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## 1 Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in [your care](#).

[Making decisions using NICE guidelines](#) explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

### 2 **1.1 Diagnostic imaging**

3 1.1.1 Offer urgent (within 24 hours of presentation) low-dose non-contrast CT  
4 to adults with suspected renal colic. If a woman is pregnant, offer  
5 ultrasound instead of CT.

6 1.1.2 Offer urgent (within 24 hours of presentation) ultrasound as first-line  
7 imaging for children and young people with suspected renal colic.

8 1.1.3 If there is still uncertainty about the diagnosis of renal colic after  
9 ultrasound for children and young people, consider low-dose non-  
10 contrast CT.

To find out why the committee made the 2018 recommendations on diagnostic imaging and how they might affect practice, see [rationale and impact](#).

### 11 **1.2 Pain management**

12 1.2.1 Offer a non-steroidal anti-inflammatory drug (NSAID) by any route as  
13 first-line treatment for adults, children and young people with suspected  
14 renal colic.

15 1.2.2 Offer intravenous paracetamol to adults, children and young people with  
16 suspected renal colic if NSAIDs are contraindicated or have not been  
17 effective.

1 1.2.3 Do not offer opioids to adults, children and young people with suspected  
2 renal colic unless both NSAIDs and intravenous paracetamol are  
3 contraindicated or have not been effective.

4 1.2.4 Do not offer muscle relaxants to adults, children and young people with  
5 suspected renal colic.

To find out why the committee made the 2018 recommendations on pain management and how they might affect practice, see [rationale and impact](#).

### 6 **1.3 Medical expulsive therapy**

7 1.3.1 Offer alpha blockers<sup>1</sup> to adults, children and young people with distal  
8 ureteric stones less than 10 mm.

9 1.3.2 Consider oral nifedipine<sup>2</sup> for adults with distal ureteric stones less than  
10 10 mm if alpha blockers are contraindicated.

To find out why the committee made the 2018 recommendations on medical expulsive therapy and how they might affect practice, see [rationale and impact](#).

11

### 12 **1.4 Timing of surgical treatment**

13 1.4.1 Offer surgical treatment (see table 1) to adults with ureteric stones and  
14 renal colic within 48 hours of diagnosis or readmission, if:

- 15 • pain is ongoing and not tolerated, **or**  
16 • the stone is unlikely to pass.

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<sup>1</sup> At the time of consultation (July 2018), alpha blockers did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

<sup>2</sup> At the time of consultation (July 2018), nifedipine did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

To find out why the committee made the 2018 recommendation on timing of surgical treatment and how it might affect practice, see [rationale and impact](#).

1

2 **1.5 Use of stents before shockwave lithotripsy**

3 1.5.1 Do not offer pre-treatment stenting to adults having shockwave lithotripsy  
4 (SWL) for ureteric or renal stones.

5 1.5.2 Consider pre-treatment stenting for children and young people having  
6 SWL for renal staghorn stones.

To find out why the committee made the 2018 recommendations on the use of stents before shockwave lithotripsy and how they might affect practice, see [rationale and impact](#).

7

8 **1.6 Surgical treatments**

9 1.6.1 Consider watchful waiting for asymptomatic renal stones in adults,  
10 children and young people if:

- 11
- 12 • the stone is less than 5 mm, or
  - 13 • the stone is larger than 5 mm and the person or their parent/carer  
14 agrees to watchful waiting after an informed discussion of the possible risks and benefits.

15 1.6.2 Follow the recommendations in table 1 for treating ureteric or renal  
16 stones in adults, children and young people when medical expulsive  
17 therapy has failed or is not indicated, there is ongoing pain or the stone  
18 is not likely to pass spontaneously.

19 **Table 1 Surgical treatment of ureteric and renal stones in children, young**  
20 **people and adults when medical expulsive therapy has failed or is not**

- 1 **indicated, there is ongoing pain or the stone is not likely to pass**
- 2 **spontaneously**

DRAFT FOR CONSULTATION

Stone type and size	Treatment for adults (16 years and over)	Treatment for children and young people (under 16 years)
Ureteric stone less than 10 mm	<p>Offer SWL</p> <p>Consider URS if:</p> <ul style="list-style-type: none"> <li>• there are contraindications for SWL, or</li> <li>• the stone is not targetable with SWL, or</li> <li>• a previous course of SWL has failed</li> </ul>	Consider URS or SWL
Ureteric stone 10 to 20 mm	<p>Offer URS</p> <p>Consider SWL if local facilities allow up to 2 SWL sessions within 4 weeks of the decision to treat</p> <p>Consider PCNL for impacted proximal stones when URS has failed</p>	Consider URS or SWL
Renal stone less than 10 mm	<p>Offer SWL</p> <p>Consider URS if:</p> <ul style="list-style-type: none"> <li>• there are contraindications for SWL, or</li> <li>• a previous course of SWL has failed, or</li> <li>• because of anatomical reasons, SWL is not indicated</li> </ul> <p>Consider PCNL if SWL and URS have failed to treat the current stone or are not an option</p>	<p>Consider URS or SWL</p> <p>Consider PCNL if:</p> <ul style="list-style-type: none"> <li>• URS or SWL have failed, or</li> <li>• for anatomical reasons it is the more favourable option</li> </ul>
Renal stone 10 to 20 mm	<p>Consider URS or SWL</p> <p>Consider PCNL if URS or SWL have failed</p>	Consider URS or SWL or PCNL <sup>1</sup>
Renal stone larger than 20 mm, including staghorn stones	<p>Offer PCNL<sup>2</sup></p> <p>Consider URS if PCNL is not an option</p>	Consider URS or SWL or PCNL <sup>1</sup>
SWL, shockwave lithotripsy; URS, ureteroscopy; PCNL, percutaneous nephrolithotomy		

<sup>1</sup> Use clinical judgement when considering mini or standard PCNL  
<sup>2</sup> Use clinical judgement when considering tubeless, mini or standard PCNL, and supine or prone positions

1

To find out why the committee made the 2018 recommendations on surgical treatments and how they might affect practice, see [rationale and impact](#).

2

### 3 **Medical expulsive therapy as adjunct to surgery**

4 1.6.3 Consider alpha blockers<sup>3</sup> as adjunctive therapy for adults having SWL  
5 for ureteric stones less than 10 mm.

To find out why the committee made the 2018 recommendation on medical expulsive therapy and how it might affect practice, see [rationale and impact](#).

6

### 7 **1.7 Use of stents after ureteroscopy**

8 1.7.1 Do not routinely offer post-treatment stenting to adults who have had  
9 ureteroscopy for ureteric stones less than 20 mm.

