patients who had a testicle removed, with an explanation recorded for 83/139 (59.7%) patients.

Adequate written information given to the patient and family at discharge could only be found in the case notes of 123/233 (52.8%) patients.

## RECOMMENDATIONS

These recommendations have been formed by a consensus exercise involving all those listed in the acknowledgements. The recommendations have been independently edited by medical editors experienced in developing recommendations for healthcare audiences to act on.

The recommendations highlight areas that are suitable for regular local clinical audit and quality improvement initiatives by those providing care to this group of patients. The results of such work should be presented at quality or governance meetings and action plans to improve care should be shared with executive boards. Quality improvement tools highlighted in this report will support this.

The recommendations in this report support those made previously by other organisations, and for added value should be read alongside the following:

[GIRFT 2021. Paediatric general surgery and urology](#)

[NICE 2023. Clinical knowledge summary: scrotal pain and swelling](#)

[HSIB 2019. Management of acute onset testicular pain](#)

Executive boards are ultimately responsible for supporting the implementation of these recommendations. Suggested target audiences to action recommendations are listed in italics under each recommendation.

### PUBLIC AWARENESS AND EDUCATION

- |   |   |
|---|---|
| 1 | <p>Raise awareness about testicular torsion, including the need to urgently attend an emergency department if someone experiences testicular pain. This should include a continued public awareness campaign for all who may be affected, including parents/carers, and raised at all stages of development:</p> <ol style="list-style-type: none"> <li>a. Maternity/antenatal care (e.g. advice for care of a new baby in the red book) and post-natal care.</li> <li>b. Nursery education.</li> <li>c. The health education curriculum in primary and secondary education.</li> <li>d. Further/higher education.</li> </ol> |
|---|---|

SEE SECTION ON [USEFUL LINKS](#)

**Primary audiences - national:** *NHS England, Office for Health Inequalities and Disparities, Welsh Government, Public Health Wales, Department of Health Northern Ireland, Public Health Agency, Departments of Education.*

**Primary audiences - local:** *Midwives, health visitors, special educational needs staff, school nurses.*

**Supported by:** *Royal College of Midwives, Royal College of Paediatrics and Child Health, British Association of Paediatric Urologists, British Association of Paediatric Surgeons, Association of Paediatric Anaesthetists of GB and Ireland, British Association of Urological Surgeons, Royal College of Surgeons, Association of Surgeons of GB and Ireland, Getting It Right First Time, Commissioners, Integrated Care Boards.*

## RECOGNITION OF TESTICULAR TORSION IN PRIMARY CARE AND THE EMERGENCY DEPARTMENT

- 2 Update training modules for primary care, and emergency department staff, to emphasise the importance of early recognition of testicular torsion, including atypical or warning presentations, urgent referral pathways and timely surgery.

**Primary audiences:** NHS 111, Ambulance Trusts, Royal College of General Practitioners, Royal College of Emergency Medicine.

**Supported by:** British Association of Paediatric Urologists, British Association of Paediatric Surgeons, Association of Paediatric Anaesthetists of GB and Ireland, British Association of Urological Surgeons, Royal College of Surgeons, Association of Surgeons of GB and Ireland, Royal College of Paediatrics and Child Health, NHS England, Welsh Government, Department of Health Northern Ireland.

## PATHWAY UP TO AND INCLUDING ARRIVAL AT HOSPITAL

- 3 Reduce delays for patients with testicular pain/suspected testicular torsion by:
- a. Minimising transfers to another hospital by referring patients to a hospital where scrotal exploration can be performed safely on-site – ideally including a pre-alert to the receiving hospital.
  - b. Ensuring that any essential transfer is as urgent as possible\*, including when patients self-present but need to be at another hospital.
  - c. Having a clear, documented clinical pathway of care for patients with testicular pain/suspected testicular torsion in hospitals where surgery for testicular torsion is undertaken, which is communicated to all healthcare professionals involved in the care of this group of patients.
  - d. Auditing the testicular torsion pathway, at least annually, to identify areas for improvement.

\*This is in line with the [GIRFT report on paediatric surgery and urology](#).

