National Cancer Recovery Group
National Cancer Quality Steering Group

Renal Cancer
Clinical Quality Performance Indicators

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Revision History

Version	Date	Summary of Changes
V1.0	January 2012	Initial publication
V2.0	November 2013	Addition of QPI 4 – Multidisciplinary Team (MDT) Meeting
V2.1	December 2014	Baseline review changes
V3.0	October 2016	Formal review changes (1st Cycle)
V3.1	August 2017	Amendment to QPI 13 – Trifecta Rate
V4.0	July 2019	Formal review changes (2nd Cycle)
V5.0	June 2022	Formal review changes (3rd Cycle)

Contents Update Record

June 2022 (v5.0)
This document was updated following formal review (3rd cycle) of the Renal Cancer Quality Performance Indicators (QPIs) which took place following analysis of year 9 of the renal cancer QPI data.

The following QPIs have been updated:

- QPI 1 – Radiological Diagnosis
- QPI 2 – Histological Diagnosis
- QPI 7 – Nephron Sparing Treatment
- QPI 10 – Prognostic Scoring in Metastatic Disease
- QPI 11 – Leibovich Score
- QPI 13 – Trifecta Rate

The following QPIs has been archived*:

- QPI 15 – 30 Day Mortality for Systemic Anti-Cancer Therapy (SACT)
- QPI 14 – Clinical Trial & Research Study Access

* These important indicators will continue to be monitored via other national reporting systems rather than through the QPI process.

As a result of the changes above, the contents page and page numbering differ from earlier versions of this document. Sections 1 – 11 and the appendices have also been updated.

Please note that this version of the Renal Cancer QPI Document applies to cases diagnosed from 1st January 2021. Where amended or new QPIs require new data items for measurement, this will apply for patients diagnosed from 1st January 2022.

Previous Versions

July 2019 (v4.0)
This document was updated following formal review (2nd cycle) of the Renal Cancer Quality Performance Indicators (QPIs) which took place following analysis of year 6 of the renal cancer QPI data.

The following QPIs have been updated:

- QPI 2 – Histological Diagnosis

- QPI 7 – Nephron Sparing Treatment
- QPI 8 – 30/90 Day Mortality following Treatment for RCC
- QPI 9 – Systemic Therapy
- QPI 10 – Prognostic Scoring in Metastatic Disease
- QPI 12 – Volume of Cases per Surgeon
- QPI 13 – Trifecta Rate
- QPI 14 – Clinical Trial & Access Research Study Access

The following new QPI has been added:

- QPI 15 – 30 Day Mortality for Systemic Anti-Cancer Therapy (SACT)

Please note that this version of the Renal Cancer QPI Document applies to cases diagnosed from 1st January 2018. Where amended or new QPIs require new data items for measurement, this will apply for patients diagnosed from 1st January 2019.

August 2017 (v3.1)
Please note that this document has been updated to amend QPI 13 – Trifecta Rate.

October 2016 (v3.0)
This document was updated following formal review of the Renal Cancer Quality Performance Indicators (QPIs) which took place following analysis of year 3 of the renal cancer QPI data.

The following QPIs have been updated:

- QPI 1 – Radiological Diagnosis
- QPI 2 – Histological Diagnosis
- QPI 4 – Multidisciplinary Team (MDT) Meeting
- QPI 7 – Nephron Sparing Surgery
- QPI 8 – 30 / 90 Day Mortality

The following QPIs have been archived:

- QPI 5 – Histological Grading
- QPI 6 - Surgical Treatment

The following new QPIs have been added:

- QPI 10 - Prognostic Scoring in Metastatic Disease
- QPI 11 - Leibovich Score
- QPI 12 - Volume of Cases per Surgeon
- QPI 13 - Trifecta Rate

Please note the extant Clinical Trials QPI has now been added into each tumour specific QPI document (see QPI 14 – Clinical Trials).
As a result of the changes above, the contents page and page numbering differ from earlier versions of this document. Sections 1 – 11 and the appendices have also been updated.

Please note that this version of the Renal Cancer QPI Document applies to cases diagnosed from 1st January 2015. Where amended or new QPIs require new data items for measurement, this will apply for patients diagnosed from 1st January 2016.

December 2014 (v2.1)
This document was updated following baseline review of the Renal Cancer QPIs which took place following analysis of year 1 of the renal cancer QPI data. As a result, the below QPIs have been updated:

- QPI 1 – Radiological Diagnosis
- QPI 8 – 30-Day Mortality

Please note that this version of the Renal Cancer QPI Document applies to cases diagnosed from 1st January 2014.

November 2013 (v2.0)
Please note that this document has been updated to include QPI 4 – Multi-Disciplinary Team (MDT) Meeting.

The overall QPI numbering, contents page and the page numbering have been amended as a result and therefore differ from earlier versions of this document.

Contents Page

1. National Cancer Quality Programme

Better Cancer: Ambition and Action (2016)[1] details a commitment to delivering the National Cancer Quality Programme across NHS Scotland, with a recognised need for national cancer QPIs to support a culture of continuous quality improvement. Addressing variation in the quality of cancer services is pivotal to delivering improvements in quality of care. This is best achieved if there is consensus and clear indicators of what good cancer care looks like.

Small sets of cancer specific outcome focussed, evidence based indicators are in place for 19 different tumour types. These QPIs ensure that activity is focused on those areas that are most important in terms of improving survival and individual care experience whilst reducing variation and supporting the most effective and efficient delivery of care for people with cancer. QPIs are kept under regular review and are responsive to changes in clinical practice and emerging evidence.

A programme to review and update the QPIs in line with evolving evidence is in place as well as a robust mechanism by which additional QPIs will be developed over the coming years.

1.1 Quality Assurance and Continuous Quality Improvement

The ultimate aim of the programme is to develop a framework, and foster a culture of continuous quality improvement, whereby real time data is reviewed regularly at an individual Multidisciplinary Team (MDT)/Unit level and findings actioned to deliver continual improvements in the quality of cancer care. This is underpinned and supported by a programme of regional and national comparative reporting and review.

NHS Boards are required to report against QPIs as part of a mandatory, publicly reported, programme at a national level. A rolling programme of reporting is in place, with approximately three national tumour specific summary reports published annually. These reports highlight the publication of performance data in the Cancer QPI dashboard held within the Scottish Cancer Registry and Intelligence Service (SCRIS). The dashboard includes comparative reporting of performance against QPIs at MDT/Unit level across NHS Scotland, trend analysis and survival. This approach helps to overcome existing issues relating to the reporting of small volumes in any one year.

In the intervening years, tumour specific QPIs are monitored on an annual basis through established Regional Cancer Network and local governance processes, with analysed data submitted to Public Health Scotland (PHS) for inclusion in the Cancer QPI Dashboard and subsequent national summary reports. This ensures that timely action is taken in response to any issues that may be identified through comparative reporting and systematic review.

2. Quality Performance Indicator Development Process

The QPI development process was designed to ensure that indicators are developed in an open, transparent and timely way.