To find out why the committee made the 2018 recommendation on the use of stents after ureteroscopy and how it might affect practice, see [rationale and impact](#).

### 10 **1.8 Metabolic testing**

11 1.8.1 Consider stone analysis for adults with ureteric or renal stones.

12 1.8.2 Consider checking serum calcium for adults with ureteric or renal stones.

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<sup>3</sup> At the time of consultation (July 2018), alpha blockers did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.



- 1 1.8.3 Consider referring children and young people with ureteric or renal  
2 stones to a paediatric nephrologist or paediatric urologist with expertise  
3 in this area for assessment and metabolic investigations.

To find out why the committee made the 2018 recommendations on metabolic testing and how they might affect practice, see [rationale and impact](#).

4

## 5 **1.9 Preventing recurrence**

### 6 **Dietary and lifestyle advice**

- 7 1.9.1 Discuss diet and fluid intake with the person (and their family or carers,  
8 as appropriate), and advise:
- 9 • adults to drink 2.5 to 3 litres of water per day and children and young  
10 people (depending on their age) 1 to 2 litres
  - 11 • adding fresh lemon juice to drinking water
  - 12 • avoiding carbonated drinks
  - 13 • adults to have a daily salt intake of no more than 6 g and children and  
14 young people (depending on their age) 2 to 6 g
  - 15 • adults to have a daily calcium intake of 700 to 1,200 mg and children  
16 and young people (depending on their age) 350 to 1,000 mg
- 17 1.9.2 Follow the recommendations on maintaining a healthy lifestyle in the  
18 NICE guideline on [preventing excess weight gain](#).

### 19 **Potassium citrate**

20 The following recommendations apply alongside the recommendations on dietary  
21 and lifestyle advice.

- 22 1.9.3 Consider potassium citrate<sup>4</sup> for adults with a recurrence of stones that  
23 are predominantly (more than 50%) calcium oxalate.

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<sup>4</sup> At the time of consultation (July 2018), potassium citrate did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the

- 1 1.9.4 Consider potassium citrate for children and young people with a  
2 recurrence of stones that are predominantly (more than 50%) calcium  
3 oxalate and with hypercalciuria or hypocitraturia.

#### 4 **Thiazides**

5 The following recommendation applies alongside the recommendations on dietary  
6 and lifestyle advice.

- 7 1.9.5 Consider thiazides<sup>5</sup> for adults with a recurrence of stones that are  
8 predominantly (more than 50%) calcium oxalate and hypercalciuria after  
9 restricting their sodium intake to no more than 6 g a day.

To find out why the committee made the 2018 recommendations on preventing recurrence and how they might affect practice, see [rationale and impact](#).

## 10 **Recommendations for research**

11 The guideline committee has made the following recommendations for research.

### 12 ***Key recommendations for research***

#### 13 **1 Metabolic assessment**

14 What is the clinical and cost effectiveness of full metabolic assessment compared  
15 with standard advice alone, in people with recurrent calcium oxalate stones?

16 To find out why the committee made the research recommendation on metabolic  
17 assessment see [rationale and impact](#).

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General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

<sup>5</sup> At the time of consultation (July 2018), thiazides did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

1 **2 Alpha blockers and ureteroscopy**

2 What is the clinical and cost effectiveness of tamsulosin as an adjunct to  
3 ureteroscopy?

4 To find out why the committee made the research recommendation on alpha  
5 blockers and ureteroscopy see [rationale and impact](#).

6 **3 Preventive treatment following shockwave lithotripsy**

7 What is the clinical and cost effectiveness of empirical potassium citrate or  
8 bendroflumethiazide as preventive treatment for people with small residual  
9 fragments following shockwave lithotripsy for renal and ureteric stones?

10 To find out why the committee made the research recommendation on preventive  
11 treatment following shockwave lithotripsy see [rationale and impact](#).

12 **4 Frequency of follow-up imaging**

13 What is the clinical and cost effectiveness of 6-monthly imaging for 3 years for  
14 people with recurrent calcium renal or ureteric stones?

15 To find out why the committee made the research recommendation on frequency of  
16 follow-up imaging see [rationale and impact](#).

17 **5 Non-steroidal anti-inflammatory drugs – route of administration**

18 What is the most clinically and cost effective route of administration for non-steroidal  
19 anti-inflammatory drugs in the management of acute pain thought to be due to renal  
20 or ureteric stones?

21 To find out why the committee made the research recommendation on non-steroidal  
22 anti-inflammatory drugs – route of administration see [rationale and impact](#).

23 **Rationale and impact**

24 These sections briefly explain why the committee made the recommendations and  
25 how they might affect practice. They link to details of the evidence and a full  
26 description of the committee's discussion.

## 1 ***Diagnostic imaging***

2 Recommendations [1.1.1 to 1.1.3](#)

### 3 **Why the committee made the recommendations**

4 Limited evidence showed that MRI, ultrasound and plain abdominal radiograph were  
5 not as good as non-contrast CT for detecting renal and ureteric stones in adults. CT  
6 is more expensive than ultrasound or plain abdominal radiograph but the extra cost  
7 is likely to be outweighed by avoiding additional investigations when a first test  
8 misses the diagnosis. The committee agreed that CT should be performed as soon  
9 as possible because renal function can decline quickly. However, they  
10 acknowledged that it could be delayed for up to 24 hours if needed (for example, in  
11 some locations and when first presentation is out of hours). The committee agreed  
12 that CT should not be offered to everyone with abdominal pain, only those with  
13 suspected renal colic. They also noted that CT should not be used for pregnant  
14 women due to the radiation exposure, and agreed that ultrasound is the preferred  
15 imaging modality in this group.

16 No evidence was found for the use of MRI or plain abdominal radiograph in  
17 diagnosing renal and ureteric stones in children. Limited evidence on the use of  
18 ultrasound showed that it was not as good as CT and there is known to be  
19 widespread variation among ultrasonographers. The committee acknowledged that  
20 although CT is a better test, there is serious concern about radiation exposure in  
21 children and young people and they were keen to minimise this. They agreed that  
22 ultrasound should be offered as first-line imaging, and that low-dose non-contrast CT  
23 should only be considered if there is still uncertainty about the diagnosis of renal  
24 colic after ultrasound.

### 25 **How the recommendations might affect practice**

26 The recommendation reflects current practice in adults so the committee agreed  
27 there should be no change.

28 Usual practice is to use ultrasound as first-line imaging for children and young  
29 people because of concerns about radiation dosages. CT is not common practice for  
30 this population but it may be used when first-line imaging is negative or unclear, or to

1 confirm the diagnosis. Therefore the recommendations should not change current  
2 practice.

