National Institute for Health and Care Excellence

Draft for consultation

Kidney cancer: diagnosis and management

Economic analysis report: management of localised renal cell carcinoma using non-surgical interventions or active surveillance

NICE guideline <…>

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Draft for Consultation

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Contents

HE1 Introduction

Renal cell carcinoma (RCC) is a common cancer with approximately 10,000 people diagnosed per year, and more than 50% of patients with RCC are diagnosed at localised stage (Mattila et al., 2022). Given the large number of cases, the resource implications on the NHS for treating localised RCC are expected to be high, and the committee highlighted this area as a priority for economic modelling. However, given the lack of clinical evidence and other review questions being more highly prioritised, a costing analysis was conducted to be presented alongside the clinical review for this question to give context of how costly each treatment option is, weighed against the outcomes in the clinical review and their potential downstream costs across the management pathway.

HE1.1 Decision problem

This costing analysis was primarily developed to support review question B on the management of localised renal cell carcinoma using non-surgical interventions or active surveillance compared with surgery, however these costs may also be useful in other reviews where the same interventions are utilised. The review questions are listed in Table HE001, and the PICO for evidence review B is detailed in Table HE002.

Table HE001: Review questions

RQ A	What is the clinical and cost effectiveness of partial compared with radical nephrectomy in adults with localised renal cell carcinoma, based on the surgical technique used, the size, location and complexity of the tumours, and the renal function and performance status of the person?
RQ B	What is the clinical and cost effectiveness of different non-surgical interventions for localised renal cell carcinoma in adults (for example thermal ablation, stereotactic ablative radiotherapy) or active surveillance, compared with surgery?
RQ C	What local interventions are clinically and cost effective for treating locally advanced renal cell carcinoma in adults? For example, surgery, extensions to surgery (such as removal of local and/or regional lymph nodes or the adrenal gland), and stereotactic ablative radiotherapy.
RQ E	For adults with small or suspected benign renal lesions that have not been treated, what are the most clinically and cost-effective approaches to active surveillance (including method, duration and frequency), based on the type of renal lesion, for the early detection of disease progression?
RQ F	For adults who have had treatment for localised or locally advanced renal cell carcinoma, what are the most clinically and cost-effective risk-stratified* follow-up strategies (based on method, duration, and frequency)?
RQ G	What are the most effective treatments and follow up strategies for adults with confirmed hereditary renal cell carcinoma following genetic assessment?
RQ H1	What is the clinical and cost-effectiveness of non-pharmacological interventions used before systemic anti-cancer therapy in adults with previously untreated advanced renal cell carcinoma?
RQ H2	What is the clinical and cost-effectiveness of non-pharmacological interventions used after systemic anti-cancer therapy for adults with advanced renal cell carcinoma?

1 **Table HE002: PICO for review question**

Population	Adults (18 years or over) with (histologically confirmed or suspected on imaging) localised renal cell carcinoma (RCC)

Intervention	• Thermal ablation
	  ○ Radiofrequency ablation
	  ○ Cryoablation
	  ○ Microwave ablation
	• Stereotactic ablative radiotherapy (SABR)
	• Active surveillance

Comparator	• Surgery
	  ○ Partial nephrectomy
	  ○ Radical nephrectomy

Outcomes	Costs

HE2 Methods

HE2.1 Model overview

A costing approach was taken to estimate upfront costs of each treatment option, alongside the costs of follow-up after each initial treatment option and the costs of potential downstream events such as recurrence. Resource use estimates were combined with unit cost data to calculate these costs for each treatment option.