**Primary audiences - national:** Royal College of General Practitioners, NHS 111, Ambulance Trusts

**Primary audiences - local:** Medical Directors, Directors of Nursing, Integrated Care Boards, Operational Delivery Networks Commissioners

**Supported by:** British Association of Paediatric Urologists, British Association of Paediatric Surgeons, Association of Paediatric Anaesthetists of GB and Ireland, British Association of Urological Surgeons, Royal College of Surgeons, Association of Surgeons of GB and Ireland, Royal College of Paediatrics and Child Health, Royal College of Emergency Medicine, Royal College of Anaesthetists, Association of Anaesthetists, Royal College of Radiologists, NHS England, Welsh Government, Department of Health Northern Ireland.

## PATHWAY IN HOSPITAL

- 4 Patients with suspected testicular torsion should have an urgent\* referral and clinical review by a senior surgical decision-maker (minimum ST3 or equivalent) specialising in urology, paediatric surgery, or general surgery.

\*[NCEPOD Classification of Intervention](#)

**Primary audiences - national (to agree a timeframe):** NHS England, Welsh Government, Department of Health Northern Ireland, British Association of Paediatric Urologists, British Association of Paediatric Surgeons, Association of Paediatric Anaesthetists of GB and Ireland, British Association of Urological Surgeons, Royal College of Surgeons, Association of Surgeons of GB and Ireland, Royal College of Emergency Medicine.

**Primary audiences - local:** Emergency Medicine Physicians, Paediatric Surgeons, Urologists, General Surgeons, Anaesthetists, Radiologists

**Supported by:** Medical Directors, Directors of Nursing

5	<p>A consensus is needed on the role of Doppler ultrasound in the care pathway for suspected testicular torsion to aid surgical decision-making whilst not adding delay to surgery.</p> <p><b>Primary audiences:</b> British Association of Urological Surgeons, British Association of Paediatric Urologists, British Association of Paediatric Surgeons, Association of Paediatric Anaesthetists of GB and Ireland, Royal College of Paediatrics and Child Health, Royal College of Radiologists, Royal College of Surgeons, Association of Surgeons, National Institute for Health and Care Excellence</p> <p><b>Supported by:</b> NHS England, Welsh Government, Department of Health Northern Ireland, medical directors, National Institute for Health and Care Research Health Technology Assessment</p>
6	<p>Perform surgery for testicular torsion as an immediate or urgent procedure (NCEPOD 1 or 2)*, once the decision to operate has been made.</p> <p><i>*NCEPOD Classification of Intervention</i> This also supports the <a href="#">GIRFT report on paediatric surgery and urology</a></p> <p><b>Primary audiences:</b> Consultant Surgeons, Consultant Anaesthetists</p> <p><b>Supported by:</b> Clinical Directors and Medical Directors</p>
<b>DISCHARGE AND FOLLOW-UP</b>	
7	<p>Discharge information for patients, and parent/carers should include:</p> <ol style="list-style-type: none"> <li>a. Any follow-up arrangements.</li> <li>b. Delayed side effects that might occur following orchidectomy, or the risk of late testicular atrophy in patients who had an operation that led to no orchidectomy, but fixation (orchidopexy), including risks to fertility.</li> <li>c. Details of patient-initiated follow-up (PIFU) follow-up e.g. to discuss prosthetic implants for patients who underwent an orchidectomy.</li> <li>d. How to access psychological support.</li> </ol> <p><b>Primary audiences:</b> The medical team or specialist nurses caring for patients following surgery for testicular torsion.</p> <p><b>Supported by:</b> Clinical Directors and Medical Directors.</p>
8	<p>Review the care of all patients who underwent an orchidectomy in a multidisciplinary morbidity and mortality meeting. This should include primary care and, ideally a regional approach to shared-learning and quality improvement.</p> <p><b>Primary audiences:</b> The medical team or specialist nurses caring for patients following surgery for testicular torsion.</p> <p><b>Supported by:</b> Clinical Directors and Medical Directors.</p>

## INTRODUCTION

Testicular torsion occurs when the spermatic cord twists and cuts off the blood supply to the testicle. Testicular torsion is a surgical emergency requiring prompt diagnosis and surgical intervention to preserve the testicle. Delay in presenting to hospital has been consistently shown to lead to poor outcomes.<sup>[1]</sup>

After admission to hospital for suspected testicular torsion, operative delay also adversely affects the chance of salvaging the testicle. In a systematic review of 1,283 patients, when surgical intervention occurred within a six-hour window from the onset of testicular pain, there was a 97% chance of the patient's testicle being saved. While the study concluded that survival percentages are significant, beyond the widely accepted time-period of six-eight hours, the salvage rates decreased, the longer that surgical intervention was delayed.<sup>[2]</sup>

The operation involves two possible procedures: either testicular fixation, when the testicle can be saved and fixed to prevent recurrent torsion (this is called orchidopexy), or removal of the testicle (orchidectomy), where it is not salvageable. In either case it is also standard practice to fix the other testicle at the same time.