3 Full details of the evidence and the committee's discussion are in [evidence review B:](#)  
4 [Imaging for diagnosis.](#)

5 [Return to recommendations](#)

## 6 ***Pain management***

7 Recommendations [1.2.1 to 1.2.4](#)

### 8 **Why the committee made the recommendations**

9 Evidence showed that non-steroidal anti-inflammatory drugs (NSAIDs) reduced the  
10 need for rescue medication compared with opioids, muscle relaxants, and  
11 intravenous paracetamol. NSAIDs also reduced pain and had fewer adverse effects.  
12 NSAIDs had a better balance of benefits and costs, so the committee agreed that  
13 these should be offered as a first-line treatment for people with suspected renal colic.

14 The committee discussed the route of administration for NSAIDs, and noted that the  
15 evidence was heterogeneous in terms of the specific route used in the studies. They  
16 noted that most studies used intravenous or intramuscular NSAIDs. They agreed  
17 that the evidence does not reflect current practice, which has changed over time, as  
18 oral or rectal NSAIDs are more commonly used. The committee were concerned that  
19 there was very little evidence that oral or rectal NSAIDs were as effective as  
20 intravenous or intramuscular NSAIDs, and were reluctant to recommend a significant  
21 change in practice that would have resource implications. Therefore, the committee  
22 were not able to specify a particular route of administration of NSAIDs, but did agree  
23 to make a research recommendation to inform future practice. Not specifying the  
24 route of administration also allows more flexibility for primary care staff, and people  
25 with recurrent stones or people who can manage their pain in the community.

26 Some evidence showed a benefit of paracetamol for pain relief when compared with  
27 opioids. The committee noted that most of the evidence was based on intravenous  
28 paracetamol. They agreed that intravenous paracetamol differed from other routes of  
29 paracetamol administration in terms of potency and speed of action, and therefore  
30 this benefit could not be generalised to other routes of administration, such as oral.

1 This difference in mechanism of action was not believed to be as strong for other  
2 drugs such as NSAIDs. Therefore, the committee recommended that intravenous  
3 paracetamol should be offered if NSAIDs cannot be used or have not been effective.

4 Opioids showed a benefit compared with muscle relaxants in terms of pain relief, and  
5 there was no difference between opioids and most comparators in terms of adverse  
6 events. There was no benefit of opioids over NSAIDs or paracetamol. The committee  
7 also noted concerns around opioid use in terms of dependency and misuse. The  
8 committee agreed that opioids could only be offered if both NSAIDs and intravenous  
9 paracetamol were contraindicated or not effective.

10 Muscle relaxants offered no benefit in terms of pain relief when compared with  
11 NSAIDs. The committee also highlighted that in the studies muscle relaxants were  
12 given intravenously, whereas in clinical practice an oral route is often used. The  
13 committee discussed how muscle relaxants can be more difficult to administer  
14 intravenously, because of an increased risk of adverse events and a need for  
15 intensive monitoring. They agreed that muscle relaxants should not be offered to  
16 people with suspected acute renal colic.

17 Very limited evidence for combinations of NSAIDs, opioids and muscle relaxants  
18 compared to NSAIDs and opioids, NSAIDs and muscle relaxants compared to either  
19 drug alone, and NSAIDs and oral paracetamol compared to either drug alone  
20 showed some benefit of a combination of NSAIDs and oral paracetamol, for pain  
21 relief, and no increase in adverse events. The committee considered that this was  
22 based on small, single studies. They noted that in practice two drugs would not be  
23 given at the same time, but a second would usually be given if the first-line drug  
24 hadn't worked, in a staged manner. They also noted that people with recurrent  
25 stones may self-manage with both oral paracetamol and NSAIDs and so it is  
26 important to ask people presenting with suspected renal colic about previous  
27 analgesia use. Overall, they agreed that there was not enough convincing evidence  
28 for any of the combination treatments.

29 All the identified evidence was for adults with renal or ureteric stones. However, the  
30 committee agreed that it would be reasonable to extrapolate the evidence on pain

1 relief to children and young people and to include this age group in the  
2 recommendations.

### 3 **How the recommendations might affect practice**

4 Currently, intravenous paracetamol is not used routinely for managing pain in people  
5 with acute renal colic, but is used in other areas of secondary care (for example,  
6 analgesia during surgery). Extending its use into other clinical areas (for example,  
7 emergency departments and surgical assessment units) will mean changes in policy  
8 and additional training for staff. Therefore this recommendation will require a change  
9 from current practice by most or all providers. The use of intravenous paracetamol  
10 may also have some implications for practice if more hospital attendances are  
11 required to administer the treatment.

12 Full details of the evidence and the committee's discussion are in [evidence review E:  
13 Pain management.](#)

14 [Return to recommendations](#)

### 15 ***Medical expulsive therapy***

16 [Recommendations 1.3.1 to 1.3.2](#)

### 17 **Why the committee made the recommendations**

18 Evidence showed that in adults both alpha blockers and calcium channel blockers  
19 improved passage of distal ureteric stones of less than 10 mm compared with no  
20 treatment. Alpha blockers also improved stone passage when compared with  
21 placebo. Alpha blockers offered more benefit than calcium channel blockers in terms  
22 of stone passage, hospital stay and pain, but there was no difference in time to stone  
23 passage and adverse events. The committee agreed that alpha blockers should be  
24 offered to adults with small distal ureteric stones, but calcium channel blockers  
25 should be considered when alpha blockers are contraindicated. The committee  
26 noted that all the evidence for calcium channel blockers was for oral nifedipine and  
27 so specified this in the recommendation.

28 Limited evidence in children showed that alpha blockers improved stone passage  
29 and time to stone passage, and decreased pain compared with no treatment or

1 placebo. They were not associated with any more adverse events so the committee  
2 agreed that alpha blockers could be offered for children and young people with distal  
3 ureteric stones less than 10 mm.

4 There was not enough evidence for the committee to make recommendations on  
5 alpha blockers or calcium channel blockers for proximal or mid-ureteric stones in  
6 adults, children and young people, or for calcium channel blockers for children and  
7 young people with distal ureteric stones less than 10 mm.

8 Medical expulsive therapy is low cost, and the savings from interventions avoided  
9 because of this therapy, are likely to offset the cost of the therapy.