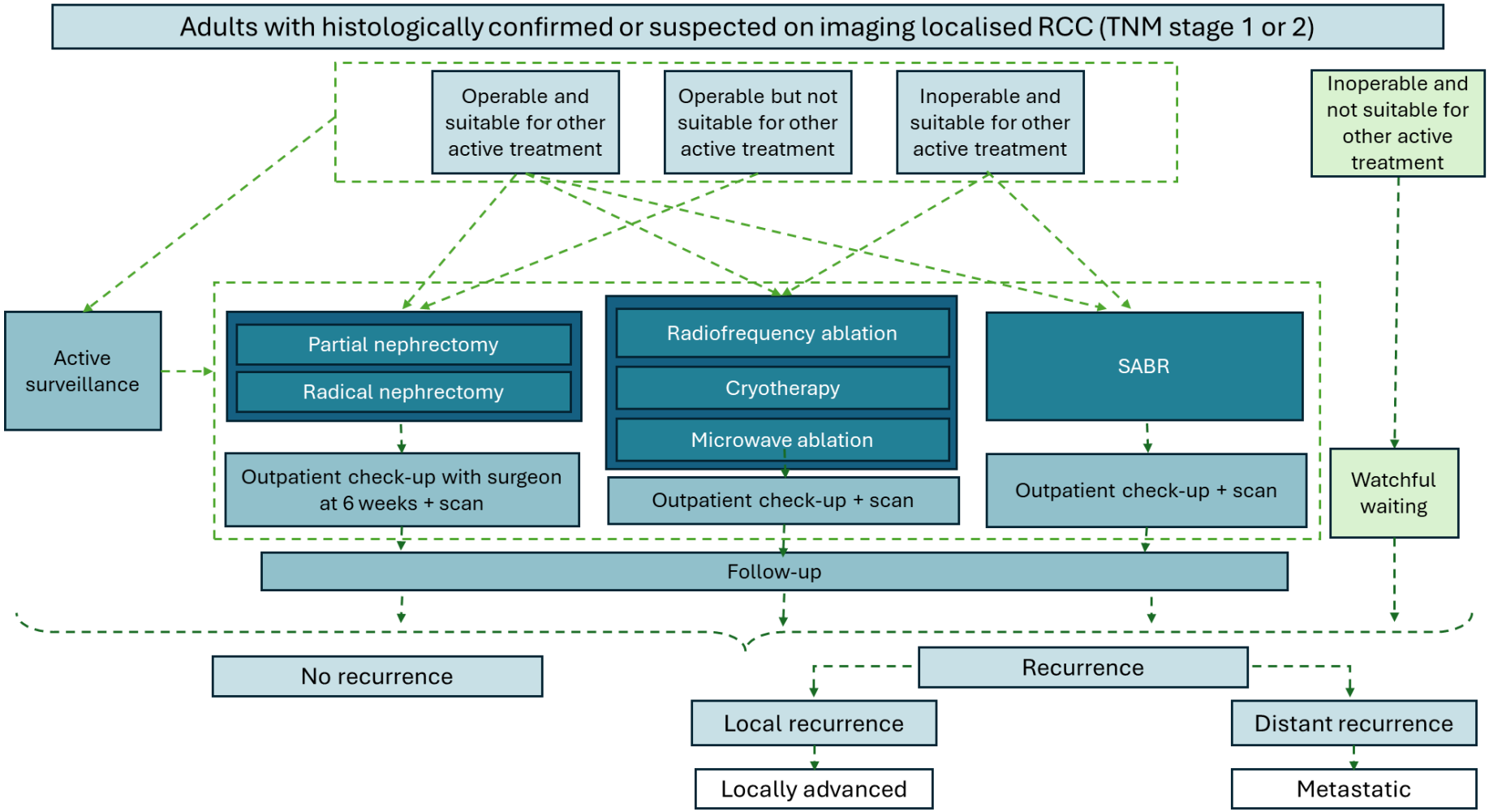
Where possible, resource use estimates were obtained from the National Kidney Cancer Audit (NKCA). Where data was not reported, a cost-effectiveness analysis with a UK NHS perspective was identified during the scoping of evidence for this guideline, Rossi et al (2021). This was a decision analysis evaluating screening for kidney cancer using focused renal ultrasound, which modelled the kidney cancer pathway and thus provided resource use inputs that were suitable for our analysis.

The committee agreed that recurrence is one of the most important outcomes for this review and is a more informative indicator of effectiveness of a treatment than survival outcomes. The likelihood of recurrence and impact on survival are at the forefront of peoples' concern about treatment options for localised RCC. Therefore, the costs of managing recurrence were included in the analysis.

The pathway for the treatment options included in the costing analysis is detailed in

Figure 1.

Figure 1: Treatment options for different patient populations in the costing analysis



HE2.1.1 Population

The population considered for this analysis is adults with histologically confirmed or suspected on imaging localised RCC, aligning with the primary review question (B).

Not everyone who is operable is suitable for SABR or ablation, and the eligibility is dependent on a variety of factors. For this analysis the costs are not calculated for each subgroup and are instead presented for each individual treatment strategy.

