| **Required/ Recommended** | **Element name** | **Values** | **Commentary** | **Implementation notes** |
| --- | --- | --- | --- | --- |
| Recommended | PRE-OPERATIVE INFORMATION | Not specified OR Multi select value list (choose all that apply): • Tumour embolization  • Cryoablation • Radio frequency ablation • External-beam radiation therapy (EBRT) • Other, Specify | Pre-operative treatments may significantly alter the gross and microscopic appearance of the tumour. |  |
| Required | SPECIMEN LATERALITY | Single selection value list: • Not specified • Left  • Right • Other eg horseshoe kidney, Specify | Specimen laterality information is needed for identification and patient safety purposes. |  |
| Required | OPERATIVE PROCEDURE | Single selection value list: • Radical nephrectomy Not specified • Simple nephrectomy • Partial nephrectomy • Other, Specify | The type of surgical procedure is important in determining the assessment of surgical margins. Specifically in the case of partial nephrectomy specimens it is important that the intra-renal surgical margin be carefully evaluated so as to ensure that no residual tumour is present in the remaining kidney.  A radical nephrectomy specimen is defined as a resection of Gerota’s fascia and its entire contents including the kidney, perinephric fat and lymphatics and a length of ureter, and may or may not be accompanied by the adrenal gland.  A simple nephrectomy is the removal of a kidney only with a small length of ureter.  A partial nephrectomy specimen may vary from a simple enucleation of the tumour to part of a kidney containing variable portions of calyceal or renal pelvic collecting system. |  |
| Required | ACCOMPANYING/ATTACHED STRUCTURES | None submitted OR Multi selection value list (select all that apply): • Adrenal gland • Lymph nodes, provide details • Other organs, provide details |  |  |
| Recommended | TISSUE REMOVED FROM SPECIMEN PRIOR TO SUBMISSION | Single selection value list: • Not stated • No • Yes, provide details | Pathologic evaluation requires a detailed examination of the complete surgical specimen. If tissue has been removed prior to examination this could compromise diagnosis, staging and prognostic assessment. |  |
| Recommended | TUMOUR SITE(S) | Single selection value list: • Not provided • Cannot be assessed  OR Multi selection value list (select all that apply): • Upper pole  • Mid zone  • Lower pole  • Cortex • Medulla • Other, specify | The position of the tumour in relation to the boundaries of the kidney and the surgical resection margin for radical nephrectomy and partial nephrectomy specimens is important for staging purposes. The position of the tumour in relation to the renal cortex or medulla may also have diagnostic importance. This is especially important for small tumours where a site of origin within the medulla would support a diagnosis of collecting duct carcinoma or medullary carcinoma.1  Locations of medulla and renal cortex should be mentioned under ‘other (specify)’.   References 1. World Health Organization (WHO) Classification of tumours. Pathology and genetics of the urinary system and male genital organs. Humphrey PA, Moch H, Reuter VE, Ulbright TM, editors. Lyon, France: IARC Press; 2016 |  |
| Required | TUMOUR FOCALITY | Single selection value list: • Cannot be assessed • Unifocal  • Multifocal, specify number of tumours (if possible) | Renal cell carcinomas are usually solitary, however, if multifocal tumours are present, this is important to record. Carcinomas in the setting of acquired cystic kidney disease are often multifocal. Multifocality may also be a clue that one may be dealing with hereditary renal cell carcinoma. Von Hippel Lindau, Birt-Hogg-Dube and hereditary papillary carcinoma syndromes are characteristically associated with multiple tumours. In a case of multiple carcinomas, it is important to record the diagnostic and prognostic parameters associated with the most significant tumours (largest, highest pT-category, highest grade). The histological subtype of the tumours may be similar or different and occasionally diverse morpho-types may be found. When numerous carcinomas are present some authors have suggested that the details of the 5 largest tumours should be recorded.4   References 4. Trpkov K, Grignon DJ, Bonsib SN et al.Handling and staging of renal cell carcinoma. The International Society of Urological Pathology (ISUP) consensus conference recommendations. Am J Surg Pathol 2013; 37: 1505-1517. |  |