A range of specialties and health services are involved in the care of patients with testicular torsion, including NHS 111, ambulance, primary care, and secondary care, and with the potential for delay in diagnosis and treatment to occur at any point of the pathway, these are the main factors that lead to poorer outcomes.

Initial delays on the part of adolescent males to seek medical assistance may be due to a 'watch and wait' approach by them and their parents/carers; a lack of public awareness about the pathology of testicular torsion, and an unwillingness to trouble healthcare services for fear of embarrassment or raising a false alarm.<sup>[3]</sup>

In 2019 the Healthcare Safety Investigation Branch (HSIB) report reviewed the diagnostic and treatment pathway and identified 'system-wide' delays.<sup>[4]</sup> The report found that the accuracy, accessibility, and variability of national guidance on the diagnosis and treatment of testicular torsion was leading to delays in treatment.

When patients with suspected testicular torsion present to hospital there are many factors that can contribute to delay in diagnosis and treatment. Commissioning guidelines state that assessment and surgical intervention should be performed locally, and that the transfer of a patient with suspected testicular torsion to a tertiary centre should only occur in exceptional circumstances.<sup>[5]</sup> Despite this, the Getting It Right First Time (GIRFT) paediatric surgery and urology report found that in some specialist trusts one in four patients had been transferred from another organisation.<sup>[6]</sup>

This NCEPOD study was developed with wide multidisciplinary input to review the care of patients with testicular torsion. It identifies several areas of care that require improvement.



## WHAT PATIENTS AND PARENTS/CARERS SAID

Young people and parents/carers were asked about their experience of care following admission to hospital and an operation for testicular torsion. The age of children and young people at the time of their operation ranged between 3-24 years with a median age of 14 years.

### WHAT IS THE ONE THING YOU THINK COULD CHANGE TO IMPROVE CARE FOR FUTURE PATIENTS WHO HAVE TESTICULAR TORSION?

**Only 3/17 young people were taught about testicular torsion at school or college.**

**12/17 young people felt that their symptoms were an emergency...  
HOWEVER,  
four of them delayed telling anyone about their symptoms and two of them said they experienced a delay before going to hospital.**

**Better public information - it's a surgical emergency and not a lot of people know it's a thing!!**

**Education for boys at school about symptoms to be aware of, how important it is to seek urgent assessment in hospital and not to be embarrassed to tell someone**

**Education for emergency department triage staff**

**Giving patients information about possible outcomes**

**GPs to ask the question so preventative surgery could be done**

# CHAPTER 1: METHOD AND DATA RETURNS

## **Study Advisory Group**

A multidisciplinary group was convened to define the objectives of the study and advise on the key questions. The Study Advisory Group (SAG) comprised healthcare professionals in urology, paediatric surgery, general surgery, anaesthetics, emergency medicine, paediatrics, radiology, nursing, commissioning representation and lay representation. This group steered the study from design to completion.

## **Study aim**

To review the complete pathway and quality of care provided to children and young people aged 2 to 24 years who presented to hospital with testicular torsion

## **Objectives**

The SAG identified several objectives that would address the primary aim of the study:

- Patient and parent/carer knowledge of torsion prior to the clinical episode and the availability of information for patients and parents/carers
- Pre-hospital care
- The admission process, including assessment and decision-making
- The use of accurate diagnostic tools
- Protocols for the management of testicular torsion and scrotal pain suggestive of torsion
- Staffing availability, training, and use of networks of care
- The timeliness of surgery including emergency surgery access
- The appropriateness of transfer arrangements
- The consent process
- Surgical practice in respect of fixing testicles at the time of orchidectomy/exploration
- Post-operative complications and follow-up of the patient
- Audit of services

## **Study population and case ascertainment**

### **Inclusion criteria**

Patients aged 2 to 24 years, inclusive, admitted to hospital who had a diagnosis of testicular torsion (ICD10 code N44), and who underwent a non-elective operation for testicular torsion (OPCS codes N03.4; N05; N06; N08; N09; N13.2; N13.3 and N13.5) between 1st April 2021 and 31st March 2022. Patients admitted with scrotal pain (ICD10 codes N45 and N508) were also identified for context but were not sampled for inclusion in the clinical peer review process.