A subset of this population is those whose cancer is inoperable and also unsuitable for thermal ablation or SABR. Given these people would not be able to receive any treatment, they would not have active surveillance (as a pre-cursor to possible treatment) and their only management option at this stage would be watchful waiting, which is often used when the goal is to manage symptoms rather than to cure the disease. Therefore, this subgroup is not included in this analysis.

HE2.1.2 Interventions

The interventions included in the costing analysis are aligned with the protocol for this review question, and cover all routinely used treatment strategies for localised RCC.

- Non-surgical interventions
    - Thermal ablation
        - Radiofrequency ablation
        - Microwave ablation
        - Cryotherapy
    - Stereotactic ablative radiotherapy (SABR)
    - Active surveillance
- Surgical interventions
    - Partial nephrectomy
    - Radical nephrectomy

HE2.1.3 Type of evaluation, time horizon, perspective, discount rate

The study was a costing analysis. Costs of different management options for this population were estimated; effectiveness measures were not included.

The perspective on costs is that of the NHS and PSS, with the majority of unit costs sourced from the NHS Cost Collection, using a 2023/24 cost year.

The analysis includes the cost of downstream events that occur after the primary treatment. For the cost of follow up, the time horizon was five years, which is the recommended minimum time that people are followed up for. For the cost of managing recurrence, there is not an explicit time horizon; this outcome is generally reported in clinical trials in which patients had at least a 5-year follow-up time for disease recurrence. The analysis does not include discounting.

HE2.2 Initial treatment costs

HE2.2.1 Surgery

Both partial and radical nephrectomies can be done as either an open or minimally invasive (laparoscopic) procedure, with the cost differing between these types of approaches rather

than whether the surgery is a partial or radical nephrectomy. The costs for open and laparoscopic procedures can be sourced from the NHS Cost Collection (see Table HE003). The committee noted that nephrectomy would also be followed by an appointment with a surgical consultant (see Table HE003 and total costs in Table HE006).

Table HE003: Nephrectomy unit costs

Nephrectomy	Unit cost	Source
Open nephrectomy	£10,142	NHS Cost Collection (2024), weighted average of codes LB61C-G, Major, Open or Percutaneous, Kidney or Ureter Procedures, 19 years and over, CC scores 0-10+
Laparoscopic nephrectomy	£9,970	NHS Cost Collection (2024), weighted average of codes LB62C and D, Major Laparoscopic, Kidney or Ureter Procedures, 19 years and over, CC scores 0-3+
Appointment with surgical consultant	£157	NHS Cost Collection (2024). Urology service 101, consultant led, outpatient attendance

The cost of robotic nephrectomy, however, is not available from NHS Cost Collection as there is not a specific HRG code for this procedure at present, and the committee noted that there are difficulties with costing these procedures. In the absence of a published unit cost for robotic nephrectomy, this cost was calculated using a published source and the costs for open and laparoscopic procedures.

Camp et al. (2018) reported 2015/16 HRG tariff costs for each of the three approaches for partial nephrectomy. The tariff costs are not used directly as they are based on the NHS Cost Collection and other factors including efficiency, inflation and local variation, whereas the NHS Cost Collection represents the actual expenses incurred by NHS providers in delivering services. To calculate the predicted reference cost for robotic nephrectomy, a ratio was calculated between the robotic and laparoscopic costs reported by Camp et al. and this ratio was then applied to the cost from the NHS Cost Collection (2024) for laparoscopic nephrectomy (see Table HE004). The ratio was calculated between robotic and laparoscopic surgery costs rather than with the open surgery cost as the committee felt that it was important to maintain that the robotic cost is expected to be higher than laparoscopic given this is what their experience had indicated.

Table HE004: Robotic nephrectomy cost calculation

Nephrectomy	Unit cost	Source
Robotic nephrectomy	£10,172	Camp et al. (2018) reported costs of £4,356 and £4,444 for laparoscopic and robotic nephrectomy, respectively. Ratio of robotic to laparoscopic partial nephrectomy cost is calculated as £4,444 / £4,356 = 1.02. Cost ratio multiplied by the laparoscopic nephrectomy reference cost in Table HE003: 1.02 x £9,970 = £10,172

The proportions of surgical techniques for both partial and radical nephrectomies were sourced from the NKCA and are presented in Table HE005. The NKCA also reported that 31% of nephrectomies were partial, and 69% were radical. These proportions were used with the unit costs to calculate the total costs of treatment with nephrectomies (see Table HE006).