#### 10 **How the recommendations might affect practice**

11 Current practice is varied, but many healthcare professionals do not offer alpha  
12 blockers for managing symptomatic ureteric stones. However, recently published  
13 evidence has called into question the established approach in the UK, and this has  
14 been confirmed by the committee's review of the evidence. Up to 2015, medical  
15 expulsive therapy was recommended practice in the UK to aid the passage of small  
16 ureteric stones. This changed after the SUSPEND trial (Pickard et al 2015), the  
17 largest RCT on this subject, concluded that there was no benefit in using alpha  
18 blockers. The guideline committee reviewed all the available evidence, some of  
19 which was more recent than the SUSPEND trial, and agreed that alpha blockers can  
20 help the passage of small ureteric stones and the management of pain. The  
21 committee agreed that prescribing alpha blockers to people with distal ureteric  
22 stones less than 10 mm or as an adjunct to shockwave lithotripsy for small ureteric  
23 stones less than 10mm may mean a change in practice, but also a potential  
24 reduction in the dose of analgesics prescribed and the length of time they are used  
25 for.

26 Full details of the evidence and the committee's discussion are in [evidence review D:  
27 Medical expulsive therapy](#).

28 [Return to recommendations](#)

#### 29 ***Timing of surgical treatment***

30 Recommendation [1.4.1](#)



1 **Why the committee made the recommendations**

2 Evidence showed a benefit of early intervention (within 48 hours) over delayed  
3 intervention (after 48 hours) in terms of stone removal, repeated or ancillary  
4 procedures and stent insertion. This could lead to substantial savings on a  
5 population level. The committee agreed that ureteric stones tend to be painful and if  
6 left untreated can lead to a loss of kidney function, so surgical treatment should be  
7 offered within 48 hours of diagnosis or readmission, to people presenting with a  
8 ureteric stones and renal colic, providing that ongoing pain is not tolerated or the  
9 stone is unlikely to pass. Although the evidence was from people with stones less  
10 than 20 mm, the committee agreed that stones of all sizes should be treated within  
11 this timeframe. There was no evidence for people with renal stones, and the  
12 committee considered that the timing of treatment for these stones should be  
13 prioritised according to the nature and severity of symptoms.

14 **How the recommendations might affect practice**

15 This recommendation applies to people who present acutely with renal colic, and  
16 have ongoing pain that is not tolerated (following pain relief), or a stone that is  
17 unlikely to pass. This can be a first presentation a re-presentation because of  
18 ongoing pain. It only applies to people having primary treatment, rather than a  
19 secondary URS or second session of SWL. It is important to be clear that all patients  
20 with ureteric stones are likely to present acutely at some point with renal colic,  
21 however not all will be eligible for early URS/SWL. Some people may be managed  
22 sufficiently with pain relief, and/or have a stone that is considered likely to pass (and  
23 therefore are either managed conservatively or could be candidates for MET) and  
24 although a decision for intervention with URS/SWL might be made – these will be  
25 people in whom surgery will be planned for a later date. Hence the wording of the  
26 recommendation also covers those who re-present as someone may become eligible  
27 for surgery within 48 hours if they develop ongoing pain or there stone is now  
28 considered unlikely to pass. Current practice for this population is to aim to treat  
29 ureteric stones with an elective surgical procedure within 4 to 6 weeks, although  
30 practice can vary and is influenced by the availability of services. During this period,  
31 people are likely to have a stent inserted while waiting for surgery.

1 These recommendations are likely to result in a change in practice because services  
2 would need to be reconfigured to allocate more theatre time for emergency surgery.  
3 More equipment would also be needed for SWL, such as more responsive networks  
4 of mobile lithotripters, more fixed-site machines or better organised referral systems.  
5 It is recognised that investment will be needed to reconfigure the system to allow  
6 early intervention. As early intervention is likely to lead to substantial savings from  
7 downstream resource use avoided such as stents, this is likely to outweigh any  
8 implementation costs, and therefore this recommendation is not expected to have a  
9 cost impact.

10 Full details of the evidence and the committee's discussion are in [evidence review G:  
11 Timing of surgery.](#)

12 [Return to recommendations](#)

### 13 ***Use of stents before shockwave lithotripsy***

14 Recommendations [1.5.1 to 1.5.2](#)

#### 15 **Why the committee made the recommendations**

16 No evidence was found for the use of stents before URS or PCNL.

#### 17 ***Adults with ureteric stones of 10 to 20 mm***

18 Limited evidence from a single study showed no benefit of pre-treatment stenting for  
19 adults having SWL for ureteric stones of 10 to 20 mm. There were more adverse  
20 events in people who had had a stent and more repeat treatments needed. The  
21 committee agreed that having a stent in place may impede treatment by stopping  
22 shock waves from reaching the stone. They agreed that pre-treatment stenting is not  
23 needed for people having SWL, because it does not significantly improve outcomes.

#### 24 ***Adults with renal stones of 10 to 20 mm***

25 Evidence from 3 studies showed no benefit of stenting before SWL for adults with  
26 renal stones of 10 to 20 mm. However, there were adverse effects (frequency,  
27 urgency, dysuria and nocturia) related to the stenting. Therefore the committee  
28 agreed that pre-treatment stenting should not be offered to any adults having SWL  
29 for renal stones of this size.

1 ***Adults with renal stones of greater than 20 mm***

2 Evidence from 1 study showed no benefit of pre-treatment stenting for adults having  
3 SWL for renal stones greater than 20 mm, in terms of stone-free state, fever and  
4 failed technology (failed access, inaccessible stone, stone not seen/reached).  
5 However, the retreatment rate was lower for those with a stent, but this was based  
6 on a small number of participants and events. The committee agreed that the study  
7 was not representative of standard UK practice because SWL is not used for stones  
8 of this size.

9 ***Adults with stones less than 10 mm or ureteric stones greater than 20 mm***

10 There was no evidence for ureteric or renal stones less than 10 mm, and no  
11 evidence for ureteric stones greater than 20 mm. The committee agreed that stone  
12 size should not be specified in the recommendation because for small renal stones  
13 current practice is not to stent, and for small ureteric stones, although current  
14 practice does sometimes include stenting for reasons such as ongoing pain and  
15 obstruction, evidence has shown that treatment within 48 hours is beneficial, and this  
16 would avoid the use of stents. Ureteric stones greater than 20 mm are unlikely to be  
17 treated with SWL and therefore the recommendation would not apply to this group.

18 ***Children and young people with renal stones of less than 10 mm***

19 Limited evidence from 1 non-randomised study showed a benefit of pre-treatment  
20 stenting for children having SWL for renal stones less than 10 mm. However, the  
21 committee had concerns about the methods used in the study. They also agreed that  
22 the evidence was inconsistent with clinical practice. The committee decided that the  
23 evidence was not convincing enough to make a recommendation.

