

# Imaging and Antibiotic Use After First Urinary Tract Infection in Children

Subject:	Imaging and Antibiotic Use After First Urinary Tract Infection in Children
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Ratified By:	Clinical Guidelines Committee
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Policy Executive Owner:	Friedericke Eben, Divisonal Director WCF
Designation of Author:	Dr Katharine Jamieson (SpR), Dr Sarah Al-Jilaihawi (ST2), Dr Mervyn Jaswon (consultant)
Name of Assurance Committee:	Clinical Guidelines Committee
Date Issued:	May 2014
Review Date:	3 years hence
Target Audience:	Paediatric Department
Key Words:	Urinary Tract Infection, Imaging, Antibiotics

## Version Control Sheet

Version	Date	Author	Status	Comment
1.0	March 1998	Dr M.S.Jaswon	No longer in use	
2.0	April 2014	Dr Katharine Jamieson (SpR), Dr Sarah Al-Jilaihawi (ST2), Dr Mervyn Jaswon (consultant)	On line	<ul style="list-style-type: none"> <li>• Title altered to reflect inclusion of guidance on antibiotic use</li> <li>• Investigation protocol updated including distinction between in- and out-patient management</li> <li>• Addition of general advice and antibiotic prophylaxis guidance</li> <li>• Modification of contacts</li> </ul>

## ➤ Criteria for use

For boys and girls admitted with, or referred with, first urinary tract infection (UTI).

## ➤ Background/ introduction

- The **aim** of imaging after UTI in children is to:
  - identify factors predisposing to development of recurrent UTI and renal scarring
  - identify existing renal scars
- Urinary tract infection in children affects at least 3.6% of boys and 11% of girls. Establishing the diagnosis can pose challenges in early childhood owing to lack of specific urinary symptoms, difficulty in urine collection and contamination of samples.
- Most children with UTI have a single episode and recover promptly.
- Since the 2007 NICE guidelines for management of UTI in children were published, a more evidence-based and less aggressive approach to investigating after first UTI has been adopted, which seeks to avoid costly and invasive diagnostic procedures, long-term antibiotic prophylaxis and prolonged follow-up.
- The common factor in UTIs is urinary stasis. The underlying cause of this varies with individuals and different age groups.
- Factors predisposing to renal damage and scarring:
  - Vesicoureteric reflux (VUR)
  - Urinary tract obstruction, eg. pelvic-ureteric junction obstruction, posterior urethral valves (PUV)
  - Young age (<3 months)
  - Delayed diagnosis and treatment of UTI
  - Neurogenic bladder
  - Calculi
  - Recurrent pyelonephritis
  - Bacterial virulence factors (eg. atypical organisms)

- The proposed scheme of investigation (in line with NICE recommendations) assumes that it is in early infancy that the greatest risk exists of developing renal scarring. As a result, this is the best opportunity to identify any factors predisposing to scarring.
- Current evidence supports prompt diagnosis and treatment of urinary tract infection as the most effective strategy in reducing morbidity from UTI and preventing subsequent renal parenchymal damage.

**Imaging Modalities:**

<b>Type</b>	<b>Application</b>
<b>Ultrasound (U/S)</b>	Identifies renal anatomy, hydronephrosis, gross scarring and bladder function in older children.
<b>Plain Abdominal X-Ray (AXR)</b>	Identifies renal tract calculi, gross constipation, neuropathic bladder and skeletal anomalies associated with spinal dysraphism.
<b>Micturating Cystogram (MCU)</b>	The definitive investigation for identifying VUR. Allows visualisation of the urethra (re: valves in boys) and provides information regarding bladder function.
<b>DMSA Isotope Scan</b>	The definitive investigation for renal parenchymal damage (renal scarring). Also provides a measure of the total function provided by each kidney (differential function).
<b>MAG 3 Isotope Scan (indirect cystogram)</b>	Provides information on dynamic renal function and diagnosis of obstruction (PUV, VUJ) and VUR in the continent child.