Table HE005: Nephrectomy proportions, NKCA

Surgical technique	Partial nephrectomies	Radical nephrectomies
Open	9%	20%
Laparoscopic	4%	48%
Robotic	87%	31%

Table HE006: Total treatment costs, nephrectomies

Surgery type	Treatment cost
Partial nephrectomy	£10,319
Radical nephrectomy	£10,226
Any nephrectomy	£10,255

HE2.242 Thermal ablation

The costs of thermal ablation procedures are available from NHS Cost Collection and are listed in Table HE007.

Table HE007: Procedure unit costs, thermal ablation

Ablation technique	Unit cost	Source
Radiofrequency ablation	£1,960	NHS Cost Collection (2024), code YL02Z Standard Percutaneous Ablation of Lesion of Kidney
Cryoablation	£3,474	NHS Cost Collection (2024), code YL01Z Complex Percutaneous Ablation of Lesion of Kidney
Microwave ablation	£1,960	NHS Cost Collection (2024), code YL02Z Standard Percutaneous Ablation of Lesion of Kidney

The committee noted that for all thermal ablation procedures there would be a follow-up appointment with a consultant surgeon after the procedure. This cost is presented in Table HE008.

Table HE008: Follow-up unit cost

Item	Unit cost	Source
Follow-up appointment	£157	NHS Cost Collection (2024). Urology service 101, consultant led, outpatient attendance

The total cost of treatment for each type of thermal ablation is presented in Table HE009. An average cost of any ablation is also presented using weights from Rossi et al. (2021) who assumed that 60% of ablation would be cryoablation, and we assumed the remaining 40% would be evenly split between microwave and radiofrequency ablation.

Table HE009: Total treatment costs of thermal ablation

Ablation technique	Cost
Radiofrequency ablation	£2,118
Cryoablation	£3,632
Microwave ablation	£2,118
All ablation (weighted average)	**£3,026**

HE2.2.3 SABR

Resource use associated with SABR was discussed with the committee, and they agreed that treatment with SABR would require preparation using a CT scan prior to the procedure and generally people would receive between one and three fractions of therapy. The unit costs associated with these elements are listed in Table HE010.

Table HE010: SABR unit costs

Item	Unit cost	Source
CT preparation	£1,691	NHS Cost Collection (2024), code SC41Z Preparation for Intensity Modulated Radiation Therapy, with Technical Support
One fraction of therapy	£237	NHS Cost Collection (2024), code SC22Z Deliver a fraction of treatment on a megavoltage machine

The committee also discussed the need for post-treatment follow up after SABR treatment and two scenarios were explored for this; follow up with the cancer multidisciplinary team (MDT) plus imaging with CT CAP, or follow up with a surgical consultant plus imaging with CT CAP. Unit costs for these follow up activities are listed in Table HE011.

Table HE011: SABR follow up unit costs

Item	Unit cost	Source
CT CAP (chest, abdomen and pelvis)	£123	NHS Cost Collection (2024), code RD26Z Computerised Tomography Scan of Three Areas, with Contrast
Cancer MDT meeting	£82	NHS Cost Collection (2024), code CMDTOth Other Cancer MDT meetings
Appointment with surgical consultant	£157	NHS Cost Collection (2024). Urology service 101, consultant led, outpatient attendance

The total costs for combinations of the number of fractions and different follow-up scenarios were calculated and are presented in Table HE012. These scenario costs range from £2,133 to £2,684, with patients receiving three fractions of therapy and follow up with a surgical consultant associated with the highest cost.

Table HE012: SABR scenario costs

Number of fractions	Follow-up type	Scenario cost
1	Cancer MDT	£2,133
1	Surgical consultant	£2,209
3	Cancer MDT	£2,608
3	Surgical consultant	£2,684

HE2.2.4 Active surveillance

At the time of analysis there was not a single agreed active surveillance protocol, so the costing analysis was based on the Getting It Right First Time (GIRFT) guidelines and committee opinion, and scenarios with different imaging modalities were discussed. One scenario included cross-sectional imaging with CT with contrast of chest, abdomen and pelvis (CT CAP) in the first year, and then annually thereafter. The second scenario included CT CAP in the first year, and then further imaging on an annual basis alternating between

ultrasound and CT CAP. The third scenario included an MRI with contrast of three areas in the first year, followed by annual imaging alternating between ultrasound and MRI.