24 ***Children and young people with renal staghorn stones***

25 Limited evidence from 1 non-randomised study showed an overall benefit of pre-  
26 treatment stenting for children having SWL for renal staghorn stones. Rates of  
27 readmission and other procedures were significantly lower in children who had had a  
28 stent. The committee agreed that these outcomes are particularly important in  
29 children who find staying in hospital and repeat procedures particularly distressing.  
30 They agreed that the evidence was not strong enough to recommend that this should  
31 be offered to all children with renal staghorn stones, but it could be considered.

1 **How the recommendations might affect practice**

2 The recommendations broadly reflect current practice.

3 Full details of the evidence and the committee's discussion are in [evidence review H:](#)  
4 [Stent before surgery.](#)

5 [Return to recommendations](#)

6 ***Surgical treatments***

7 Recommendations [1.6.1 to 1.6.2](#)

8 **Why the committee made the recommendations**

9 The committee noted that in current practice, watchful waiting may be used for  
10 people with asymptomatic renal stones, as these stones are not likely to have a  
11 quality of life impact and may pass spontaneously without intervention. This is  
12 particularly the case for stones less than 5 mm, but may also apply to larger stones.  
13 The committee noted that larger stones are more likely to have risks associated with  
14 watchful waiting such as the stone's location may move and cause obstruction. They  
15 agreed that watchful waiting should be considered for those with asymptomatic renal  
16 stones less than 5 mm, and for stones larger than 5 mm as long as the possible risks  
17 and benefits have been discussed with the patient.

18 ***Adults, ureteric stones, smaller than 10 mm***

19 Some evidence showed a small benefit of URS over SWL for stone removal, repeat  
20 treatments needed and quality of life, but there was a shorter hospital stay, less pain  
21 and fewer major adverse events with SWL. Economic analysis showed that SWL  
22 offered a better balance of benefits and costs than URS, even when the possible  
23 need for repeat treatment was taken into account. The cost differences were  
24 substantial and sensitivity analysis showed economic benefit for SWL even with  
25 lower SWL success rates. The committee therefore agreed to offer the less-invasive  
26 procedure of SWL to treat small ureteric stones (less than 10 mm) in adults.  
27 However, they acknowledged that prompt treatment of these stones is needed  
28 because of the risk of obstruction and kidney damage. URS may be considered as  
29 an alternative treatment if, for example, there are contraindications to SWL, the

1 stone is not targetable, or a course of SWL has previously failed (as patients tend to  
2 form the same type of stones).

3 ***Adults, ureteric stones, 10 to 20 mm***

4 Evidence showed a benefit of URS over SWL for stone removal and repeat  
5 treatments needed, but there was a shorter hospital stay, less pain, and fewer major  
6 adverse events with SWL.

7 Prompt treatment of ureteric stones is needed because of the risk of obstruction and  
8 kidney damage. There is more of a risk for ureteric stones than with renal stones,  
9 because there is less room for the stone to move in the ureter compared with the  
10 kidney. The risk is even more of a concern for larger stones.

11 The committee acknowledged that in terms of costs, SWL may offer better value,  
12 however the committee were very concerned about the risks in using SWL for  
13 ureteric stones. SWL may be delayed because of availability of a lithotripter.  
14 Additionally, given the varying effectiveness of SWL depending on factors such as  
15 type of machine (fixed/mobile) and operator skill, the total time to clear the stone if  
16 multiple sessions are needed, would also add to the risk level. Therefore they agreed  
17 to recommend URS for adults with ureteric stones of 10 to 20 mm, but SWL can be  
18 considered if local facilities allow up to 2 sessions of SWL within 4 weeks of the  
19 decision to treat.

20 Evidence (mainly in a group with impacted stones) suggested a benefit of  
21 percutaneous nephrolithotomy (PCNL) for stone removal compared with URS, but  
22 there was a shorter hospital stay with URS. The committee agreed that PCNL is not  
23 usually performed in the UK, but that it could be considered for larger impacted  
24 stones, particularly in the proximal ureter.

25 ***Adults, ureteric stones, larger than 20 mm***

26 No evidence was identified, and the committee agreed that this is a very small group.  
27 Usual practice depends on local availability of treatments and expertise. The  
28 committee decided that they could not make a recommendation for this group.

1 ***Adults, renal stones, smaller than 10 mm***

2 There was evidence comparing SWL with URS, SWL with PCNL and surgery with  
3 non-surgical treatment, which suggested a benefit of URS in terms of retreatment  
4 rate and ancillary procedures, and a benefit of SWL in terms of readmission, failed  
5 technology, and major adverse events. Limited evidence from 1 small study  
6 suggested a benefit of PCNL over SWL in terms of stone-free state and ancillary  
7 procedures. There was also evidence of a benefit of surgery compared with non-  
8 surgical treatment.

9 Because SWL offered a better balance of benefits and costs, the committee agreed  
10 that it should be offered in the first instance, and that URS should be considered if  
11 there are contraindications for SWL, or anatomical reasons (such as multiple  
12 stones), or a previous course of SWL has failed. Because of concerns around the  
13 limited evidence for PCNL, this should only be considered as an option when both  
14 SWL and URS have failed.

15 ***Adults, renal stones, 10 to 20 mm***

16 There was evidence comparing SWL with URS, SWL with PCNL, URS with PCNL,  
17 tubeless with standard PCNL, and surgery with non-surgical treatment. Standard  
18 PCNL in this comparison was defined as with a tube.

19 Some evidence showed a benefit of SWL in terms of length of stay, quality of life and  
20 some major adverse events compared with URS and PCNL. Both URS and PCNL  
21 had clinical benefits in terms of stone-free state, retreatment rate and ancillary  
22 procedures, compared with SWL. There was no difference between PCNL and URS  
23 for most outcomes. One study showed a benefit of surgery in terms of ancillary  
24 procedures and stone-free state compared with non-surgical treatment, and one  
25 study showed a benefit of tubeless compared with standard PCNL in terms of stone-  
26 free state.

27 The committee agreed that URS or SWL offered a better balance of benefits and  
28 costs compared with PCNL and this intervention should be considered only if URS or  
29 SWL have failed. In terms of a choice between URS and SWL, the size of the stone  
30 was a concern for the committee, however factors such as quality of life and the risks  
31 associated with larger stones were difficult to quantify in any costing work. The

1 committee agreed that the stone size itself would be a factor in the treatment  
2 decision, as effectiveness of SWL can also vary by stone size, and a stone nearer to  
3 the lower end of the range (10 to 20 mm) could be an appropriate candidate for  
4 SWL. Overall, the committee felt that a recommendation to consider URS or SWL  
5 would allow flexibility for clinicians in choosing a treatment option. The committee  
6 agreed that they did not have enough confidence in the evidence to recommend  
7 tubeless over standard PCNL, but agreed that either approach could be used,  
8 according to clinical judgement.