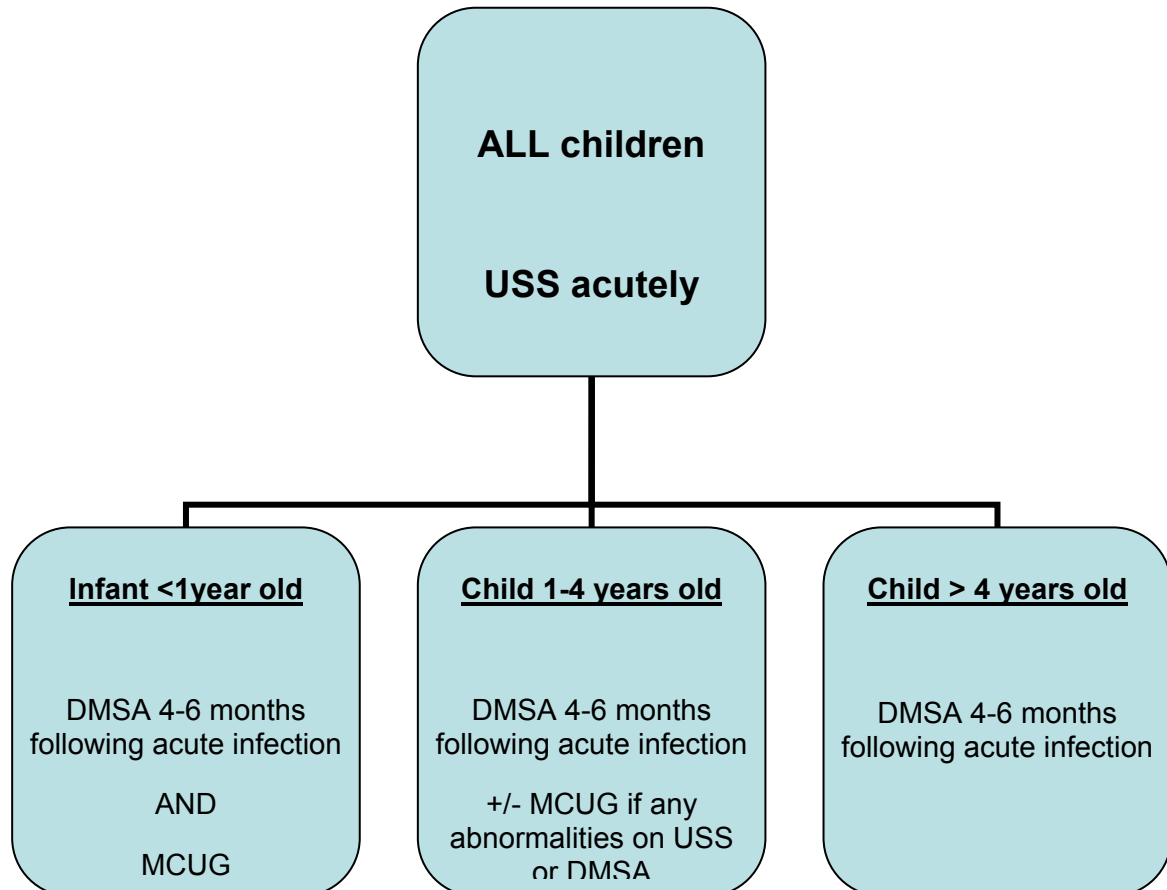
**Definitions:**

NICE differentiates between typical, atypical and recurrent UTIs. The authors of this guideline acknowledge that the necessity of a child to be seen in/admitted to hospital suggests that some aspect of the history or clinical presentation is 'atypical'. Therefore for this hospital-based guideline we do not adhere to the same distinction.

## ➤ Clinical management

### Investigation Protocol:

☞ Recommended imaging for inpatients:



### Recommended imaging for children referred to clinic:

Arrange outpatient USS – with particular emphasis to bladder emptying for children >3 years (because bladder dysfunction plays an increasing role in UTIs with age).