Unit costs of the three imaging modalities are listed in Table HE013 and the scenarios and corresponding annual costs are presented in Table HE014.

Table HE013: Imaging unit costs

Item	Unit cost	Source
CT CAP (chest, abdomen and pelvis)	£123	NHS Cost Collection (2024), code RD26Z Computerised Tomography Scan of Three Areas, with Contrast
Ultrasound	£53	NHS Cost Collection (2024), code RD41Z Ultrasound Scan with duration of less than 20 minutes, with Contrast
MRI	£202	NHS Cost Collection (2024), code RD05Z Magnetic Resonance Imaging Scan of Two or Three Areas, with Contrast

Table HE014: Imaging scenario annual costs

Scenario	First year cost	Mean subsequent annual cost
CT CAP only	£123	£123
Alternating CT CAP and ultrasound	£123	£88
Alternating MRI and ultrasound	£202	£128

HE2.3 Follow-up costs

Monitoring of patients after treatment comprises imaging, namely CT scans, at regular intervals. Complete blood counts are taken prior to imaging.

The committee noted that current clinical practice is inconsistent for follow-up after treatment of primary RCC. Follow-up schedules over 5 years for the costing analysis are based on the GIRFT guidance (see Table HE015) and committee opinion, with costs of scans taken from NHS Cost Collection.

Costs were estimated for each risk category, with their risk score based on their RCC subtype (e.g. Leibovich score for clear cell RCC). People previously receiving SABR and thermal ablation are assumed to be followed up as if they are intermediate risk.

The total cost of 5 years of follow-up is calculated for each risk group, presented in Table HE017.

Table HE015: GIRFT guidance, risk stratified follow-up after nephrectomy

Risk profile	3m	6m	1y	1.5y	2y	3y	4y	5y	>5y
Low	-	-	CT	-	-	CT	-	CT	Discharge
Intermediate	-	CT	CT	-	CT	CT	CT	CT	CT every 2 years
High	CT	CT	CT	CT	CT	CT	CT	CT	CT every 2 years

Table HE016: Unit costs for follow up

Item	Unit cost	Source
CT CAP (chest, abdomen and pelvis)	£123	NHS Cost Collection (2024), code RD26Z Computerised Tomography Scan of Three Areas, with Contrast
Blood test	£3	NHS Cost Collection (2024), DAPS PATH05 haematology, total

Table HE017: Total cost of 5 years of follow-up

Risk level	Total costs
Low risk	£378
Intermediate risk	£757
High risk	£1,009

HE2.4 Adjuvant treatment costs

Pembrolizumab is approved as an adjuvant treatment after complete tumour resection of RCC in adults at increased risk of recurrence after resection. People treated with SABR or ablation are not eligible for adjuvant therapy with pembrolizumab, as per the NHS commissioning guidelines. The committee considered this treatment an important cost and advised that around 30% of people who have had a nephrectomy would go on to receive adjuvant pembrolizumab.

Adjuvant pembrolizumab is given as a 200mg dose every three weeks for one year. The BNF reports the list price of one 100mg vial of pembrolizumab as £2,630, and the total cost of one year of adjuvant treatment is calculated as £91,486. When applied to the eligible 30% of the population, this is an average cost of £27,446.

Pembrolizumab is administered intravenously within a hospital setting, and it is assumed to take 30 minutes. The unit cost was estimated from NHS Cost Collection (HRG code SB12Z - administer simple parenteral chemotherapy at first attendance), and was assumed to be a weighted average of day case and regular day and night admission procedure costs.

Pembrolizumab has a patient access scheme comprising a confidential simple discount to the list price. This has not been included in this costing analysis as it was not made available to the project team. In addition, this cost does not include the costs associated with monitoring and testing requirements for people who are eligible for pembrolizumab, as these are incorporated into the cost of follow up (see Section HE2.3). Therefore, the cost of adjuvant treatment in this analysis overestimates the medicine cost and underestimates the associated costs to the NHS.

HE2.5 Cost of downstream events

The key clinical outcome for the review questions on treatment of localised and locally advanced RCC is disease-free survival. It was therefore considered important to estimate the costs of disease recurrence in this analysis to give an indication of downstream costs after initial treatment of RCC.