9 ***Adults, renal stones, larger than 20 mm***

10 Very limited evidence from a single study showed a benefit of PCNL in terms of  
11 stone-free state compared with SWL, but no difference when compared with URS.  
12 Several low to very low quality studies showed a benefit of URS in terms of ancillary  
13 procedures, length of stay and adverse events compared with PCNL.

14 Limited evidence suggested a benefit of tubeless PCNL in terms of length of stay  
15 and pain, and of mini PCNL in terms of length of stay and major adverse events  
16 compared with standard PCNL (with a tube, or standard size depending on  
17 comparison). There was a benefit of supine PCNL in terms of length of stay and  
18 adverse events compared with prone PCNL, although a benefit of prone PCNL was  
19 found for retreatment. There were no differences between interventions for stone-  
20 free state, ancillary procedures or minor adverse events.

21 Current practice for renal stones greater than 20 mm is PCNL, and the committee  
22 agreed that there was insufficient evidence to change this. However the committee  
23 considered that PCNL may not always be an option (for example for people with high  
24 comorbidity, anaesthetic risks, or anatomical considerations), and so URS could be  
25 considered in these circumstances. The committee agreed that all evidence for types  
26 of PCNL was based on small studies, and there was no difference between them for  
27 many outcomes. Therefore any approach should be available and considered based  
28 on clinical judgement.

1 ***Adult, renal stones, staghorn***

2 There was no evidence for renal staghorn stones in adults. Current practice for these  
3 stones is to use PCNL. The committee agreed that staghorn stones are all over  
4 20 mm and so would be treated as renal stones larger than 20 mm.

5 ***Children and young people, ureteric stones, less than 10 mm***

6 Limited evidence from a single small study showed a benefit of URS over SWL in  
7 terms of stone-free state, retreatment rate, and ancillary procedures. The committee  
8 agreed to recommend SWL as the first treatment for these stones in adults because  
9 of the better balance of benefits and costs. However, they noted that evidence for  
10 children and young people was much more limited. They also discussed that unlike  
11 adults, children may need a general anaesthetic for each session of SWL, depending  
12 on their age. As both URS and SWL are used in current practice, the committee  
13 agreed that either could be considered for children and young people with stones  
14 less than 10 mm.

15 ***Children and young people, ureteric stones, 10 to 20 mm***

16 No evidence was identified so the committee made a recommendation based on  
17 their knowledge and experience. They noted that children have a higher incidence of  
18 spontaneous passage of larger stones and have less risk of obstruction than adults  
19 so the risk of waiting for treatment is not as high. Additionally children tend to be  
20 treated in specialist centres where SWL is more readily available, therefore the  
21 committee agreed that unlike the adult population where URS should be offered in  
22 the first instance and SWL considered if facilities allow quick stone clearance, for  
23 children and young people both SWL and URS could be treatment options so  
24 allowing clinical flexibility.

25 ***Children and young people, ureteric stones, larger than 20 mm***

26 No evidence was identified and the committee agreed that currently these stones are  
27 treated on a case-by-case basis. They decided that they could not make a  
28 recommendation for this group.



1 ***Children and young people, renal stones, less than 10 mm***

2 No evidence was identified. The committee discussed current practice and used their  
3 knowledge and experience to recommend that URS or SWL should be considered in  
4 the first instance, and PCNL when other treatment has failed.

5 ***Children and young people, renal stones, 10 to 20 mm***

6 Very limited evidence from a single study showed a benefit of URS in terms of stone-  
7 free state, retreatment and significant residual stones when compared with SWL.  
8 Limited evidence from another single study showed benefits of PCNL in terms of  
9 stone-free state, retreatment rate and ancillary procedures when compared with  
10 SWL. The only evidence showing a benefit for SWL was for fewer minor adverse  
11 events, when SWL was compared with PCNL. Two non-randomised studies  
12 comparing URS and PCNL had inconclusive results. The committee agreed that  
13 clinical judgement should be used when deciding which treatment to use (URS, SWL  
14 or PCNL).

15 ***Children and young people, renal stones, larger than 20 mm***

16 Evidence from a single study showed a benefit of URS compared with PCNL in  
17 terms of length of stay and adverse events, but a benefit of PCNL in terms of stone-  
18 free state and retreatment rate. Evidence from 2 small studies showed a benefit of  
19 tubeless PCNL compared with standard PCNL in terms of length of stay, ancillary  
20 procedures and minor adverse events, but a benefit of standard PCNL in terms of  
21 retreatment. One non-randomised study showed a benefit of PCNL compared with  
22 SWL for stone-free state and retreatment, but a benefit of SWL for length of stay.

23 The committee agreed that PCNL may be effective, but carries more risks than URS.  
24 They decided that either URS or PCNL could be considered, and that SWL should  
25 not be ruled out.

26 ***Children and young people, renal stones, staghorn***

27 No evidence was identified. The committee agreed that staghorn stones in children  
28 would be treated in the same way as stones larger than 20 mm.

1 **How the recommendations might affect practice**

2 Changes in practice are likely for adults with ureteric stones smaller than 10 mm  
3 because SWL is recommended whereas currently URS is more frequently used.  
4 Economic analysis showed there will be a saving from using SWL over URS,  
5 although this may be more longer term because of short-term implementation costs  
6 required. Having good referral systems may mean that additional lithotripters are not  
7 needed. Alternatively more investment in mobile or fixed lithotripters could be an  
8 option, or networks of mobile or fixed-site lithotripters allowing patients timely access  
9 to treatment. However, more staff may be needed to undertake SWL (for example,  
10 ultrasonographers) to meet the additional demand. Additional training to maximise  
11 the effectiveness of lithotripsy may also be needed. Increases in staffing can provide  
12 benefits to other areas of the NHS as it is likely that not all their time will be spent  
13 treating renal and ureteric stones.

14 In adults with ureteric stones of 10 to 20mm, URS tends to be used, so  
15 recommendations to consider SWL could lead to a change in practice, with potential  
16 longer term savings, depending on uptake.

17 In adults with renal stones of 10 to 20mm; PCNL tends to be used, so  
18 recommendations to consider URS or SWL as first line could lead to a change in  
19 practice, with likely savings, depending on uptake.