The Renal Cancer QPI Development Group was convened in May 2010, chaired by Dr Robert Masterton (Chair of the National Cancer Quality Steering Group). Membership of this group included clinical representatives drawn from the three regional cancer networks, Healthcare Improvement Scotland, Information Services Division (ISD) and patient/carer representatives.

The development process and membership of the development group can be found in appendix 1.

3. QPI Formal Review Process

As part of the National Cancer Quality Programme, a systematic rolling programme of national review has been developed. This ensures all tumour specific QPIs are subject to formal review following every 3rd year of comparative QPI data analysis.

The formal review process is clinically driven with proposals for change sought from specialty specific representatives in each of the Regional Cancer Networks. It is designed to be flexible in terms of the extent of review required with tumour specific Regional Clinical Leads undertaking a key role in this decision making. Formal review meetings to further discuss proposals are arranged where deemed necessary. The review builds on existing evidence using expert clinical opinion to identify where new evidence is available, and a full public engagement exercise will take place where significant revisions have been made or new QPIs developed.

During formal review QPIs may be archived and replaced with new QPIs. Triggers for doing so include significant change to clinical practice, targets being consistently met by all Boards, and publication of new evidence. Where QPIs have been archived, associated data items will continue to be collected where these are utilised for other indicators, or measures such as survival analysis.

Any new QPIs are developed in line with the following criteria:

- **Overall importance** – does the indicator address an area of clinical importance that would significantly impact on the quality and outcome of care delivered?
- **Evidence based** – is the indicator based on high quality clinical evidence?
- **Measurability** – is the indicator measurable i.e. are there explicit requirements for data measurement and are the required data items accessible and available for collection?

Three formal reviews of the Renal Cancer QPIs have been undertaken to date. Further information can be found in appendix 2.

4. Format of the Quality Performance Indicators

QPIs are designed to be clear and measurable, based on sound clinical evidence whilst also taking into account other recognised standards and guidelines.

- Each QPI has a **short title** which will be utilised in reports as well as a fuller **description** which explains exactly what the indicator is measuring.
- This is followed by a brief overview of the **evidence base and rationale** which explains why the development of this indicator was important.
- The measurability **specifications** are then detailed; these highlight how the indicator will actually be measured in practice to allow for comparison across NHS Scotland.
- Finally a **target** is indicated, which dictates the level each unit should be aiming to achieve against each indicator.

In order to ensure that the chosen target levels are the most appropriate and drive continuous quality improvement as intended they are kept under review and revised as necessary, if further evidence or data becomes available.

Rather than utilising multiple exclusions, a tolerance level has been built into the QPIs. It is very difficult to accurately measure patient choice, co-morbidities and patient fitness therefore target levels have been set to account for these factors. Further detail is noted within QPIs where there are other factors which influence the target level.

Where 'less than' (<) target levels have been set the rationale has been detailed within the relevant QPI. All other target levels should be interpreted as 'greater than' (>) levels.

5. Supporting Documentation

A national minimum core dataset and a measurability specification have been developed in parallel with the indicators to support the monitoring and reporting of the Renal Cancer QPIs. The latest version of these documents can be found at:

Public Health Scotland Cancer Audit

6. Renal Cancer Definition

Approximately 80% of renal cancers are Renal Cell Carcinomas[2] (RCC), and various different subtypes of RCC exist, the most common being clear cell.

The Renal Cancer QPI Development Group therefore agreed that all QPIs developed by them would focus on Renal Cell Carcinoma (RCC) and these two terms (RCC and renal cancer) are used interchangeably throughout this document.

7. Quality Performance Indicators for Renal Cancer

QPI 1 - Radiological Diagnosis

QPI Title:	Patients with renal cancer should have cross sectional imaging for staging of Renal Cell Carcinoma (RCC).
Description:	Proportion of patients with RCC receiving active treatment[a] who undergo pre-treatment cross-sectional imaging of the chest, abdomen +/- pelvis.
Rationale and Evidence:	Although definitive diagnosis of renal cell carcinoma requires pathological assessment, radiology suggests the diagnosis in almost all cases and is the first line of investigation. Patients with renal cell carcinoma should undergo CT with contrast to assess the extent of local and distant metastatic disease[3]. MRI is also an alternative option for patients who require further imaging, or have allergies to intravenous CT contrast media[4].
Specifications:	**Numerator:** Number of patients receiving active treatment[a] with a diagnosis of RCC who undergo cross-sectional imaging (CT or MRI) of the chest, abdomen +/- pelvis (with contrast) before first treatment. **Denominator:** All patients receiving active treatment[a] with a diagnosis of RCC. **Exclusions:** • No exclusions
Target:	95% The tolerance within this target is to account for those patients with contraindications due to renal impairment, allergies to contrast media and also where renal cancer is an incidental finding following surgery.

[a] *Active treatment is defined as partial or radical nephrectomy, cryotherapy, radio frequency ablation (RFA), stereotactic ablative radiotherapy (SABR) or systemic therapy.*

QPI 2 - Histological Diagnosis

QPI Title:	Patients with renal cancer not undergoing surgery should have a histological diagnosis prior to commencing treatment.
Description:	Proportion of patients with RCC where surgery is not the primary treatment who have a histological diagnosis before treatment, via biopsy. **Please note:** The specifications of this QPI are separated to ensure clear measurement of patients undergoing the following treatments: (i) Cryotherapy / radiofrequency ablation (RFA) / stereotactic ablative radiotherapy (SABR); and (ii) Systemic anti-cancer therapy (SACT)
Rationale and Evidence:	With alternative minimally invasive therapies such as radio frequency ablation (RFA) and cryotherapy where the primary tumour is not resected, it is essential to make a histological or cytological diagnosis of renal carcinoma prior to treatment to avoid treating a non-malignant lesion[3,5]. In patients who are being considered for expensive medical anti-cancer therapy, histological confirmation of the diagnosis is essential as other cell types will not benefit from this treatment[6].
Specification (i):	**Numerator:** Number of patients with RCC undergoing cryotherapy, radiofrequency ablation or SABR as their first treatment who have a histological diagnosis (confirmed by biopsy) before commencing treatment. **Denominator:** All patients with RCC undergoing cryotherapy, radiofrequency ablation or SABR as their first treatment. **Exclusions:** • Patients with inherited genetic renal cancer.
Target:	90% The tolerance within this target accounts for those lesions that are technically difficult to access and also situations where it may be clinically inappropriate to perform a biopsy e.g. Cystic Renal Tumours.
Specification (ii):	**Numerator:** Number of patients with RCC undergoing SACT as their first treatment who have a histological diagnosis (confirmed by biopsy) before commencing treatment. **Denominator:** All patients with RCC undergoing SACT as their first treatment. **Exclusions:** • No exclusions.
Target:	90% The tolerance within this target accounts for situations where patients may require treatment urgently.