### **Exclusion criteria**

Patients who did not undergo a procedure for testicular torsion, and patients who were subsequently identified as being admitted on an elective basis.

## **Hospital participation**

Data were included from hospitals in England, Wales, and Northern Ireland.

## **Data collection – peer review**

### **Identification of a sample population**

A pre-set spreadsheet was provided to every local reporter to identify all patients meeting the study criteria during the defined time period. From this initial cohort, up to eight patients per hospital were sampled for inclusion in the study.

### **Questionnaires**

Two questionnaires were used to collect data for this study:

#### ***Clinician questionnaire***

This questionnaire was sent electronically to the surgeon responsible for the care of the patient at the time of their procedure.

#### ***Organisational questionnaire***

This questionnaire was sent electronically to the local reporter to pass on to the relevant people who could provide information on protocols, resources, network arrangements, training, information for patients and parents/carers, follow-up arrangements, and audit.

### **Case notes**

Copies of the case notes relating to the index admission were requested for peer review, including:

- NHS 111 pathways notes
- All primary care notes that could relate to the testicular torsion, including GP consultations
- Out of hours or emergency department attendances
- Ambulance patient report form
- Medical and nursing notes from the emergency department clerking to discharge
- Imaging reports
- Operation notes
- Anaesthetic charts
- Consent forms
- Discharge summaries and follow-up letters

### **Peer review of the case notes and questionnaire data**

A multidisciplinary group of case reviewers comprising consultants, trainees, advanced clinical practitioners, and clinical nurse specialists from: urology, general surgery, paediatric surgery, emergency medicine, paediatrics, anaesthetics, radiology, and general practice were recruited to peer review the case notes and associated clinician questionnaires.

All patient identifiers were removed by the non-clinical staff at NCEPOD before the case notes or questionnaires were presented to the group. Using a semi-structured electronic questionnaire, each set of case notes was reviewed by at least one reviewer within a multidisciplinary meeting. At regular intervals discussion took place, allowing each reviewer to summarise their cases and ask for opinions from other specialties or raise aspects of the case for further discussion.

### **Data collection – patient and parent/carer survey**

An open-access anonymous online survey was developed to collect the views of patients and parents/carers of patients who had undergone surgery for testicular torsion on the care they had received. The data were not linked to any other aspect of clinical data collection.

## **Data collection – clinician survey**

An open-access anonymous online survey was developed to collect the views of clinicians who provide care for this group of patients on the services they can provide. The data were not linked to any other aspect of clinical data collection.

## **Information governance**

All data received and handled by NCEPOD complied with all relevant national requirements, including the General Data Protection Regulation 2016 (Z5442652), Section 251 of the NHS Act 2006 (21/CAG/0085, App No 1019), and the Code of Practice on Confidential Information. Each young person was given a unique NCEPOD number. All electronic questionnaires were submitted through a dedicated online application.

## **Data analysis**

Following cleaning of the quantitative data, descriptive data summaries were produced. Qualitative data collected from the case reviewers' opinions and free text answers in the clinician questionnaires were coded, where applicable, according to content to allow quantitative analysis. As the methodology provides a snapshot of care over a set point in time, with data collected from several sources to build a national picture, denominators will change depending on the data source, but each source is referenced throughout the document. This deep dive uses a qualitative method of peer review, and anonymised case studies have been used throughout this report to illustrate themes. The sampling method of this enquiry, unlike an audit, means that data cannot be displayed at a hospital/trust/health board/regional level.

## **Data analysis rules**

- Small numbers have been suppressed if they risk identifying an individual
- Any percentage under 1% has been presented in the report as <1%
- Percentages were not calculated if the denominator was less than 100 so as not to inflate the findings
- There is variation in the denominator for different data sources and for each individual question as it is based on the number of answers given

The findings of the report were reviewed prior to publication by the SAG, case reviewers and the NCEPOD Steering Group, which included clinical co-ordinators, trustees, and lay representatives.