20 Other recommendations for adults reflect current practice. In children; multiple  
21 treatment options have been recommended to allow for clinical judgement, and  
22 therefore a change in practice is unlikely.

23 Full details of the evidence and the committee's discussion are in [evidence review F:](#)  
24 [Surgical interventions.](#)

25 [Return to recommendations](#)

26 ***Medical expulsive therapy as adjunctive to surgery***

27 Recommendation [1.6.3](#)

1 **Why the committee made the recommendation**

2 Evidence showed a benefit in terms of stone passage when alpha blockers were  
3 used as adjunctive therapy for adults having SWL for small distal or proximal ureteric  
4 stones (less than 10 mm). There was no difference in adverse events. The  
5 committee agreed that alpha blockers could be considered as adjunctive therapy to  
6 SWL for adults with small ureteric stones in any location. There was no evidence for  
7 mid ureteric stones less than 10 mm, however the committee agreed that this is a  
8 small group of people and usual clinical practice often involves waiting to see if the  
9 stone progresses to the distal ureter. There was not enough evidence for the  
10 committee to make a recommendation for adjunctive therapy for other interventions  
11 or for larger ureteric stones of 10 to 20 mm.

12 Evidence showed a benefit of alpha blockers as adjunctive therapy to URS in terms  
13 of stone passage and some outcomes relating to pain for adults with small distal  
14 ureteric stones (less than 10 mm) and proximal ureteric stones (10 to 20 mm). The  
15 committee agreed that this is not usual practice and also noted that the evidence  
16 was based on single studies. They agreed that further research on the use of alpha  
17 blockers, particularly tamsulosin, as adjunctive to URS for any stone less than  
18 20 mm would be beneficial to inform future practice, so decided to make a research  
19 recommendation.

20 **How the recommendations might affect practice**

21 Alpha blockers are not widely used as an adjunct to SWL for ureteric stones so this  
22 will represent a change in practice. The small cost of the alpha blockers is likely to  
23 be outweighed by the saving related to improved stone clearance.

24 Full details of the evidence and the committee's discussion are in [evidence review D:](#)  
25 [Medical expulsive therapy.](#)

26 [Return to recommendations](#)

27 ***Use of stents after ureteroscopy***

28 Recommendation [1.7.1](#)

1 **Why the committee made the recommendation**

2 No evidence was found for the use of stents after SWL or PCNL, or for people with  
3 renal stones, or for children and young people.

4 Evidence showed that there was no benefit of routine stenting after ureteroscopy for  
5 adults with ureteric stones less than 20 mm. Stents were associated with a number  
6 of adverse symptoms (dysuria, haematuria, irritative symptoms, frequency and  
7 urgency). People with a stent also had more abdominal and bladder pain, which the  
8 committee agreed were likely to be stent related. Therefore, the committee agreed  
9 that as there was no benefit of stents, and they cause adverse events that negatively  
10 affect quality of life; stents should not be routinely offered to adults who have had  
11 ureteroscopy for ureteric stones less than 20 mm. There may be instances when  
12 stents might be considered (such as more treatment anticipated, evidence of  
13 infection or obstruction, or a solitary kidney).

14 There was no evidence for stones larger than 20 mm. The committee agreed that  
15 this is a small group and the surgical treatment used varies. They noted that the  
16 decision to use a stent would be based on clinical judgement and so agreed not to  
17 make a recommendation for this group.

18 **How the recommendations might affect practice**

19 Currently around 70% of people overall receive a stent after URS and many of these  
20 are being used to avoid future problems that are unlikely to occur. Stents may still be  
21 needed in some cases, for example, when further treatment is anticipated, or there is  
22 evidence of infection or obstruction, a solitary kidney or for a Clavien-Dindo grade 3  
23 complication. A few urologists currently advocate the routine placement of stents  
24 after all URS procedures. The recommendation is likely to mean fewer people  
25 receiving stents and may be cost saving.

26 Full details of the evidence and the committee's discussion are in [evidence review 1:](#)  
27 [Stent after surgery.](#)

28 [Return to recommendations](#)

1 ***Metabolic testing***

2 Recommendations [1.8.2 to 1.8.3](#)

3 **Why the committee made the recommendations**

4 Stone analysis and blood testing (serum calcium) allows the diagnosis of rare but  
5 treatable conditions such as cystinuria, uric acid stones, and primary  
6 hyperparathyroidism. Urine testing allows for the identification of metabolic  
7 abnormalities which can be treated and so reduce the risk of future stones.

8 Evidence showed that there is effective treatment for hypercalciuria and  
9 hypocitraturia, and the committee noted that these conditions would be diagnosed  
10 with a 24-hour urine test. This shows that understanding underlying metabolic  
11 diseases can lead to prevention of stone recurrence. However, no clinical or cost  
12 effectiveness evidence for 24-hour urine testing was identified, so they agreed that  
13 they could not make a practice recommendation. They agreed to make a research  
14 recommendation on the clinical and cost effectiveness of a full metabolic  
15 investigation to inform future guidance.

16 No evidence was also found on stone analysis or blood tests in people who have or  
17 have had renal or ureteric stones. The committee agreed that there is variation in  
18 current practice, with a full range of metabolic tests being done in some areas and  
19 fewer tests in others. They agreed that it is not clear which tests are most useful and  
20 whether tests should be offered to all people with a stone or just those at high risk of  
21 stone recurrence. The committee agreed that stone analysis and serum calcium  
22 tests should be considered for adults.

23 The committee agreed that current practice for children and young people is highly  
24 variable and that referral to a paediatric nephrologist or urologist with expertise for  
25 assessment and metabolic investigations should be considered.

26 **How the recommendations might affect practice**

27 Current practice is varied and metabolic investigation is often based on the interests  
28 or preference of individual healthcare professionals, therefore the recommendations  
29 may mean a change in practice for some providers. However, the committee agreed

1 that existing centres should have the resources to cope with an increased demand  
2 for stone analysis, which is relatively easy to do and is not urgent.

3 Full details of the evidence and the committee's discussion are in [evidence review A:](#)  
4 [Metabolic investigations](#).

5 [Return to recommendations](#)

## 6 ***Frequency of follow-up imaging***

### 7 **Why the committee made the research recommendation**

8 No evidence was found on the optimum frequency of imaging in people who have or  
9 have had renal or ureteric stones. The committee agreed that there is variation in  
10 current practice, with frequency often depending on factors such as whether the  
11 person has had one stone or recurrent stones. The committee was not able to make  
12 a recommendation for practice because their experience differed, but they did agree  
13 to make a research recommendation to inform future guidance.

14 Full details of the evidence and the committee's discussion are in [evidence review J:](#)  
15 [Imaging for follow up](#).