| Required | MAXIMUM TUMOUR DIMENSION | Numeric: \_\_mm | The maximum dimension of the tumour is required for staging purposes as it constitutes the defining feature of the pT1 and pT2 categories of the TNM staging classification.2 Further it has been shown that for clear cell renal cell carcinoma tumour size correlates with outcome as a continuous variable.3 Measurement of tumour size should be undertaken following detailed dissection of the gross specimen and the greatest dimension should be recorded. Tumour extending into extracapsular tissue and/or the renal sinus, in continuity with the primary tumour intra-renal should be included in the measurement. Tumour within the real vein should not be included in this measurement. If multiple tumours are present the greatest dimension of the five largest tumours should be recorded.4  References 2. Amin MB, Edge SB, Greene FL, et al, eds. (2017) AJCC Cancer Staging Manual. 8th ed. New York: Springer 3. Delahunt B, Kittelson JM, McCredie MRE, et al. Prognostic importance of tumor size for localized conventional (claear cell) renal cell carcinoma. Assessment of TNM T1 and T2 categories andcomparison with other prognostic parameters. Cancer 2002; 94: 658-664  4. Trpkov K, Grignon DJ, Bonsib SN et al.Handling and staging of renal cell carcinoma. The International Society of Urological Pathology (ISUP) consensus conference recommendations. Am J Surg Pathol 2013; 37: 1505-1517. | Notes: If multiple tumours the maximum dimension of the largest five should be recorded. |
| Recommended | BLOCK IDENTIFICATION KEY | Text |  | Notes: List overleaf or separately with an indication of the nature and origin of all tissue blocks |
| Required | HISTOLOGICAL TUMOUR TYPE | Multi selection value list (select all that apply): • Clear cell renal cell carcinoma  • Multilocular clear cell renal cell neoplasm of low malignant potential • Papillary renal cell carcinoma o Type 1 o Type 2 o Oncocytic o NOS • Chromophobe renal cell carcinoma o Hybrid oncocytic chromophobe tumour • Collecting duct carcinoma • Renal medullary carcinoma • MiT family translocation renal cell carcinoma  o Xp11 translocation renal cell carcinoma o t(6;11) renal cell carcinoma o Other, specify • Mucinous tubular and spindle cell carcinoma • Tubulocystic renal cell carcinoma • Acquired cystic disease associated renal cell carcinoma • Clear cell papillary/tubulopapillary renal cell carcinoma  • Hereditary leiomyomatosis and renal cell carcinoma-associated renal cell carcinoma • Succinate dehydrogenase (SDH) deficient renal carcinoma • Renal cell carcinoma, unclassified • Other, specify | Many of the various sub-types of renal epithelial neoplasia exhibit differing clinical behaviour and prognosis.1,2,10-15 This has been confirmed in large single and multicentre studies for the main tumour sub-types. Several series have also clearly demonstrated that many of the newly described entities of renal malignancy have a prognosis that differs from that of clear cell renal cell carcinoma.15 In addition to this protocols for the various types of adjuvant anti-angiogenic therapy relate to specific tumour sub-types.16   The 2013 International Society of Urological Pathology (ISUP) Vancouver Classification of adult renal tumours identified an emerging/provisional category of renal cell carcinoma (RCC).9 While appearing distinctive, these rare tumours had not been fully characterized by morphology, immunohistochemistry and molecular studies. This category was also included in the fourth edition of the World Health Organization (WHO) classification of renal neoplasia. In the WHO classification oncocytoid RCC post-neuroblastoma, thyroid-like follicular RCC, anaplastic lymphoma kinase (ALK) rearrangement-associated RCC and RCC with (angio) leiomyomatous stroma are included in this category. These entities should be classified under ‘other’ with the name specified.  Papillary RCC has traditionally been subdivided into Type 1 and Type 2.17 Recent studies have shown these tumours to be clinically and biologically distinct. Type 1 tumours are associated with alterations in the MET pathway while type 2 tumours are associated with activation of the NRF2-ARE pathway. On the basis of molecular features type 2 tumours may be sub-divided into at least 3 subtypes.18 Type 1 and type 2 tumours show differing immunohistochemical staining with type 1 tumours more frequently expressing cytokeratin 7 in comparison to type 2.1,9,17,18 Oncocytic papillary renal cell carcinoma is a category included in the fourth edition of the WHO renal tumour classification.1 While not fully characterized, this tumour is best included in the broader papillary category. Papillary RCC is associated with a more favourable outcome than clear cell renal cell carcinoma (ccRCC), collecting duct carcinoma and hereditary leiomyomatosis and renal cell carcinoma (HLRCC)1,15 Papillary subtyping is also of prognostic significance with type 1 tumours having a better prognosis then those with type 2 morphology.15,17,18  References 1. World Health Organization (WHO) Classification of tumours. Pathology and genetics of the urinary system and male genital organs. Humphrey PA, Moch H, Reuter VE, Ulbright TM, editors. Lyon, France:IARC Press;2016 2. Amin MB, Edge SB, Greene FL, et al, eds. (2017) AJCC Cancer Staging Manual. 