## **Data returns**

### **Clinical data**

In total, 8,583 patients were initially identified between 1st April 2021 – 31st March 2022 as meeting the study criteria. This included patients who were admitted with testicular torsion; orchitis and epididymitis, and 'other' specified disorders of male genital organs, according to the coding. Figure 1.1 summarises the data included. Of the 1,091 patients initially sampled for inclusion, 264 were subsequently excluded. The main reasons for exclusion were that the patient was found not to have torsion during their procedure (n=219), or the operation was undertaken on an elective basis (n=40). A sample of hydatid of Morgagni cases was assessed separately and is presented in Appendix 1.

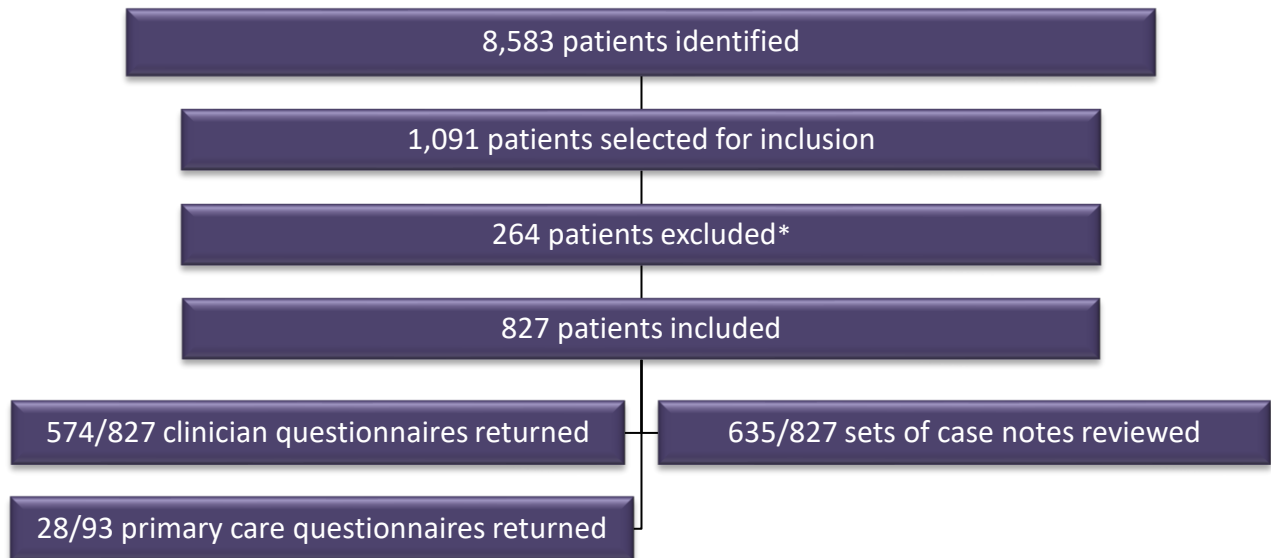


Figure 1.1 Population sampled

*\*Patients did not meet the study inclusion criteria*

### **Organisational data**

Organisational questionnaires were returned from 143/207 (69.1%) hospitals.

### **Survey data**

The patient and parent/carer survey was completed by 17 respondents.

The clinician survey was completed by 580 respondents (surgery n=379 (including 318 urologists); emergency medicine n=78; anaesthetics n=64; paediatrics n=42; primary care n=6; other n=11).

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## USEFUL LINKS

	<p><a href="#"><u>Testicular Health Information</u></a></p>
	<p><a href="#"><u>Paediatric General Surgery and Urology</u></a></p>
<p><b>NICE</b> National Institute for Health and Care Excellence</p>	<p><a href="#"><u>Scrotal Pain and Swelling</u></a></p>
	<p><a href="#"><u>Testicular Torsion</u></a></p>
	<p><a href="#"><u>Testicle Pain</u></a></p>
	<p><a href="#"><u>Testicular Torsion</u></a></p>
	<p><a href="#"><u>Clinical Decision Tool</u></a></p>
	<p><a href="#"><u>Testicular Torsion Educational Information</u></a></p>

## ACKNOWLEDGEMENTS

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### **Our particular thanks go to:**

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Katie Bagstaff	Senior Sister, Recovery (Royal College of Nursing)
Lucy Beales	General Practitioner
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