The need for further imaging will be dependent on results of USS/individual.

### Consider abdominal x-ray in the following situations:

- History suggestive of renal stones (loin pain, haematuria, proteus)
- Spinal anomaly
- Neuropathic bladder
- Unusual organism (e.g. proteus, pseudomonas, serratia)

## General Advice:

To be offered to parents as appropriate

- Hygiene – Wipe/wash front to back
- Cotton underwear
- Liberal fluid intake (**see Appendix 1**)
- Regular voiding, ie. Every 2.5-3 hours, or at break times at school
- Tampons rather than sanitary towels for menstruating girls
- Treat co-existent constipation (may prevent complete bladder emptying and result in urinary stasis)
- Maintain healthy BMI (raised BMI can prevent complete voiding)

## Antibiotic Prophylaxis:

- Do not prescribe this routinely
- Consider oral antibiotic prophylaxis after acute pyelonephritis or in high risk cases (eg. <1 year) until investigations complete, or in recurrent UTI (choice of antibiotic dependent on sensitivities)
- When a micturating cystourethrogram (MCUG) is performed, give oral prophylactic antibiotics for 3 days with MCUG taking place on the second day.

### ➤ **Contacts (inside and outside the Trust including out-of-hours contacts)**

- ☞ Dr Mervyn Jaswon, Consultant Paediatrician: 07850559495
- ☞ Dr Andrew Robins, Consultant Paediatrician: [andrewrobins@nhs.net](mailto:andrewrobins@nhs.net)
- ☞ Dr Nick Owens, Consultant Radiologist: [nick.owen@nhs.net](mailto:nick.owen@nhs.net)
- ☞ Dr Jane Young, Consultant Radiologist: [jane.young9@nhs.net](mailto:jane.young9@nhs.net)

## ➤ References

- ☞ Mori, Lakhanpaul and Verrier Jones; Diagnosis and management of urinary tract infection in children : summary of NICE guidance. BMJ, 2007, 335 (7616): 395-7.
- ☞ NICE clinical guideline 54 (2007). UTI in children: diagnosis, treatment and long-term management.
- ☞ Pilling d, Postlethwaite RJ; Imaging in Urinary Tract infection; London: British Paediatric Association, 1996.
- ☞ Postlethwaite; Clinical Prediatric Nephrology; 1994, 2<sup>nd</sup> ed Chapter 14.
- ☞ Verrier J; Time to review the value of imaging after urinary tract infection in infants. Arch Dis Child, 2005, 90(7): 663-664.
- ☞ Williams G, Craig JC (2011); Long-term antibiotics for preventing recurrent urinary tract infection in children (Cochrane Review); The Cochrane Library 2011 (3).

➤ **Compliance with this guideline (how and when the guideline will be monitored e.g. audit and which committee the results will be reported to) Please use the tool provided at the end of this template**

➤ Appendices

**Appendix 1: Suggested daily intake of drinks for children and young people**

<b>Age</b>	<b>Sex</b>	<b>Total Volume Per Day</b>	<b>Number of cups/glasses</b> <small>(based on standard glass or tea/coffee mug with 225ml capacity)</small>
<b>4-8 years</b>	<b>Female</b>	<b>1000–1400 ml</b>	<b>4 - 6</b>
	<b>Male</b>	<b>1000–1400 ml</b>	<b>4 - 6</b>
<b>9-13 years</b>	<b>Female</b>	<b>1200–2100 ml</b>	<b>5 - 8</b>
	<b>Male</b>	<b>1400–2300 ml</b>	<b>6 - 9</b>
<b>14-18 years</b>	<b>Female</b>	<b>1400–2500 ml</b>	<b>6 - 10</b>
	<b>Male</b>	<b>2100–3200 ml</b>	<b>8 - 13</b>



To be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval

		Yes/No	Comments
1.	<b>Does the procedural document affect one group less or more favourably than another on the basis of:</b>		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
	• Disability - learning disabilities, physical disability, sensory impairment and mental health problems	No	
2.	<b>Is there any evidence that some groups are affected differently?</b>	No	
3.	<b>If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?</b>	No	
4.	<b>Is the impact of the procedural document likely to be negative?</b>	No	
5.	<b>If so can the impact be avoided?</b>	N/A	
6.	<b>What alternatives are there to achieving the procedural document without the impact?</b>	N/A	
7.	<b>Can we reduce the impact by taking different action?</b>	N/A	

If you have identified a potential discriminatory impact of this procedural document, please refer it to the Director of Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact the Director of Human Resources.