8th ed. New York: Springer.  9. Srigley JR, Delahunt B, Eble JN, et al. The International Society of Urological Pathology (ISUP) Vancouver classification of renal neoplasia. Am J Surg Pathol 2013; 37: 1469-1489. 10. Murphy WM, Grignon DJ, Perlman EJ, editors. Tumours of the Kidney, Bladder, and Related Urinary Structures. AFIP Atlas of Tumour Pathology Series 4. American Registry of Pathology. Washington DC; 2004. 11. Kim H, Cho NH, Kim D et al. Renal cell carcinoma in South Korea: A multicenter study. Hum Pathol 2004; 35: 1556-1563. 12. Ljungberg B, Alamdri FI, Stenling R et al. Prognostic significance of the Heidelberg Classification of renal cell carcinoma. Eur Urol 1999; 36: 565-569. 13. Moch H, Grasser T, Amin MB. Prognostic utility of the recently recommended histologic classification and revised TNM staging system of renal cell carcinoma. A Swiss experience with 588 tumours. Cancer 2000;89:604-614. 14. Srigley JR, Delahunt B. Uncommon and recently described renal carcinomas. Modern Pathology 2009;22:S2-S23. 15. Delahunt B, Cheville JC, Martignoni G, et al. The International Society of Urological Pathology (ISUP) Grading System for Renal Cell Carcinoma and Other Prognostic Parameters. 2013; 37:1490-1504. 16. O'Brien MF, Russo P, Motzer RJ. Sunitinib therapy in renal cell carcinoma. BJU International 2008;101:1339-1342. 17. Delahunt B, Eble JN, McCredie MR, et al. Morphologic typing of papillary renal cell carcinoma: comparison of growth kinetics and patient survival in 66 cases. Hum Pathol 2002; 32: 590-595. 18. The Cancer Genome Atlas Research Network. Comprehensive molecular characterization of papillary renal-cell carcinoma. NEJM 2015; 1-10. November 4, 2015DOI: 10.1056/NEJMoa1505917 | Notes: Value list from the World Health Organization Classification of Tumours of the Urinary System and Male Genital Organs, Fourth edition (2016) classification of renal cell tumours and the International Society of Urological Pathology Vancouver classification of renal neoplasia.  Note that permission to publish the WHO Classification of Tumours may be needed in your implementation. It is advisable to check with the International Agency for Research on Cancer (IARC).  Occasionally more than one histologic type of carcinoma occurs within the same kidney specimen. Each tumour type should be separately recorded. |
| Required | HISTOLOGICAL TUMOUR GRADE - WHO/ISUP | Single selection value list: • Not applicable • Grade X - Cannot be assessed • Grade 1 - Nucleoli absent or inconspicuous and basophilic at 400x magnification • Grade 2 - Nucleoli conspicuous and eosinophilic at 400x magnification, visible but not prominent at 100x magnification  • Grade 3 - Nucleoli conspicuous and eosinophilic at 100x magnification  • Grade 4 - Extreme nuclear pleomorphism and/or multi nuclear giant cells and/or rhabdoid and/or sarcomatoid differentiation | Grade should be assigned based on the single high power field showing the greatest degree of nuclear pleomorphism. This grading system is the World Health Organization/ International Society of Urological Pathology (WHO/ISUP) grading system for renal cell carcinoma which is recommended in the 2016 WHO.1,15 This system has been validated as a prognostic parameter for clear cell and papillary renal cell carcinoma.15,19,20 It has not been validated for other types of renal cell carcinoma but may be used for descriptive purposes.21 The current recommendation is that chromophobe renal cell carcinoma is not graded.1,22 References  1. World Health Organization (WHO) Classification of tumours. Pathology and genetics of the urinary system and male genital organs. Humphrey PA, Moch H, Reuter VE, Ulbright TM, editors. Lyon, France: IARC Press;2016 15. Delahunt B, Cheville JC, Martignoni G, et al. The International Society of Urological Pathology (ISUP) Grading System for Renal Cell Carcinoma and Other Prognostic Parameters. 2013; 37:1490-1504. 19. Sika-Paotonu D, Bethwaite PB, McCredie MRE, Jordan TW, Delahunt B . Nucleolar grade but not Fuhrman grade is applicable to papillary renal cell carcinoma. Am J Surg Pathol 2006; 30: 1091-1096. 20. Delahunt B, Sika-Paotonu D, Bethwaite PB, et al. Grading of clear cell renal cell carcinoma should be based on nucleolar prominence. Am J Surg Pathol 2011; 135: 1134-1139. 21. Delahunt B, Egevad L, Samaratunga H, et al. Gleason and Fuhrman no longer make the grade. Histopathology. 2016 Mar;68(4):475-81. 22. Delahunt B, Sika-Paotonu D, Bethwaite PB, et al. Fuhrman grading is not appropriate for chromophobe renal cell carcinoma. Am J Surg Pathol 2007; 31: 957-960. |  |