16 [Return to recommendations](#)

## 17 ***Preventing recurrence***

18 Recommendations [1.9.1 to 1.9.5](#)

### 19 **Why the committee made the recommendations**

#### 20 ***Diet and lifestyle advice***

21 Some evidence showed a benefit of a high water intake in reducing stone recurrence  
22 in adults. Limited evidence from a single study in adults showed a benefit of lemon  
23 juice in terms of urine calcium and pH but no difference in urine oxalate. Lemon juice  
24 is high in citrate leading to higher concentrations of citrate in urine. This may stop  
25 calcium from binding to other stone constituents and so prevent stone formation and  
26 recurrence. The committee agreed to recommend a high water intake and adding  
27 lemon juice to water. Evidence showed a benefit of avoiding carbonated drinks in

1 terms of stone recurrence, and so the committee agreed to recommend that these  
2 should be avoided.

3 Evidence on diet was mixed but the committee agreed that an adequate calcium  
4 intake and a low salt intake may help to prevent stone recurrence. Evidence on  
5 avoiding a high protein diet was inconclusive, but the committee acknowledged that  
6 this is the advice currently given.

### 7 ***Potassium citrate***

8 Evidence showed that potassium citrate reduced the recurrence of calcium oxalate  
9 and calcium oxalate/calcium phosphate stones in adults compared with no  
10 intervention or placebo. There were more adverse events with potassium citrate and  
11 the committee agreed that there may be concerns about hyperkalaemia in some  
12 groups. However, the benefits in terms of stones avoided are likely to outweigh any  
13 harms. Potassium citrate is currently used in UK practice and so the committee  
14 agreed it could be considered to prevent stone recurrence in adults with calcium  
15 oxalate stones.

16 Limited evidence in children showed that potassium citrate reduced stone recurrence  
17 after PCNL and SWL. There was no information on adverse events or on the type of  
18 stone or results of urine testing. The committee discussed that in UK practice  
19 potassium citrate is used for children based on the levels of calcium or citrate in  
20 urine. They agreed that it could be considered for children with recurrence of calcium  
21 oxalate stones and with hypercalciuria or hypocitraturia.

### 22 ***Thiazides***

23 Limited evidence showed that thiazides reduced stone recurrence in adults with  
24 hypercalciuria compared with no intervention. There was no benefit for adults with  
25 normal levels of urinary calcium, and evidence was mixed when the biochemical  
26 abnormality was mixed or not defined. The committee agreed that thiazides tend to  
27 be well tolerated but should only be used after salt has been restricted. They agreed  
28 that thiazides could be considered for adults with hypercalciuria and recurrent  
29 calcium oxalate stones, but only after reducing salt intake to recommended levels.

1 There was not enough evidence for the committee to make recommendations on  
2 allopurinol or combined therapy of allopurinol and thiazides. Although limited  
3 evidence suggested a potential benefit of magnesium, the committee knew from their  
4 experience that magnesium may cause adverse effects. Magnesium is not  
5 commonly used in UK practice for people with renal or ureteric stones and the  
6 committee agreed that the limited evidence and potential for adverse events did not  
7 justify a recommendation.

8 Limited evidence from a single study of thiazides compared with placebo in people  
9 who had had previous SWL showed some benefit of thiazides in reducing the need  
10 for further SWL and for stone growth. The committee agreed that this is not usual  
11 practice and that further research would be beneficial to inform future practice.

## 12 **How the recommendations might affect practice**

### 13 ***Diet***

14 The recommendations on diet broadly reflect current practice. They emphasise the  
15 importance of dietary advice in preventing further stone episodes. Dietary advice  
16 should be given in conjunction with lifestyle advice.

### 17 ***Potassium citrate and thiazides***

18 The committee considered the impact the recommendations would have on practice,  
19 including metabolic laboratory testing. Identifying stone composition or metabolic  
20 abnormalities would be a prerequisite to the recommendations and this would have a  
21 cost as well as potential service impact.

22 Recommending the interventions also has a monitoring impact. There is variation in  
23 current practice in terms of the use of thiazides and potassium citrate for people with  
24 renal or ureteric stones.

25 Full details of the evidence and the committee's discussion are in [evidence review C:](#)  
26 [Dietary interventions.](#)

27 [Return to recommendations](#)



## 1 **Context**

2 Renal and ureteric stones usually present as an acute episode with severe pain,  
3 although some stones are picked up incidentally during imaging or may present as a  
4 history of infection. The initial diagnosis is made by taking a clinical history and  
5 examination and carrying out imaging; initial management is with painkillers and  
6 treatment of any infection.

7 Ongoing treatment of renal and ureteric stones depends on the site of the stone and  
8 size of the stone (less than 10 mm, 10 to 20 mm, greater than 20 mm; staghorn  
9 stones). Options for treatment range from observation with pain relief to surgical  
10 intervention. Open surgery is performed very infrequently; most surgical stone  
11 management is minimally invasive and the interventions include shockwave  
12 lithotripsy (SWL), ureteroscopy and percutaneous stone removal (surgery). As well  
13 as the site and size of the stone, treatment also depends on local facilities and  
14 expertise. Most centres have access to SWL, but some use a mobile machine on a  
15 sessional basis rather than a fixed-site machine with easier access during the  
16 working week. The use of a mobile machine may affect options for emergency  
17 treatment, but may also add to waiting times for non-emergency treatment.

18 Although surgery for renal and ureteric stones (ureteroscopy) is increasing (there  
19 has been a 49% increase from 12,062 treatments in 2009-2010, to 18,066 in 2014-  
20 2015 [HES data]), there is a trend towards day-case/ambulatory care, with this  
21 increasing by 10% to 31,000 cases a year between 2010 and 2015. The total  
22 number of bed-days used for renal stone disease has fallen by 15% since 2009-  
23 2010. However, waiting times for treatment are increasing and this means that  
24 patient satisfaction is likely to be lower.

25 Because the incidence of renal and ureteric stones and the rate of intervention are  
26 increasing, there is a need to reduce recurrences through patient education and  
27 lifestyle changes. Assessing dietary factors and changing lifestyle have been shown  
28 to reduce the number of episodes in people with renal stone disease.

29 Adults, children and young people using services, their families and carers, and the  
30 public will be able to use the guideline to find out more about what NICE

- 1 recommends, and help them make decisions. These recommendations apply to all
- 2 settings in which NHS-commissioned care is provided.

### 3 **Finding more information and resources**

- 4 To find out what NICE has said on topics related to this guideline, see our web page
- 5 on [renal and ureteric stones](#).