QPI 3 - Clinical Staging – TNM

QPI Title:	The TNM staging system should be used to stage patients with Renal Cell Carcinoma (RCC).
Description:	Proportion of patients whose RCC is staged pre-treatment using the TNM staging system.
Rationale and Evidence:	The TNM stage of disease will aid in determining prognosis, choice of therapy and follow up[7]. The TNM staging system is widely recommended for staging of renal cell carcinoma as it has consequences for prognosis and therapy[4,7].
Specifications:	**Numerator:** Number of patients diagnosed with RCC who were clinically staged using TNM staging system before first treatment. **Denominator:** All patients diagnosed with RCC. **Exclusions:** • No exclusions **Please Note:** For a patient to be recorded as having been clinically staged using the TNM staging system, cT, cN and cM *all* require to be recorded.
Target:	98% The tolerance within the target accounts for the small number of renal cancers found incidentally on the pathological specimen of kidneys removed for benign reasons.

QPI 4 - Multi-Disciplinary Team (MDT) Meeting

QPI Title:	Patients with Renal Cell Carcinoma (RCC) should be discussed by a multidisciplinary team (MDT) prior to definitive treatment.
Description:	Proportion of patients with RCC who are discussed at MDT meeting before definitive treatment.
Rationale and Evidence:	Evidence suggests that patients with cancer managed by a multi-disciplinary team have a better outcome. There is also evidence that the multidisciplinary management of patients increases their overall satisfaction with their care[6]. Discussion prior to definitive treatment decisions being made provides reassurance that patients are being managed appropriately.
Specifications:	**Numerator:** Number of patients with RCC discussed at the MDT before definitive treatment. **Denominator:** All patients with RCC. **Exclusions:** • Patients who died before first treatment.
Target:	95% The tolerance within this target is designed to account for situations where patients require treatment urgently or where renal cancer has been an incidental finding following surgery.

QPI 7 - Nephron Sparing Treatment

QPI Title:	Patients with T1a renal cancer should receive nephron sparing treatment.
Description:	Proportion of patients with T1aN_0M_0 RCC who undergo nephron sparing treatment (cryotherapy, RFA, SABR or robotic / laparoscopic / open partial nephrectomy).
Rationale and Evidence:	When compared with radical nephrectomy, NSS can achieve preserved renal function, decreased overall mortality, reduced frequency of cardiovascular events and increased quality of life for patients. Patients should be informed of these potential advantages of nephron sparing surgery[3]. Surgical resection is the gold standard of care for curative treatment of RCC. Patients with T1a tumours should undergo nephron sparing surgery where appropriate, as clinical trials have shown that long term survival rates are comparable to those following radical surgery[3,5,7]. Tumour ablation is also an effective treatment option for small renal tumours with good outcome data demonstrated for cryotherapy and radiofrequency ablation (RFA)[8,9,10].
Specifications:	**Numerator:** Number of patients with T1a N_0M_0 RCC undergoing nephron sparing treatment (cryotherapy, RFA, SABR or robotic / laparoscopic / open partial nephrectomy). **Denominator:** All patients with T1a N_0M_0 RCC. **Exclusions:** • Patients who decline treatment. • Patients receiving supportive care only (not for active treatment). • Patients receiving active surveillance (no active treatment). • Patients who died before treatment.
Target:	50% This target reflects the fact that some patients opt for a laparoscopic radical nephrectomy (LRN) rather than nephron sparing surgery (NSS) due to factors such as shorter convalescence period and decreased complications associated with LRN compared to NSS. Including this patient group in the exclusion criteria noted above would by default make the target meaningless as 100% would be achieved.

QPI 8 - 30 / 90 Day Mortality Following Treatment for RCC

QPI Title:	30 and 90 Day Mortality following treatment for RCC.
Description:	Proportion of patients who die within 30 or 90 days of minimally invasive (RFA, cryotherapy) or operative treatment for RCC.
Rationale and Evidence:	Treatment related mortality is a marker of the quality and safety of the whole service provided by the Multi-Disciplinary Team (MDT). However, all causes of death have been used in this indicator as the recording of cause of death by the certifying medical practitioner is not always as specific as the recording of a cancer diagnosis. "For clinicians to restore and retain public confidence, they need to show that effective mechanisms exist for assessing events such as death and to justify patients' faith in the delivery of care" [11]. **Please note**: 30 Day Mortality following Systemic Anti-Cancer Therapy (SACT) will be measured separately from the QPI process. National SACT data from CEPAS (Chemotherapy Electronic Prescribing and Administration System) will be utilised to support reporting and monitoring of this measure rather than clinical audit. This methodology will allow all renal cancer patients undergoing SACT to be captured rather than only those newly diagnosed within the audit.
Specifications:	**Numerator:** Number of patients with RCC who undergo minimally invasive (RFA, cryotherapy) or operative treatment who die within 30 / 90 days of treatment. **Denominator:** All patients with RCC who undergo minimally invasive (RFA, cryotherapy) or operative treatment. **Exclusions:** • Patients who undergo emergency surgery (nephrectomy). **Please Note:** This QPI will be reported separately as 30 day mortality and 90 day mortality as opposed to a single figure. In addition, this QPI will be reported by treatment type as opposed to a single figure for all treatment options covered by the indicator (i.e. RFA, cryotherapy, or surgery).
Target:	<2% for patients receiving operative treatment, RFA and cryotherapy. This target reflects the fact that death from any cause, rather than death from renal cancer is being measured by this indicator.

QPI 9 - Systemic Therapy

QPI Title:	Patients with advanced and/or metastatic Renal Cell Carcinoma (RCC) receiving initial Systemic Anti-Cancer Therapy (SACT) in the first year after diagnosis.	
Description:	Proportion of patients presenting with advanced and/or metastatic RCC who receive initial SACT within 12 months of diagnosis.	
Rationale and Evidence:	Sunitinib is currently recommended for use in Scotland as a first-line treatment option for people with advanced and/or metastatic RCC who are suitable for immunotherapy and have an Eastern Cooperative Oncology Group (ECOG) performance status of 0 or 1[12]. Pazopanib is recommended by the Scottish Medicines Consortium (SMC) as a first line treatment option for people with advanced RCC[13,14]. Although the SMC advice does not restrict patients according to ECOG performance status, the clinical trial supporting its use was restricted to ECOG PS 0 or 1 patients. Large randomised clinical trials have demonstrated clinical effectiveness of a variety of agents in this setting. Cost effectiveness analysis has demonstrated that sunitinib and pazopanib are considered cost effective in this setting within NHS Scotland. There are a significant proportion of patients with advanced and /or metastatic RCC who are not suitable for surveillance or focal treatments within the first year after diagnosis and therefore should receive SACT. In some cases it is reasonable to delay systemic therapy and the assumption is that 100% of suitable patients should receive systemic therapy between diagnosis and death. We estimate that at least 40% of these patients would be expected to die within 12 months of diagnosis in the absence of systemic treatment and therefore have chosen this time period as suitable for assessing this aspect of practice.	
Specifications:	**Numerator:**	Number of patients with RCC which is advanced and / or metastatic at time of diagnosis[b] where at least 12 months have elapsed since diagnosis irrespective of whether or not they have died who receive initial treatment with SACT, within 12 months of diagnosis[c].
	Denominator:	All patients with RCC which is advanced and / or metastatic at time of diagnosis where at least 12 months have elapsed since diagnosis irrespective of whether or not they have died.
	Exclusions:	• Patients documented to have performance status 2, 3 or 4 at time of diagnosis. • Patients documented to have declined systemic treatment. Patients enrolled in clinical trials.