| Required | SARCOMATOID MORPHOLOGY | Single selection value list: • Not identified • Present | The presence of sarcomatoid morphology is seen in approximately 5% of renal cell carcinomas and is associated with a poor prognosis.15,23-26 Numerous studies have confirmed that sarcomatoid morphology may occur within any of the main subtypes of renal cell carcinoma and represents high grade disease.1,9 The five year survival for patients with sarcomatoid morphology is of the order of 15 to 22%.1,9,23-26 The outcome associated with sarcomatoid morphology is stage dependent.27 The presence of sarcomatoid morphology is incorporated into the WHO/ISUP grading system (Grade 4).15  References 1. World Health Organization (WHO) Classification of tumours . Pathology and genetics of the urinary system and male genital organs. Humphrey PA, Moch H, Reuter VE, Ulbright TM, editors. Lyon, France:IARC Press;2016 9. Srigley JR, Delahunt B, Eble JN, et al. The International Society of Urological Pathology (ISUP) Vancouver classification of renal neoplasia. Am J Surg Pathol 2013; 37: 1469-1489. 15. Delahunt B, Cheville JC, Martignoni G, et al. The International Society of Urological Pathology (ISUP) Grading System for Renal Cell Carcinoma and Other Prognostic Parameters. 2013; 37:1490-1504. 23. Cheville JC, Lohse CM, Zincke H et al. Sarcomatoid renal cell carcinoma. An examination of underlying histologic subtype and an analysis of associations with patient outcome. Am J Surg Pathol 2004;28:435-441. 24. Cangiano T, Liao J, Naitoh J et al. Sarcomatoid renal cell carcinoma: biologic behavior, prognosis and response to combined surgical resection and immunotherapy. J Clin Oncol 1999;17:523-528. 25. Delahunt B. Sarcomatoid renal cell carcinoma. the final common dedifferentiation pathway of renal epithelial malignancies. Pathology 1999; 31: 185-190. 26. de Peralta-Venturina M, Moch H, Amin M et al. Sarcomatoid differentiation in renal cell carcinoma. A study of 101 cases. Am J Surg Pathol 2001; 25: 275-278. 27. Mian BM, Bhadkamkar N, Slaton JW et al. Prognostic factors and survival of patients with sarcomatoid renal cell carcinoma. J Urol 2002; 167: 64-70. | If present, consider reporting extent |
| Recommended | Extent of sarcomatoid component | Numeric: \_\_% | While there is no recommended or agreed method to calculate the sarcomatoid component at this stage.15 It has been suggested that the proportion of tumour showing sarcomatoid differentiation has prognostic significance. In particular, significantly different survivals were demonstrated for tumours divided with a cutpoint of 50% sarcomatoid component.26   References 15. Delahunt B, Cheville JC, Martignoni G, et al. The International Society of Urological Pathology (ISUP) Grading System for Renal Cell Carcinoma and Other Prognostic Parameters. 2013; 37:1490-1504. 26. de Peralta-Venturina M, Moch H, Amin M et al. Sarcomatoid differentiation in renal cell carcinoma. A study of 101 cases. Am J Surg Pathol 2001; 25: 275-278. |  |
| Required | RHABDOID MORPHOLOGY | Single selection value list: • Not identified • Present | Similar to the sarcomatoid morphology, rhabdoid morphology is a feature of high grade disease.15,28 Tumours showing this phenotype resemble rhabdoid cells having bulky eosinophilic cytoplasm and an eccentric nucleus, often with a prominent nucleolus.1,9 Rhabdoid change is associated with a poor prognosis. It has been shown that 71% of patients with rhabdoid morphology developed metastases with a mean follow-up of 4.5 months. Within 2 years it was also noted that 43% of patients in this series had died, with a median survival rate of 8-31months.15,28-30 In approximately 25% of tumours with rhabdoid morphology, there is co-existing sarcomatoid carcinoma.1 The presence of rhabdoid morphology is incorporated into the WHO/ISUP grading system (Grade 4).15  References 1. World Health Organization (WHO) Classification of tumours . Pathology and genetics of the urinary system and male genital organs. Humphrey PA, Moch H, Reuter VE, Ulbright TM, editors. Lyon, France:IARC Press;2016 9. Srigley JR, Delahunt B, Eble JN, et al. The International Society of Urological Pathology (ISUP) Vancouver classification of renal neoplasia. Am J Surg Pathol 2013; 37: 1469-1489. 15. Delahunt B, Cheville JC, Martignoni G, et al. The International Society of Urological Pathology (ISUP) Grading System for Renal Cell Carcinoma and Other Prognostic Parameters. 2013; 37:1490-1504. 28. Kuroiwa K, Kinoshita Y, Shiratsuchi H et al. Renal cell carcinoma with rhabdoid features: an aggressive neoplasm. Histopathology 2002; 41: 538-548. 29. Gokden N, Nappi O, Swanson PE et al. Renal cell carcinoma with rhabdoid features. Am J Surg Pathol 2000; 24: 1329-1338. 30. Leroy X, Zini L, Buob D et al. Renal cell carcinoma with rhabdoid features. Arch Pathol Lab Med 2007; 131: 102-106. | If present, consider reporting extent |