HE2.5.11 Localised recurrence

Localised or locally advanced recurrences were assumed to be managed with partial or radical nephrectomy, as either open, laparoscopic or robotic procedures as reported by Rossi et al. and listed in Table HE018. In the Rossi et al study, 51% of people with stage III RCC were managed by open radical nephrectomy while the remaining were managed by laparoscopic or robotic nephrectomy, and this was based on expert opinion. Nephrectomy procedure costs are assumed to be equivalent to those listed in Table HE2.2.1.

People with localised recurrences also received a CT scan, blood test and medical or clinical oncologist visits every 4 months during 5-year follow-up after the recurrence.

The total cost for the management of a localised or locally advanced recurrence is estimated as £14,649 per recurrence.

Table HE018: Management of localised recurrences

Management strategy	Proportion
Open nephrectomy	51.0%
Laparoscopic nephrectomy	24.5%
Robotic nephrectomy	24.5%

Table HE019: Unit costs for the management of localised recurrences

Management strategy	Cost	Source
Open nephrectomy	£10,142	NHS Cost Collection (2024), weighted average of codes LB61C-G, Major, Open or Percutaneous, Kidney or Ureter Procedures, 19 years and over, CC scores 0-10+
Laparoscopic nephrectomy	£9,970	NHS Cost Collection (2024), weighted average of codes LB62C and D, Major Laparoscopic, Kidney or Ureter Procedures, 19 years and over, CC scores 0-3+
Robotic nephrectomy	£10,172	Camp et al. (2018) reported costs of £4,356 and £4,444 for laparoscopic and robotic nephrectomy, respectively. Ratio of laparoscopic to robotic nephrectomy is calculated as £4,444 / £4,356 = 1.02. Ratio multiplied by the laparoscopic reference cost in Table HE003: 1.02 x £9,970 = £10,172
Clinical oncologist	£160	NHS Cost Collection (2024), Summary outpatient attendances 800 clinical oncology
Medical oncology appointment	£193	NHS Cost Collection (2024) Summary outpatient attendances 370 medical oncology
CT scan	£123	NHS Cost Collection (2024), Computerised Tomography Scan of Three Areas, with Contrast
Blood test	£3	NHS Cost Collection (2024), DAPS PATH05 haematology, total
Total cost	**£14,649**	

HE2.5.12 Distant recurrence

Management of distant recurrences consists of a range of treatments, including systemic therapy, metastasectomy and palliative care. For this analysis, the types and distribution of treatments received were not available from NKCA, and so were obtained from Rossi et al. (2021) and confirmed with the guideline committee.

Rossi et al. reported that 28% of people with stage IV RCC receive no systemic therapy. The committee noted that the remaining proportion of people receiving systemic therapy (72%) was lower than expected and is slightly out of date as data were sourced from published papers between 2013-2018 which pre-dates many of the systemic therapy options recommended by NICE, and suggested that this proportion receiving systemic therapy could be assumed to be 85%. The procedure costs were sourced from NHS Cost Collection. The costs of systemic therapies were sourced from the NICE RCC pathway model (TA964), including medicine costs and all healthcare costs.

People who received cytoreductive nephrectomy and metastasectomy were assumed to have a CT scan, blood test and medical and clinical oncologist visits every 4 months during 1-year follow up. These proportions and costs are listed in Table HE020 and Table HE021.

The total cost for the management of distant recurrence is estimated as £77,342 per recurrence.

Table HE020: Management of distant recurrences

Management strategy	Proportion	Source
Cytoreductive nephrectomy (including costs over 1 year)	37.0%	Rossi et al. (2021)
Metastasectomy	17%	Rossi et al. (2021)
Palliative radiotherapy for bone pain	12%	Rossi et al. (2021)
Any systemic therapy	85.0%	Committee opinion

Table HE021: Unit costs for the management of distant recurrences

Management strategy	Unit cost	Source
Cytoreductive nephrectomy	£10,226	NHS Cost Collection (2024) - see Table HE006 (assume same as radical nephrectomy)
Clinical oncologist	£160	NHS Cost Collection (2024), Summary outpatient attendances 800 clinical oncology
Medical oncology appointment	£193	NHS Cost Collection (2024) Summary outpatient attendances 370 medical oncology
CT scan	£123	NHS Cost Collection (2024), Computerised Tomography Scan of Three Areas, with Contrast
Blood test	£3	NHS Cost Collection (2024), DAPS PATH05 haematology, total
Metastastectomy	£5,733	Weighted average of NHS Cost Collection (2024) LB06J-M Kidney urinary tract or prostate neoplasms with interventions CC score 0-8 and DZ17P-R Respiratory neoplasms with single intervention CC score 0-10+