(continued overleaf)

[b] *Advanced/ metastatic disease defined as T4NanyMany; TanyNanyM1.*

[c] *Systemic anti-cancer treatments will include any drug which is licensed in this indication; the accompanying data standard contains relevant information about appropriate treatments.*

QPI 9 - Systemic Therapy…….. (continued)

Target:	40% This target has been updated following review of national comparative data across Scotland. The target reflects the following facts: i. some patients will decline very quickly and systemic therapy is inappropriate; ii. some patients will have very indolent disease and systemic therapy is not appropriate within 12 months of diagnosis; iii. some patients will die of unrelated causes within 12 months of diagnosis without the need for systemic anti-cancer therapy; iv. some patients will have specific medical contra-indications to systemic therapy; v. some patients with isolated metastatic disease may undergo surgical resection.

QPI 10 - Prognostic Scoring in Metastatic Disease

QPI Title:	Patients with metastatic Renal Cell Carcinoma (RCC) should be assigned a valid prognostic score[d] following diagnosis.
Description:	Proportion of patients with metastatic RCC who are assigned a valid prognostic score following diagnosis.
Rationale and Evidence:	Various models exist to predict the survival and prognosis for patients with metastatic RCC. These are key in making decisions about the most appropriate treatment plan for patients, particularly with the use of targeted therapies[15]. In order to be consistent, the formal review group have agreed that one standard scoring tool should be used - the International Metastatic RCC Database Consortium Risk Score (Heng Scoring).
Specifications:	**Numerator:** Number of patients with metastatic RCC who are assigned a valid prognostic score following diagnosis. **Denominator:** All patients diagnosed with metastatic RCC. **Exclusions:** • No exclusions
Target:	90% The tolerance within this target is to account for those patients with M1 renal cancer where score assignment may not be possible due to clinical circumstances.

[d] *Within this QPI, valid prognostic scoring should be assigned using the International Metastatic RCC Database Consortium (IMDC)/Heng scoring tool.*

QPI 11 - Leibovich Score

QPI Title:	Patients with clear cell Renal Cell Carcinoma (RCC) should be assigned a Leibovich score following radical nephrectomy.	
Description:	Proportion of patients with clear cell RCC who are assigned a Leibovich score following radical nephrectomy.	
Rationale and Evidence:	Various prognostic scores exist to predict the likelihood of developing metastatic disease following surgery. The Leibovich score was specifically developed for patients following radical nephrectomy for clear cell RCC and assists clinicians and patients in making decisions regarding treatment plans. Evidence has shown that Leibovich scoring tools provide an accurate model of prediction and may be better associated with recurrence free survival than other strategies[16].	
Specifications:	**Numerator:**	Number of patients with clear cell RCC who undergo radical nephrectomy and are assigned a Leibovich score following surgery.
	Denominator:	All patients with clear cell RCC who undergo radical nephrectomy.
	Exclusions:	• Patients with metastatic disease (TanyNanyM1). • Patients undergoing neoadjuvant systemic anti-cancer therapy (SACT).
Target:	100%	

QPI 12 - Volume of Cases per Surgeon

QPI Title:	Renal surgical resection[e] should be performed by surgeons who perform the procedures routinely.
Description:	Number of renal surgical resections performed by a surgeon over a 1 year period.
Rationale and Evidence:	A number of studies have demonstrated the relationship between the number of patients operated on at a particular hospital and the outcome of surgery. The literature demonstrates that there is a relationship between increasing surgical volume and lower complication rates for surgeons undertaking partial nephrectomy for renal cell carcinoma[17].
Specifications:	Number of renal surgical resections performed by each surgeon in a given year. **Exclusions:** • No exclusions
Target:	Minimum 15 procedures per surgeon in a 1 year period. This is a minimum target level and is designed to ensure that all surgeons performing renal surgery perform a minimum of 15 procedures per year. **Please Note:** Varying evidence exists regarding the most appropriate target level for surgical case volume. In order to ensure that the target level takes account of level 1 evidence and will drive continuous quality improvement as intended this performance indicator must be kept under regular review. It is recommended that where two consultants operate together on the same patient the case should be counted under the Lead Surgeon.

Please note:
SMR01 data will be utilised to support reporting and monitoring of this QPI rather than clinical audit. This will maximise the use of data which are already collected and remove the need for any duplication of data collection. Standard reports are in place with direct access for each Board to run these reports to ensure nationally consistent analysis and reporting.

[e] Renal surgical resection includes nephrectomy, partial nephrectomy and nephroureterectomy

QPI 13 - Trifecta Rate

QPI Title:	Trifecta Rate in Partial Nephrectomy T1a Renal Cell Carcinoma (RCC) patients.	
Description:	Proportion of patients with T1a RCC undergoing partial nephrectomy who achieve trifecta (ischaemia time conditions met[f], negative surgical margins and no complications[g]).	
Rationale and Evidence:	Trifecta is regarded as a surrogate measure of surgical quality. The combination of achieving negative margins, minimal surgical complications and a reduced warm ischaemia time (associated with improved renal function) is associated with better outcomes for patients undergoing partial nephrectomy[18]. Other ischaemia techniques may be used e.g. cold ischaemia or selective clamping. These have no optimal timing therefore for the purpose of this QPI, measurement will focus on documentation of timing in relation to these techniques (rather than a specific time).	
Specifications:	**Numerator:**	Number of patients with T1a RCC undergoing partial nephrectomy who have ischaemia time conditions met, negative surgical margins and no complications (length of stay ≤7days).
	Denominator:	All patients with T1a RCC undergoing partial nephrectomy.
	Exclusions:	• No exclusions
Target:	50% The tolerance within this target takes account of the fact that it is not always possible to achieve trifecta due to patient fitness, complex lesions and in solitary kidneys. It may also not always be safe or practical for patients to go home within 7 days of surgery.	

[f] *Ischaemia conditions are as follows: warm ischaemia time of <25 minutes, or cold ischaemia (time documented), or selective clamping (time documented).*

[g] *Length of stay is being used as a surrogate measure for the quality of surgery and post-operative care including post-operative complications.*

8. Survival

Improving survival forms an integral part of the National Cancer Quality Programme. Renal cancer survival analysis will be reported and analysed on a 3 yearly basis by Public Health Scotland (PHS). The specific issues which will be addressed will be identified by an expert group ahead of any analysis being undertaken, as per the agreed national cancer quality governance and improvement framework.

The Renal Cancer QPI Group has identified the following issues for survival analysis:

- 1, 3 and 5 year overall survival.

To ensure consistent application of survival analysis, it has been agreed that a single analyst on behalf of all three regional cancer networks undertakes this work. Survival analysis is scheduled as per the national survival analysis and reporting timetable, agreed with the National Cancer Quality Steering Group and National Cancer Recovery Group. This reflects the requirement for record linkage and the more technical requirements of survival analyses which makes it difficult for individual Boards to undertake routinely and in a nationally consistent manner.