| Recommended | Extent of rhabdoid component | Numeric: \_\_% | There is currently no firm evidence to demonstrate that the volume of cells showing rhabdoid morphology is of prognostic significance.15  References 15. Delahunt B, Cheville JC, Martignoni G, et al. The International Society of Urological Pathology (ISUP) Grading System for Renal Cell Carcinoma and Other Prognostic Parameters. 2013; 37:1490-1504. |  |
| Required | NECROSIS | Single selection value list: • Cannot be assessed • Not identified • Present  o Microscopic coagulative necrosis  o Macroscopic tumour necrosis | The presence of tumour necrosis has been shown to be a prognostic indicator for clear cell renal cell carcinoma and chromophobe renal cell carcinoma independent of tumour stage.15,35 Papillary renal cell carcinoma typically contains foci of necrosis, however the prognostic significance of this is, at best debated. At present it is recommended that the presence of both macroscopic and microscopic (coagulative) necrosis be recorded.15 For patients who have undergone pre-surgical renal embolization, the degree of tumour-related necrosis cannot be assessed.   References 15. Delahunt B, Cheville JC, Martignoni G, et al. The International Society of Urological Pathology (ISUP) Grading System for Renal Cell Carcinoma and Other Prognostic Parameters. 2013; 37:1490-1504. 35. Cheville JC, Lohse CM, Zincke H, Weaver AL, Blute ML. Comparison of outcome and prognostic features among histologic suptypes of renal cell carcinoma. Am J Surg Pathol 2003; 27: 612-624. | If present, consider reporting extent |
| Recommended | Extent of necrosis | Numeric: \_\_% | The presence of tumour necrosis has been shown to be a prognostic indicator for clear cell renal cell carcinoma and has limited or no prognostic implications for papillary renal cell carcinoma. It has been shown that tumour necrosis >10% is associated with a less favourable outcome, while for TNM stage 1 and 2 tumours a cutpoint of 20% of the area of the tumour showing necrosis has been suggested to have prognostic significance.36 At present the prognostic significance of the amount of necrosis within a tumour is uncertain. Despite this it has been recommended that this be recorded as a percentage.15   References 15. Delahunt B, Cheville JC, Martignoni G, et al. The International Society of Urological Pathology (ISUP) Grading System for Renal Cell Carcinoma and Other Prognostic Parameters. 2013; 37:1490-1504. 36. Klatte T, Said JW, de Martino M et al. Presence of tumour necrosis is not a significant predictor of survival in clear cell renal cell carcinoma: higher prognostic accuracy of extent based rather than presence/absence classification. J Urol 2009; 181: 1558-1564. | Notes: Applicable to clear cell renal cell carcinoma only |
| Required | EXTENT OF INVASION | Single selection value list: • Tumour limited to the kidney  OR Complete each of the following elements | Macroscopic extent The identification of tumour directly infiltrating the renal sinus or large vessels has prognostic significance and this information is required for staging purposes.2,5 Careful gross examination of the specimen to assess large vessel invasion for example of the renal vein or beyond (if applicable) should be undertaken. The renal sinus is an important pathway of spread of renal cell carcinoma and is often an under-recognized phenomenon.6 The renal sinus fat should be carefully assessed and generously sampled in order to detect renal sinus fat involvement. There is evolving literature suggesting that renal sinus fat involvement predicts a more aggressive outcome than peripheral perinephric fat invasion.7,8  When renal carcinoma involves the adrenal gland, it is important to document whether the involvement is contiguous spread of tumour or a separate (noncontiguous) nodule of carcinoma, the latter representing metastatic disease (pM1).2   Figure 1.  A: Diagram showing the renal sinus fat (S) and its rich venous system that envelops the collecting system. The renal capsule terminates (arrow) just inside the vestibule of the hilus.  B: A renal malignancy is constrained by the renal capsule (arrow), yet no fibrous capsule impedes its growth into the vascular tissue of the renal sinus (curved arrows).  From Bonsib et al.6 The American Journal of Surgical Pathology. © 2000 Wolters Kluwer Health. Reproduced with permission.  