Management strategy	Unit cost	Source
	£1,770	NHS Cost Collection (2024), SC41z preparation for intensity modulated radiation therapy with technical support
Palliative radiotherapy	£240	NHS Cost Collection (2024), SC22z deliver a fraction of treatment on a megavoltage machine
Systematic therapy	£84,510	Calculated from RCC pathway model including medicine and all other healthcare costs

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HE3 Results

HE3.1 Summary results

3 A summary of the management costs is presented in Table HE022.

4 **Table HE022: Summary of management costs**

Procedure	Type of procedure	Total cost of the procedure
Partial nephrectomy	Open: 9% Laparoscopic: 4% Robotic: 87%	Open: £10,142 Laparoscopic: £9,970 Robotic: £10,172 Surgical consultant: £157 Total: £10,319
Radical nephrectomy	Open: 20% Laparoscopic: 48% Robotic: 31%	Open: £10,142 Laparoscopic: £9,970 Robotic: £10,172 Surgical consultant: £157 Total: £10,226
Thermal ablation	Radiofrequency: 20% Cryoablation: 60% Microwave ablation: 20%	Radiofrequency: £2,118 Cryoablation: £3,632 Microwave ablation: £2,118 Total: £3,026
SABR	Lowest estimate: 1 fraction of radiation, post-surgical appointment with cancer MDT Highest estimate: 3 fractions of radiation, post-surgical appointment with surgical consultant	£2,133 £2,684

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6 The costs of downstream costs, including adjuvant treatment, follow-up and management of
7 recurrences, are presented in Table HE023.

8 **Table HE023: Summary of downstream costs**

Downstream resource	Costing approach	Total cost

Adjuvant treatment	Assume 30% receive adjuvant pembrolizumab after nephrectomy. Cost per vial: £2,630. Administration cost per dose: £398. Dose administered every 3 weeks.	Total 1-year cost: £29,522
Follow up	CT scan with contrast of three areas. Low risk: 3 total scans, intermediate risk: 6 total scans, high risk: 8 total scans.	Total 5-year cost: Low risk: £378 Intermediate risk: £757 High risk: £1,009
Recurrence	Local recurrence: 51% managed by open nephrectomy, 24.5% by laparoscopic nephrectomy and 24.5% by robotic nephrectomy. Distant recurrence: 85% systemic therapy, 37% cytoreductive nephrectomy, 12% radiotherapy, 17% metastasectomy.	Cost per local recurrence (5-year cost): £14,649 Cost per distant recurrence (1-year cost): £77,342 Note that these costs apply onto to those who experience recurrence.

HE3.2 Discussion

HE3.2.1 Principal findings

The analysis highlighted that the treatment costs of nephrectomy are higher than those for thermal ablation, SABR, or active surveillance, particularly when adjuvant therapy costs are included. For SABR, the upfront and follow-up costs were slightly lower than thermal ablation.

The procedure and management costs of each method of nephrectomy are estimated to be broadly similar, although the committee did note that they would expect the cost of robotic surgery to be higher than laparoscopic surgery.

Although the comparative rates of downstream events were not included in the analysis, it was important that the committee were aware of the magnitude of costs associated with managing recurrences to help inform their discussions. The costs of managing recurrences, particularly distant recurrences that are treated with systemic therapy, are higher than the costs of primary treatments. Local recurrences are less expensive to manage than distant recurrences and have better outcomes, but can still cause anxiety to people even if the subsequent treatment was not clinically complex.

Apart from benefits in risk reduction of recurrence and metastases, some treatments are associated with a higher risk of complications in certain population groups, for instance surgery versus thermal ablation for elders with comorbidities, therefore recommendations for individual treatments should weigh the risks and benefits of recurrence against operative complications by considering the patient's wishes and comorbidities/condition.

Disease recurrence as a key clinical outcome has large impact on patients and the choice of management. Despite the low to very low quality of clinical evidence, the clinical data on recurrence outcomes suggests that both radical and partial nephrectomy may have better results than thermal ablation, which aligns with committee's' clinical experience.