9. Areas for Future Consideration

The Renal Cancer QPI Groups have not been able to identify sufficient evidence, or determine appropriate measurability specifications, to address all areas felt to be of key importance in the treatment of renal cancer, and therefore in improving the quality of care for patients affected by renal cancer.

The following areas for future consideration have been raised across the lifetime of the Renal Cancer QPIs:

- Metastasectomy/Cytoreductive nephrectomy
- Palliative radiotherapy
- Management of brain metastases

10. Governance and Scrutiny

A national and regional governance framework to assure the quality of cancer services in NHS Scotland has been developed; key roles and responsibilities within this are set out below. Appendices 3 and 4 provide an overview of these governance arrangements diagrammatically. The importance of ensuring robust local governance processes are in place is recognised and it is essential that NHS Boards ensure that cancer clinical audit is fully embedded within established processes.

10.1 National

- National Cancer Recovery Group
    - Accountable for overall National Cancer Quality Programme and overseeing the quality of cancer care across NHS Scotland.
    - Advise Scottish Government Health and Social Care Directorate (SGHSCD) if escalation required.

- Healthcare Improvement Scotland
    - Proportionate scrutiny of performance.
    - Support performance improvement.

        - Quality assurance: ensure robust action plans are in place and being progressed via regions/Boards to address any issues identified.

- Public Health Scotland (PHS)
    - Publish national comparative report on tumour specific QPIs and survival analysis for approximately three tumour types per annum as part of the rolling programme of reporting.

10.2 Regional – Regional Cancer Networks

- Annual regional comparative analysis and reporting against tumour specific QPIs.
- Support national comparative reporting of specified generic QPIs.
- Identify and share good practice.
- In conjunction with constituent NHS Boards identify regional and local actions required to develop an action plan to address regional issues identified.
- Review and monitor progress against agreed actions.
- Provide assurance to NHS Board Chief Executive Officers and National Cancer Recovery Group that any issues identified have been adequately and timeously progressed.

10.3 Local – NHS Boards

- Collect and submit data for regional comparative analysis and reporting in line with agreed measurability and reporting schedule (generic and tumour specific QPIs).
- Utilise local governance structures to review performance, develop local action plans and monitor delivery.
- Demonstrate continual improvements in quality of care through on-going review, analysis and feedback of clinical audit data at an individual multidisciplinary team (MDT) or unit level.

11. References

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12. Appendices

Appendix 1: QPI Development Process

Preparatory Work and Scoping

The preparatory work involved the development of a structured briefing paper by Healthcare Improvement Scotland (formerly NHS Quality Improvement Scotland). This paper took account of existing, high quality, clinical guidance and provided a basis for the development of QPIs.

The scope for development of renal cancer QPIs and a search narrative were defined and agreed by the Renal Cancer QPI Development Group. The table below shows the final search criteria.

Inclusion		Exclusion	
Renal cell carcinoma, clear cell and other cell carcinoma, renal parenchyma renal cortical lesions Adults only (over 16 years of age) *Date:*	2000 or later	*Topics:*	Prevention and palliative/end of life care related cancers such as bladder and urethra, pelvis tumours, Wilms tumours nephroblastoma.
Language:	All		
Topics:	Referral, diagnosis, staging, management of non-metastatic (organ confined or locally advanced) and metastatic (advanced) disease, follow up, management of genetic risk.		

Table 1 – Renal Cancer Search Criteria

A systematic search was carried out by Healthcare Improvement Scotland using selected websites and two primary medical databases to identify national and international guidelines.

Nineteen guidelines were appraised for quality using the AGREE II instrument[19]. This tool assesses the methodological rigour and precision used when developing a guideline. Six of the guidelines were not recommended for use, of the remaining 13 guidelines, 5 were recommended for use and 8 recommended for use with modifications.

Indicator Development

The Renal Cancer QPI Development Group defined evidence based, measurable indicators with a clear focus on improving the quality and outcome of care provided.

The group developed QPIs using the clinical recommendations set out in the briefing paper as a base, ensuring all indicators met the following criteria:

- **Overall importance** – does the indicator address an area of clinical importance that would significantly impact on the quality and outcome of care delivered?
- **Evidence based** – is the indicator based on high quality clinical evidence?
- **Measurability** – is the indicator measurable i.e. are there explicit requirements for data measurement and are the required data items accessible and available for collection?

Engagement Process

A wide clinical and public engagement exercise was undertaken as part of development in 2011 where the Renal Cancer QPIs, along with the accompanying draft minimum core dataset and measurability specifications, were made available of the Scottish Government website.

During the engagement period clinical and management colleagues from across NHS Scotland, patients affected by renal cancer and the wider public were given the opportunity to influence the development of Renal Cancer QPIs.

Following the engagement period all comments and responses received were reviewed by the Renal Cancer QPI Development Group and used to produce and refine the final indicators.

Renal Cancer QPI Development Group Membership (2012)

Name	Designation	Cancer Network/Base
Michael Aitchison *(until October 2010)*	Consultant Urologist	WoSCAN - Gartnavel General Hospital, Glasgow
David Brewster	Director – Scottish Cancer Registry	ISD, National Services Scotland
Emma Brown	Consultant Clinical Oncologist	NOSCAN - Ninewells Hospital, Dundee
John Brush	Consultant Radiologist	SCAN - Western General Hospital, Edinburgh
Jacqueline Campbell	Clinical Nurse Specialist	WoSCAN - Stobhill Hospital, Glasgow
Maria Doherty	Patient Representative	
Rachael Dunk	Team Leader - Cancer Strategies	Scottish Government Health Department
Clare Echlin	Acting Head of Standards Development	Healthcare Improvement Scotland
Jenny Fleming	Service Manager	SCAN - Western General Hospital, Edinburgh
Grahame Howard	Consultant Oncologist	SCAN - Western General Hospital, Edinburgh
Rob Jones	Consultant Oncologist	WoSCAN - Beatson West of Scotland Cancer Centre
Andrew Martindale	Consultant Urologist	NOSCAN - Ninewells Hospital, Dundee
Robert Masterton (CHAIR)	Chair – National Cancer Quality Steering Group	
Christine McIntosh	Highland Cancer Network Manager	NOSCAN - Raigmore Hospital, Inverness
Frances McLinden	Clinical Service Manager	WoSCAN - Royal Infirmary, Glasgow
Rita O'Dea	Clinical Nurse Specialist	SCAN - Western General Hospital, Edinburgh
Marie O'Donnell	Consultant Pathologist	SCAN - Western General Hospital, Edinburgh

Khaver Qureshi (*from October 2010)*	Consultant Urologist	WoSCAN - Gartnavel General Hospital, Glasgow
Tony Riddick	Consultant Urologist	SCAN - Western General Hospital, Edinburgh
Iona Scott	Project Manager	WoSCAN
Evelyn Thomson	Regional Manager (Cancer)	WoSCAN

NOSCAN - North of Scotland Cancer Network
SCAN - South East Scotland Cancer Network
WoSCAN – West of Scotland Cancer Network