## Checklist for the Review and Approval of Procedural Document

To be completed and attached to any procedural document when submitted to the relevant committee for consideration and approval.

	Title of document being reviewed:	Yes/No	Comments
<b>1.</b>	<b>Title</b>		
	Is the title clear and unambiguous?	Yes	
	Is it clear whether the document is a guideline, policy, protocol or standard?	Yes	
<b>2.</b>	<b>Rationale</b>		
	Are reasons for development of the document stated?	Yes	
<b>3.</b>	<b>Development Process</b>		
	Is it clear that the relevant people/groups have been involved in the development of the document?	Yes	
	Are people involved in the development?	Yes	
	Is there evidence of consultation with stakeholders and users?	Yes	
<b>4.</b>	<b>Content</b>		
	Is the objective of the document clear?	Yes	
	Is the target population clear and unambiguous?	Yes	
	Are the intended outcomes described?	Yes	
<b>5.</b>	<b>Evidence Base</b>		
	Are key references cited in full?	N/A	
	Are supporting documents referenced?	N/A	
<b>6.</b>	<b>Approval</b>		
	Does the document identify which committee/group will approve it?	Yes	
<b>7.</b>	<b>Dissemination and Implementation</b>		
	Is there an outline/plan to identify how this will be done?	Yes	
<b>8.</b>	<b>Document Control</b>		
	Does the document identify where it will be held?	Yes	

	Title of document being reviewed:	Yes/No	Comments
<b>9.</b>	<b>Process to Monitor Compliance and Effectiveness</b>		
	Are there measurable standards or KPIs to support the monitoring of compliance with and effectiveness of the document?	Yes	
	Is there a plan to review or audit compliance with the document?	Yes	
<b>10.</b>	<b>Review Date</b>		
	Is the review date identified?	Yes	
	Is the frequency of review identified? If so is it acceptable?	Yes	
<b>11.</b>	<b>Overall Responsibility for the Document</b>		
	Is it clear who will be responsible for co-ordinating the dissemination, implementation and review of the document?	Yes	

<b>Executive Sponsor Approval</b>			
If you approve the document, please sign and date it and forward to the author. Procedural documents will not be forwarded for ratification without Executive Sponsor Approval			
Name		Date	
Signature			
<b>Relevant Committee Approval</b>			
The Director of Nursing and Patient Experience's signature below confirms that this procedural document was ratified by the appropriate Governance Committee.			
Name		Date	
Signature			
<b>Responsible Committee Approval – only applies to reviewed procedural documents with minor changes</b>			
The Committee Chair's signature below confirms that this procedural document was ratified by the responsible Committee			
Name		Date	
Name of Committee		Name & role of Committee Chair	
Signature			

### Tool to Develop Monitoring Arrangements for Policies and guidelines

What key element(s) need(s) monitoring as per local approved policy or guidance?	Who will lead on this aspect of monitoring?  Name the lead and what is the role of the multidisciplinary team or others if any.	What tool will be used to monitor/check/observe/Assess/inspect/ authenticate that everything is working according to this key element from the approved policy?	How often is the need to monitor each element?  How often is the need complete a report ?  How often is the need to share the report?	What committee will the completed report go to?
Element to be monitored	Lead	Tool	Frequency	Reporting arrangements
Compliance with the guideline	Dr Andrew Robins	Audit one year after the implementation of the guideline.	Once every 2 years	Paediatric Consultants