Microscopic extent Extra-renal extension of tumour is a feature of pT3 and pT4 staging categories of the TNM staging classification. Extension of tumour beyond Gerota’s fascia is a feature of the pT4 staging category of the TNM staging system.2  The renal sinus is the compartment that lies between the renal parenchymal and the renal pelvis and calyces. This compartment contains varying amounts of fat and is rich in lymphatics. As a consequence infiltration of the renal sinus is the principal route for the extension of tumour beyond the kidney.30 Renal sinus invasion is present when there is tumour in contact with renal sinus fat, loose connective tissue clearly beyond the renal parenchyma of the renal sinus and in endothelial-lined spaces (with or without mural smooth muscle) within the renal sinus.30 This is most commonly seen in clear cell renal cell carcinoma and appears to be associated with tumour size. In particular it has been noted that in clear cell renal cell carcinomas ≥ 7cm in diameter, renal sinus invasion was seen in > 90% of cases.7,8 Involvement of the renal sinus by tumour is a feature of pT3a tumour staging category of the TNM classification. It is likely that renal sinus invasion is preceded by involvement of renal sinus veins. It has also been shown that involvement of lymphatics within the renal sinus is of prognostic significance.31  If renal sinus invasion is seen on gross inspection of the specimen, then only one confirmatory section need be taken. If there is no evidence of renal sinus invasion grossly, then sampling should consist of at least three blocks of tissue.4  Macroscopic infiltration rather than microscopic evidence of invasion of the renal vein was a feature of pT3a in earlier editions of the TNM classification32, however, it has been shown that microvascular invasion correlates with outcome independent of T category, grade and perirenal fat invasion.45 Further, it is appreciated that infiltration of the renal vein may be overlooked on gross examination. For this reason the qualifier “grossly”, in relation to renal vein invasion, was removed as part of the definition of the pT3a staging category in the eighth edition of the AJCC staging system.  Adrenal gland: It is now recognized that direct spread of tumour to the ipsilateral adrenal gland has an outcome similar to pT4 tumour.33,34 In earlier TNM classifications this was included in the pT3a category, however, in view of these recent findings this was included as a feature of the pT4 category. In contrast a discrete, separate nodule in the adrenal gland is considered M1 disease.2 Other organs: The presence of metastatic disease is a feature of the pM1 staging category of the TNM staging classification.2  References 2. Amin MB, Edge SB, Greene FL, et al, eds. (2017) AJCC Cancer Staging Manual. 8th ed. New York: Springer 4. Trpkov K, Grignon DJ, Bonsib SN et al.Handling and staging of renal cell carcinoma. The International Society of Urological Pathology (ISUP) consensus conference recommendations. Am J Surg Pathol 2013; 37: 1505-1517. 5. Stőrkel S, Eble JN, Adlakha K, et al. Classification of renal cell carcinoma. Cancer 1997; 80:987-989. 6. Bonsib SM, Gibson D, Mhoon M, Greene GF. Renal sinus involvement in renal cell carcinoma. Am J Surg Pathol 2000; 24: 451-458. 7. Bonsib SM. T2 clear cell renal cell carcinoma is a rare entity: a study of 120 clear cell renal cell carcinomas. J Urol 2005; 174: 1199-1202. 8. Thompson RH, Leibovich BC, Cheville JC et al. Is renal sinus fat invasion the same as perinephric fat invasion for pT3a renal cell carcinoma? J Urol 2005; 174: 1218-1221. 30. Leroy X, Zini L, Buob D et al. Renal cell carcinoma with rhabdoid features. Arch Pathol Lab Med 2007; 131: 102-106. 31. Bonsib SM. Renal lymphatics, and lymphatic involvement in sinus vein invasive (pT3b) clear cell renal cell carcinoma: a study of 40 cases. Mod Pathol 2006; 19 :746-753. 32. Madbouly K, Al-Qahtani SM, Ghazwani Y et al. Microvascular tumour invasion: prognostic significance in low stage renal cell carcinoma. Urology 2007; 69: 670-674. 33. Thompson RH, Cheville JC, Lohse CM et al. Reclassification of patients with pT3 and pT4 renal cell carcinoma improves prognostic accuracy. Cancer 2005; 104: 53-60. 34. Ficcara V, Novara G, Iafrate M et al. Proposal for reclassification of the TNM staging system in patients with locally advanced (pT3-4) renal cell carcinoma according to the cancer-related outcome. Eur Urol 2007; 51: 722-729.  45 Madbouly K, Al-Qahtani SM, Ghazwani Y *et al.* Microvascular tumour invasion: prognostic significance in low stage renal cell carcinoma. *Urology* 2007; 69: 670-674 |  |
| Required | Tumour spread beyond the renal capsule | Single selection value list: • Cannot be assessed • Not identified • Present |  |  |