Appendix 2: Renal Cancer QPI Formal Reviews

Formal review of the Renal Cancer QPIs was undertaken for the first time in February 2016 following reporting of 3 years of national QPI data. A Formal Review Group was convened, chaired by Dr Val Doherty (South East Cancer Network Lead Cancer Clinician). Membership of this group is outlined below:

Renal Cancer QPI Formal Review Group Membership (2016)

Name	Designation	Cancer Network
Val Doherty (Chair)	Lead Cancer Clinician	SCAN
Prasad Bollina	Clinical Lead Urological Cancers MCN	SCAN
Lorna Bruce	Audit Manager	SCAN
Nicholas Cohen	Consultant Urological Surgeon	NOSCAN
Jen Doherty	Project Co-ordinator	National Cancer Quality Programme
Chris Goodman	Clinical Lead Urological Cancers MCN	NOSCAN *(until April 2016)*
Steve Leung	Consultant Urological Surgeon	SCAN
Grenville Oades	Clinical Lead Urological Cancers MCN	WoSCAN
Kevin O'Connor	Consultant Urological Surgeon	SCAN
Iona Scott	Quality & Service Improvement Manager	WoSCAN
Evelyn Thomson	Regional Manager (Cancer)	WoSCAN

Formal review of the Renal Cancer QPIs has been undertaken in consultation with various other clinical specialties e.g. Oncology and Pathology.

NOSCAN – North of Scotland Cancer Network
SCAN - South East Scotland Cancer Network
WoSCAN – West of Scotland Cancer Network

2nd Cycle Formal Review

The 2nd cycle of formal review commenced in February 2019. This review was more selective and focussed on ensuring the ongoing clinical relevance of the QPIs. A Formal Review Group was convened, with Mr Sami Shimi, Consultant Surgeon and Regional Lead Cancer Clinician, North Cancer Alliance (NCA) appointed as Clinical Advisor/Chair to the group. Membership of this group is outlined below:

Renal Cancer QPI Formal Review Group Membership – 2nd Cycle (2019)

Name	Designation	Cancer Network
Sami Shimi (Chair)	Consultant Surgeon	NCA
Grigorios Athanasiadis	Locum Urologist	NCA
Lorna Bruce	Audit Manager	SCAN
Nicholas Cohen	Consultant Urological Surgeon	NCA
Jen Doherty	Project Co-ordinator	National Cancer Quality Programme
Rob Jones	Consultant Medical Oncologist	WoSCAN
Alex Laird	Consultant Surgeon	SCAN
Steve Leung	Consultant Urological Surgeon	SCAN
Alan McNeil	Consultant Urological Surgeon	SCAN
Grenville Oades	Consultant Urological Surgeon	WoSCAN
Khaver Qureshi	Consultant Urological Surgeon	WoSCAN
Lorraine Stirling	Project Officer	National Cancer Quality Programme
Stefan Symeonides	Consultant Medical Oncologist	SCAN
Evelyn Thomson	Regional Manager (Cancer)	WoSCAN
Gordon Urquhart	Consultant Medical Oncologist	NCA

3rd Cycle Formal Review

The 3rd cycle of formal review commenced in February 2022. Dr Megan Mowbray, Consultant Dermatologist, NHS Fife was appointed as Clinical Advisor/Chair to the Formal Review Group. Membership of this group is outlined below:

Renal Cancer QPI Formal Review Group Membership – 3rd Cycle (2022)

Name	Designation	Cancer Network
Megan Mowbray (Chair)	Consultant Dermatologist	SCAN
Grigorios Athanasiadis	Consultant Urological Surgeon	NCA
Lorna Bruce	Audit Manager	SCAN
Jen Doherty	Project Co-ordinator	National Cancer Quality Programme
James Donaldson	Consultant Urological Surgeon	NCA

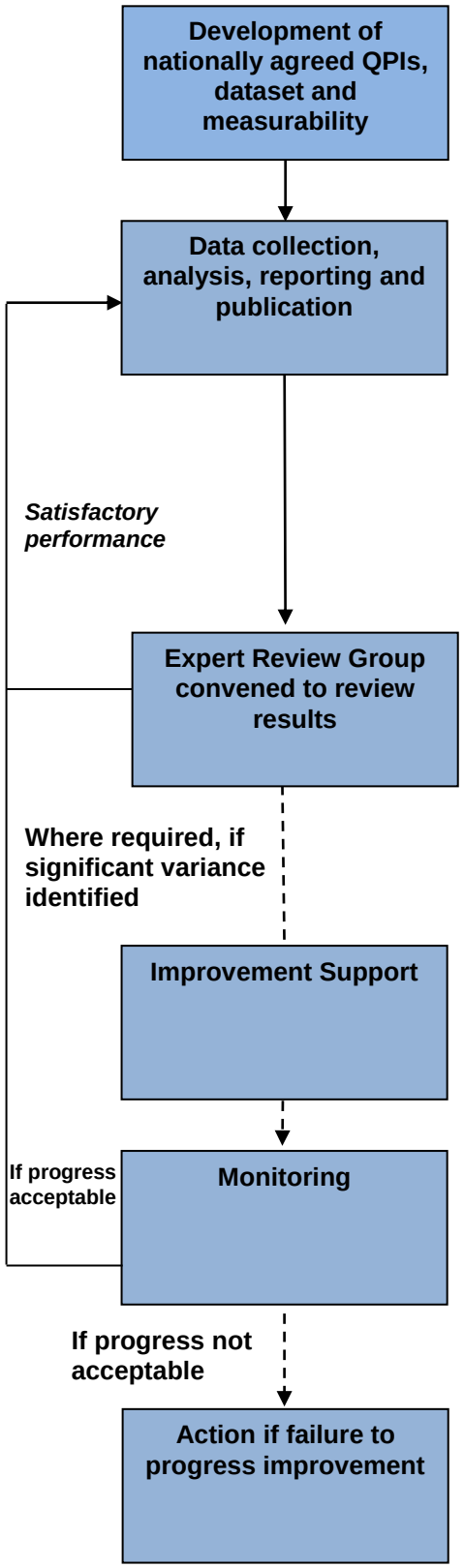
Tony Elliott	Consultant Medical Oncologist	SCAN
Steve Leung	Consultant Urological Surgeon	SCAN
Jahangeer Malik	Consultant Medical Oncologist	SCAN
Andrew Martindale,	Urology Clinical Lead	NCA
Kate Robertson	Programme Co-ordinator	NCA
Lorraine Stirling	Project Officer	National Cancer Quality Programme
Nkem Umez-Eronini	Clinical Lead, Urology MCN	WoSCAN
Gordon Urquhart	Consultant Medical Oncologist	NCA
Balaji Venugopal	Consultant Medical Oncologist	WoSCAN

Formal review of the Renal Cancer QPIs are undertaken in consultation with various other clinical specialties e.g. oncology and pathology.

NCA – North Cancer Alliance
SCAN – South East Scotland Cancer Network
WoSCAN – West of Scotland Cancer Network

Appendix 3: 3 Yearly National Governance Process & Improvement Framework for Cancer Care

This process is underpinned by the annual regional reporting and governance framework (see appendix 4).