Even though the cost of surgery is much higher than the cost of thermal ablation and SABR, this short-term high procedure cost may be offset by the reduction of costs of recurrence management in future. Thermal ablation and active surveillance may have better renal function outcomes than radical nephrectomy, and may therefore have reduced costs of managing reduced renal function, which can be substantial at end stage kidney disease where dialysis or transplantation may be required.

HE3.2.2 Strengths of the analysis

The main strength of this costing analysis is that it covers multiple review questions, as the interventions are common across different stages of treatment.

Although the analysis did not directly account for additional factors such as length of hospital stay after treatment, this was implicitly captured as the NHS Cost Collection were used which do include all costs incurred for particular hospital episodes.

HE3.2.3 Limitations of the analysis

The main limitation of this analysis is that clinical outcomes such as recurrence rates and adverse events were not incorporated as the focus of this analysis was intended to be on costs rather than a cost effectiveness analysis. The majority of clinical evidence for this review was very low quality and was based on non-randomised studies, which suggests that building a model based on this poor evidence would be full of uncertainties and may not be informative. Therefore, the downstream costs were presented as unit costs per event rather than as expected costs for each intervention, and do not enable a quantitative comparison. However, these costs were useful for the committee to give some context of the cost to the NHS alongside the clinical evidence presented.

The committee expressed that there is currently inconsistency in clinical practice in follow-up protocols, with variation in both frequency and approach. Therefore, there is some uncertainty in the cost estimates for these elements, and ranges and scenarios have been presented to account for this uncertainty.

The committee noted that there are challenges with assigning costs to robotic surgery procedures, and that they would expect a larger difference in total episode cost between robot-assisted nephrectomy and other surgical approaches given the number of staff required and cost of consumables (e.g. acquiring and maintaining the robot). When making their recommendations the committee were aware of this likely higher cost.

HE4 References

Camp C, O'Hara J, Hughes D, Adshead J. Short-term Outcomes and Costs Following Partial Nephrectomy in England: A Population-based Study. 2018. European urology focus, 4(4) 579-585.

Jones K, Weatherly H, Birch S, Castelli A, Chalkley M, Dargan A, Forder J, Gao M, Hinde S, Markham S, et al. Unit Costs of Health and Social Care 2023 Manual. Technical report. Personal Social Services Research Unit (University of Kent) & Centre for Health Economics (University of York). 2024. Available from https://www.pssru.ac.uk/unitcostsreport/.

Mattila, K. E., Vainio, P., & Jaakkola, P. M. (2022). Prognostic Factors for Localized Clear Cell Renal Cell Carcinoma and Their Application in Adjuvant Therapy. Cancers, 14(1), 239. https://doi.org/10.3390/cancers14010239.

National Institute for Health and Care Excellence (NICE). British National Formulary (BNF). 2024. Available from https://bnf.nice.org.uk/.

National Institute for Health and Care Excellence (NICE). Cabozantinib with nivolumab for untreated advanced renal cell carcinoma TA964. Available from: https://www.nice.org.uk/guidance/TA964

National Institute for Health and Care Excellence (NICE). Resource impact report: Pembrolizumab for adjuvant treatment of renal cell carcinoma (TA830). 2022. Available from https://www.nice.org.uk/guidance/ta830/resources.

National Kidney Cancer Audit (NKCA). National Kidney Cancer Audit State of the Nation Report 2024. Available from https://www.natcan.org.uk/reports/nkca-state-of-the-nation-report-2024/.

NHS England Getting It Right First Time (GIRFT). Urology: Towards better care for patients with kidney cancer. 2023. Available from https://gettingitrightfirsttime.co.uk/girft-guide-supports-better-care-for-people-with-kidney-cancer/.

NHS England National Cancer Drugs Fund list. 2024. Available from https://www.england.nhs.uk/publication/national-cancer-drugs-fund-list/.

NHS England. National Cost Collection for the NHS: National schedule of NHS costs 2023/24. Available from https://www.england.nhs.uk/costing-in-the-nhs/national-cost-collection/.

Rossi SH, Klatte T, Usher-Smith JA, et al. A Decision Analysis Evaluating Screening for Kidney Cancer Using Focused Renal Ultrasound. 2021. European urology focus, 7(2) 407-419.