| Required | Tumour in renal sinus | Single selection value list: • Cannot be assessed • Not identified • Present in fat • Present in vascular spaces • Present in fat and vascular spaces |  |  |
| Required | Tumour extends beyond Gerota’s fascia | Single selection value list: • Cannot be assessed • Not identified • Present |  |  |
| Required | Tumour in major veins (renal vein or its segmental branches, inferior vena cava) | Single selection value list: • Cannot be assessed • Not identified • Present |  |  |
| Required | Tumour in adrenal gland | Single selection value list: • Not provided • Cannot be assessed • Not identified • Present - direct extension • Present - metastasis |  |  |
| Required | Tumour in other organs/structures | Single selection value list: • Not provided • Cannot be assessed • Not identified • Present, specify sites |  |  |
| Recommended | Tumour in renal vein wall | Single selection value list: • Cannot be assessed • Not identified • Present |  |  |
| Recommended | Tumour in pelvicalyceal system | Single selection value list: • Cannot be assessed • Not identified • Present |  |  |
| Recommended | LYMPHOVASCULAR INVASION | Single selection value list: • Not identified • Present | Lymphovascular invasion includes intratumoral, peritumoral and perirenal space invasion.4 In the renal sinus, it may be difficult to distinguish microscopic lymphovascular invasion from involvement of thin walled veins lacking smooth muscle. From a practical perspective, the presence of either pattern should be considered as renal sinus involvement (pT3a). Microvascular invasion has been shown to correlate with the development of metastases and with survival, independent of tumour size, primary tumour category, and grade.40  In both clear cell and papillary RCC, tumour spread is predominantly haematogenous via the sinus veins, renal vein and vena cava to the lung. Infiltration of the perirenal fat can result in retroperitoneal spread. Lymphatic spread to the nodes of the renal hilum may also occur and is more common in papillary RCC than with ccRCC.2   References 2. Amin MB, Edge SB, Greene FL, et al, eds. (2017) AJCC Cancer Staging Manual. 8th ed. New York: Springer 4. Trpkov K, Grignon DJ, Bonsib SN et al.Handling and staging of renal cell carcinoma. The International Society of Urological Pathology (ISUP) consensus conference recommendations. Am J Surg Pathol 2013; 37: 1505-1517. 40. Lang H, Lindner V, Letourneux H et al. Prognostic value of microscopic venous invasion in renal cell carcinoma: long term follow-up. Eur Urol 2004; 46: 331-335. |  |
| Required | LYMPH NODES STATUS |  | In earlier editions of the UICC/AJCC of the TNM classification, the number of lymph nodes infiltrated by tumour was used to differentiate the different pN categories. This has been simplified to now consist of presence or absence of lymph node involvement by tumour.1 It has, however been shown that survival does decrease with an increase in the number of lymph nodes involved (>4).37   References 1. World Health Organization (WHO) Classification of tumours. Pathology and genetics of the urinary system and male genital organs. Humphrey PA, Moch H, Reuter VE, Ulbright TM, editors. Lyon, France: IARC Press. 2016 37. Terrone C, Cracco C, Porpiglia et al. Reassessing the current TNM lymph node staging for renal cell carcinoma. Eur Urol 2006; 49: 324-331. | Heading Required only on receipt of LNs |
| Required | Number of lymph nodes examined | Numeric: \_\_\_ OR  Number cannot be assessed |  |  |
| Required | Number of positive lymph nodes | Numeric: \_\_\_ |  | If >0 consider recording size and extranodal extension |
| Recommended | Size of largest focus | Numeric: \_\_\_mm |  |  |
| Recommended | Extranodal extension | Single selection value list: • Cannot be assessed • Not identified • Present |  |  |
| Required | MARGIN STATUS | Single selection value list: • Cannot be assessed • Not involved • Involved | Assessment of surgical margins is important in determining if residual tumour is present. In a partial nephrectomy specimen, the renal parenchymal margin should be inked and histologically assessed. Most partial nephrectomy specimens also contain a portion of perinephric fat overlying the tumour site. The perirenal fat margin should also be assessed. In situations where no perirenal fat is submitted, the renal capsular margin should be inked and examined histologically. In radical nephrectomy specimens the ureteric, major vascular (renal vein, renal artery) and soft tissue (Gerota’s fascia, renal sinus) margins should be examined and documented in the report. | If involved specify the sites |