1. National QPI Development Stage

- QPIs developed by QPI development groups, which include representation from Regional Cancer Networks, Healthcare Improvement Scotland, PHS, patient representatives and the Cancer Coalition.

2. Data Analysis Stage:

- NHS Boards and Regional Cancer Advisory Groups (RCAGs)* collect data and analyse on yearly basis using nationally agreed measurability criteria and produce action plans to address areas of variance, see appendix 4.
- Submit yearly reports to PHS for collation and publication every 3 years.
- National comparative report approved by NHS Boards and RCAGs.
- PHS produce comparative, publicly available, national report consisting of trend analysis of 3 years data and survival analysis.

3. Expert Review Group Stage (for 3 tumour types per year):

- Expert group, hosted by Healthcare Improvement Scotland, review comparative national results.
- Write to RCAGs highlighting areas of good practice and variances.
- Where required NHS Boards requested to submit improvement plans for any outstanding unresolved issues with timescales for improvement to expert group.
- Improvement plans ratified by expert group and National Cancer Recovery Group.

4. Improvement Support Stage:

- Where required Healthcare Improvement Scotland provide expertise on improvement methodologies and support.

5. Monitoring Stage:

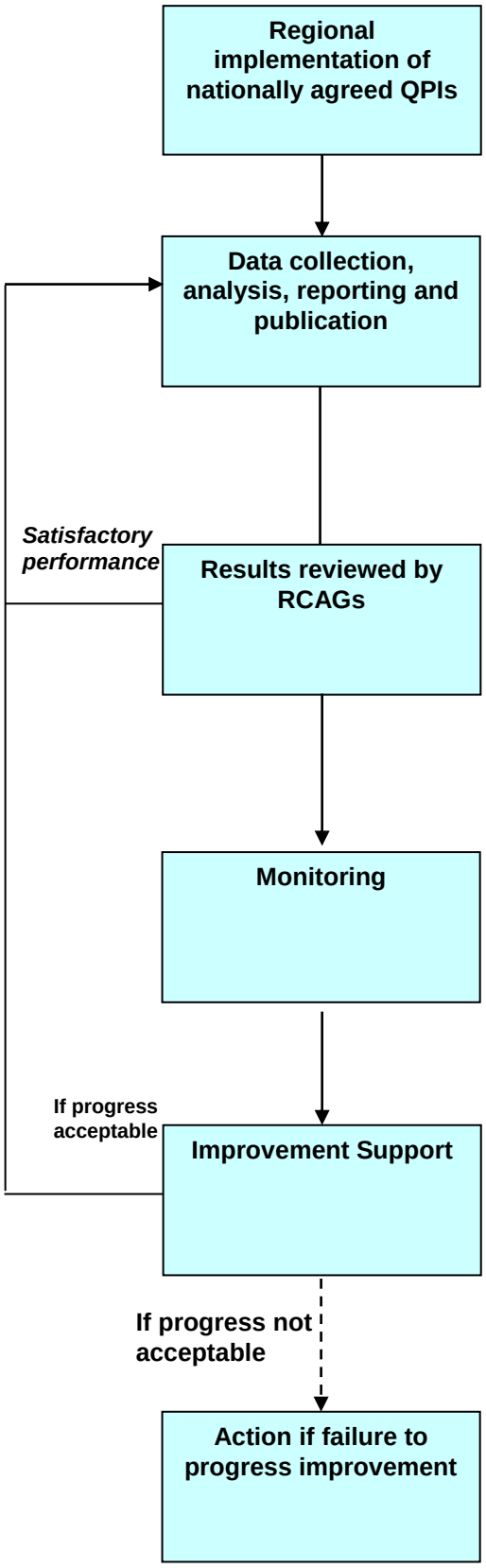
- RCAGs work with Boards to progress outstanding actions, monitor improvement plans and submit progress report to Healthcare Improvement Scotland.
- Healthcare Improvement Scotland report to National Cancer Recovery Group as to whether progress is acceptable**.**

6. Escalation Stage:

- If progress not acceptable, Healthcare Improvement Scotland will visit the service concerned and work with the RCAG and Board to address issues.
- Report submitted to National Cancer Recovery Group and escalation with a proposal to take forward to Scottish Government Health Department.

**The Regional Cancer Planning Group (South and East of Scotland) and the North Cancer Clinical Leadership Group (North Cancer Alliance) are equivalent to the Regional Cancer Advisory Group (RCAG) in the West of Scotland.*

Appendix 4: Regional Annual Governance Process and Improvement Framework for Cancer Care



1. Regional QPI Implementation Stage:

- National cancer QPIs and associated national minimum core dataset and measurability specifications, developed by QPI development groups.
- Regional implementation of nationally agreed dataset to enable reporting of QPIs.

2. Data Analysis Stage:

- NHS Boards collect data and data is analysed on a yearly basis using nationally agreed measurability criteria at local/ regional level.
- Data/results validated by Boards and annual regional comparative report produced by Regional Networks.
- Areas of best practice and variance across the region highlighted.
- Yearly regional reports submitted to PHS for collation and presentation in national report every 3 years.

3. Regional Performance Review Stage:

- RCAGs* review regional comparative report.
- Regional or local NHS Board action plans to address areas of variance developed.
- Appropriate leads identified to progress each action.
- Action plans ratified by RCAGs.

4. Monitoring Stage:

- Where required, NHS Boards monitor progress with action plans and submit progress reports to RCAGs.
- RCAGs review and monitor regional improvement.

5. Improvement Support Stage:

- Where required Healthcare Improvement Scotland maybe requested to provide expertise to NHS Boards/RCAGs on improvement methodologies and support.

6. Escalation Stage:

- If progress not acceptable, RCAGs will escalate any issues to relevant Board Chief Executives. If progress remains unacceptable RCAGs will escalate any relevant issues to Healthcare Improvement Scotland.

**The Regional Cancer Planning Group (South and East of Scotland) and the North Cancer Clinical Leadership Group (North Cancer Alliance) are equivalent to the Regional Cancer Advisory Group (RCAG) in the West of Scotland*

Appendix 5: Glossary of Terms

Ablative therapy	See *Cryotherapy* and *Radiofrequency Ablation*
Active surveillance	Closely watching a patient's condition but not giving treatment unless there are changes in test results. It is used to find early signs that the condition is getting worse.
Active treatment	Treatment directed to cure the disease.
Anatomy	The study of the structure of a plant or animal.
Angiomyolipoma	A benign (non-cancerous) tumour of the kidney.
Anti-cancer therapy	Any treatment which is designed to kill cancer cells.
Biopsy	Removal of a sample of tissue from the body to assist in diagnosis of a disease.
Cardiovascular	Having to do with the heart and blood vessels.
Chronic kidney disease	Long term kidney problems.
Clear cell renal cell carcinoma/renal cancer	The most common subtype of renal cell carcinoma/renal cancer.
Clinical effectiveness	Measure of the extent to which a particular intervention works.
Clinical trials	A type of research study that tests how well new medical approaches or medicines work. These studies test new methods of screening, prevention, diagnosis, or treatment of a disease.
Computed Tomography (CT)	An x-ray imaging technique, which allows detailed investigation of the internal organ of the body.
Contralateral	Referring to the opposite side of the body.
Convalescence	The gradual return to health and strength after an illness.
Cost effectiveness	Value for money
Cross sectional imaging	The term used to cover different techniques (e.g. CT) which produce cross-sectional images of the body. See *Computed Tomography (CT)*
Cryotherapy	A treatment which aims to eradicate cancer by freezing.
Curative intent	Treatment which is given with the aim of curing the cancer.
Cytological / Cytopathological	The study of the structure and function of cells under the microscope, and of their abnormalities.
Diagnosis	The process of identifying a disease, such as cancer, from its signs and symptoms.
Dialysis	The process of filtering the blood when the kidneys are not able to cleanse it.
Elective	An elective procedure is one that is chosen by the patient or doctor that is advantageous to the patient but is not urgent.
First-line / Primary treatment	Initial treatment used to reduce a cancer.
Fuhrman grading system	A specific grading system for clear cell renal cancer. See *Grading*.
Grading	The degree of malignancy of a tumour, i.e. how closely the cancer cells look like normal kidney cells.

Histological / Histopathogical	The study of the structure, composition and function of tissues under the microscope, and their abnormalities.
Immunotherapy	Treatment to stimulate or restore the ability of the immune system to fight infection and disease. Also used to lessen the side-effects that may be caused by some cancer treatments.
Intravenous (IV) contrast	A substance administered intra venously (directly into bloodstream) to enhance the visibility of structures on imaging.
Invasive	Cancer that can or has spread from its histological original site.
Kidney	One of a pair of organs in the abdomen. Kidneys remove waste from the blood (as urine), produce erythropoietin (a substance that stimulates red blood cell production), and play a role in blood pressure regulation.
Laparoscopic nephrectomy	Surgery performed using a laparoscope; a special type of endoscope inserted through a small incision in the abdominal wall.
Lesion	Tumour, mass, or other abnormality.
Licensed indication	Approved use of a drug/treatment (by the Scottish Medicines Consortium or National Institute for Health and Clinical Excellence).
Magnetic Resonance Imaging (MRI)	A procedure in which radio waves and a powerful magnet linked to a computer are used to create detailed pictures of areas inside the body. These pictures can show the difference between normal and diseased tissue.
Malignant	Cancerous. Malignant cells can invade and destroy nearby tissue and spread to other parts of the body.
Metastases/Metastatic disease	Spread of cancer away from the primary site to somewhere else via the bloodstream or the lymphatic system.
Minimally invasive procedure	A procedure undertaken with only a small incision or no incision at all.
Morbidity	How much ill health a particular condition causes.
Morphology	The science of the form and structure of organisms (plants, animals, and other forms of life).
Mortality	Either (1) the condition of being subject to death; or (2) the death rate, which reflects the number of deaths per unit of population in any specific region, age group, disease or other classification, usually expressed as deaths per 1000, 10,000 or 100,000.
Multi-disciplinary team meeting (MDT)	A meeting which is held on a regular basis, which is made up of participants from various disciplines appropriate to the disease area, where diagnosis, management, and appropriate treatment of patients is discussed and decided.
National Institute for Clinical Effectiveness (NICE)	An independent organisation responsible for providing NHS England with guidance on promoting good health and preventing and treating ill health.
Needle aspirate	Fluid withdrawn from a lump (often a cyst) using a needle.
Nephrectomy	Surgery to remove all or part of a kidney. Radical nephrectomy removes the entire kidney, nearby lymph nodes and other surrounding tissue.
Nephron sparing surgery (NSS)	Partial nephrectomy (also known as Nephron sparing surgery) removes only the tumour and part of the kidney surrounding it.
Non-metastatic	Cancer which has not metastasised. Cancer which has not spread to any other part of the body other than primary site in kidney.

Open resection	Surgery to remove part or all of an organ or a tumour and nearby lymph nodes. The incision is large enough to let the surgeon see into the body.
Palliative	Anything which serves to alleviate symptoms due to the underlying cancer but is not expected to cure it.
Partial nephrectomy	Partial nephrectomy (also known as nephron sparing surgery) removes only the tumour and part of the kidney surrounding it.
Pathological	The study of disease processes with the aim of understanding their nature and causes. This is achieved by observing samples of fluid and tissues obtained from the living patient by various methods, or at post mortem.
Performance status	A measure of how well a patient is able to perform ordinary tasks and carry out daily activities. (PS WHO score of 0=asymptomatic, 4=bedridden).
Primary Tumour	The original tumour.
Prognosis	An assessment of the expected future course and outcome of a person's disease.
Prognostic Score	A method used to classify stage of disease to help assess the severity of a patient's cancer.
Radical nephrectomy	Radical nephrectomy removes the entire kidney, nearby lymph nodes and other surrounding tissue.
Radiofrequency ablation (RFA)	A procedure that uses radio waves to heat and destroy abnormal cells.
Radiology	The use of radiation (such as x-rays) or other imaging technologies (such as ultrasound and magnetic resonance imaging) to diagnose or treat disease.
Renal	Having to do with the kidneys.
Renal Cell Carcinoma / Renal Cancer	Cancer of the kidney/s.
Renal function	An indication of how well the kidney is working.
Scottish Medicines Consortium (SMC)	The purpose of the SMC is to accept for use those newly licensed drugs that clearly represent good value for money to NHS Scotland. SMC analyses information supplied by the drug manufacturer on the health benefits of the drug and justification of its price.
Space-occupying lesion	Substantial physical lesions which occupy space.
Staging	Process of describing to what degree cancer has spread from its original site to another part of the body. Staging involves clinical, surgical and pathology assessments.
Supportive care	Care given to improve the quality of life of patients who have a serious or life-threatening disease. The goal of supportive care is to prevent or treat as early as possible the symptoms of a disease, side effects caused by treatment of a disease, and psychological, social, and spiritual problems related to a disease or its treatment.
Surgery / Surgical resection	Surgical removal of the tumour/lesion.
Systemic Anti Cancer Therapy (SACT)	Treatment of cancer using drugs which prevent the replication or growth of cancer cells. This encompasses biological therapies and cytotoxic chemotherapy.

Systemic therapies	Treatment, usually given by mouth or by injection, that reaches and affects tumour cells throughout the body rather than targeting one specific area.
TNM staging system	TNM classification provides a system for staging the extent of cancer. T refers to the size of the primary tumour. N refers to the involvement of the lymph nodes. M refers to the presence of metastases or distant spread of the disease.
Transitional Cell Carcinoma (TCC)	Cancer which develops in cells, known as transitional cells, which form the lining of the bladder, ureters and renal pelvis.
Trifecta	A combination of three clinical measure (warm ischaemia time <25 minutes, negative surgical margins and no complications) which taken together are associated with better outcomes for renal cancer patients.
Tumour excision	Removal of the tumour mass.
Unresectable	Unable to be removed by surgery.
Ureter	Hollow muscular tubes that carry urine from the kidneys to the bladder.
Vasculature	Arrangement of blood vessels in the body.