| Required | Site(s) | Multi selection value list (select all that apply): • Renal parenchymal margin (partial nephrectomy only)  • Renal capsular margin (partial nephrectomy only)  • Perinephric fat margin (partial nephrectomy only)  • Gerota’s fascial margin  • Renal vein margin  • Ureteral margin  • Other, specify |  |  |
| Required | CO-EXISTING PATHOLOGY IN NON-NEOPLASTIC KIDNEY | Single selection value list: • None identified  • Insufficient tissue for evaluation (<5 mm tissue adjacent to the tumour)  OR Multi selection value list (select all that apply): • Glomerular disease, specify type  • Tubulointerstitial disease, specify type  • Vascular disease, specify type  • Cyst(s) , specify type  • Tubular (papillary) adenoma(s)  • Other, specify | It is important to recognize that medical kidney diseases may be present in nonneoplastic renal tissue in nephrectomy and nephroureterectomy specimens.38,39 Arterionephrosclerosis (or hypertensive nephropathy) and diabetic nephropathy are seen in approximately 30% and 20% of cases, respectively. Other medical renal diseases that have been identified include thrombotic microangiopathy, focal segmental glomerulosclerosis, and IgA nephropathy. The findings of greater than 20% global glomerulosclerosis or advanced diffuse diabetic glomerulosclerosis are predictive of significant decline in renal function 6 months after radical nephrectomy.39 Evaluation for medical renal disease should be performed in each case; PAS and/or Jones methenamine silver stains should applied if necessary. Consultation with a nephropathologist should be pursued as needed.   References 38. Henriksen KJ, Meehan SM, Chang A. Non-neoplastic renal diseases are often unrecognized in adult tumor nephrectomy specimens: a review of 246 cases. Am J Surg Pathol 2007; 31:1703-1708. 39. Bijol V, Mendez GP, Hurwitz S, Rennke HG, Nose V. Evaluation of the non-neoplastic pathology in tumor nephrectomy specimens: predicting the risk of progressive failure. Am J Surg Pathol 2006; 30: 575-584. |  |
| Recommended | ANCILLARY STUDIES | Single selection value list: • Not performed • Performed, specify tests and results | Ancillary studies are being increasingly utilized for subtyping of renal cell neoplasms. Fluorescent in-situ hybridization (FISH) can be used to confirm a diagnosis of translocation carcinoma (MiT family tumour) and has been shown to be of utility in distinguishing oncocytoma from chromophobe renal cell carcinoma.1 Cytogenetics may be undertaken in some instances; however, this is not usually performed as part of the routine assessment of a renal tumour. It is now recognized that immunohistochemical assessment of tumours can be diagnostically helpful. There are currently no ancillary tests that are accepted as having prognostic significance for renal cell neoplasms.41,42  References 1. World Health Organization (WHO) Classification of tumours. Pathology and genetics of the urinary system and male genital organs. Humphrey PA, Moch H, Reuter VE, Ulbright TM, editors. Lyon, France: IARC Press. 2016 41. Tan P-H, Cheng L, Leclerq-Roux N, Merino M, Netto G, Reuter V, Shen S, Grignon DJ, Montironi R, Egevad L, Srigley JR, Delahunt B, Moch H, The ISUP Renal Tumor Panel. Renal cancer biomarkers: Diagnosis and prognosis. Am J Surg Pathol 2013; 37: 1518-1531. 42. Reuter VE, Argani P, Zhou M, Delahunt b, Amin MB, Epstein JI, Ulbright TM, Humphrey PA, Egevad L, Montironi R, Grignon D, Trpkov K, Lopez-Beltran A, Berney DM, Srigley JR. Best practice recommendations in the application of immunohistochemistry in kidney tumors.; report for the International society of Urological Pathology consensus conference. Am J Surg Pathol 2014; 38: e35-e49 |  |
| Required | PATHOLOGICAL STAGING (TNM 8th edition) |  | This dataset includes the AJCC TNM 8th edition2 definitions. The implementation of AJCC TNM 8th edition has been deferred until January 2018 in some jurisdictions. UICC 7th edition43 or AJCC 7th edition44 may be useful in the interim.  Figures. | Heading Please note that implementation of AJCC TNM 8th edition has been deferred until January 2018 in some jurisdictions. UICC 7th edition or AJCC 7th edition may be useful in the interim. Note that permission to publish the TNM cancer staging tables may be needed in your implementation. It is advisable to check. |
| Required | TNM descriptors | Choose if applicable: • m - multiple primary tumours at a single site • r - recurrent tumours after a disease free period • y - classification is performed during or following multimodality treatment |  |  |
| Required | Primary tumour (T) | TNM 8th edition |  |  |
| Required | Regional lymph nodes (N) | TNM 8th edition |  |  |
| Required | Distant metastasis (M) | TNM 8th edition or Not applicable |  |  |