

**Supplementary Appendix 1. PICOTS (population, interventions, comparators, outcomes, timing, and setting)**

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| <b>Population(s)</b>      | Newly diagnosed adults (18 years or older) with solid renal masses (or cystic renal masses with a solid component) suspicious for stage I and II renal cell carcinoma, which corresponds to clinical stage T1 (less than 7 cm and organ confined) or T2 (greater than 7 cm and organ confined) renal masses  |
| <b>Interventions</b>      | <ul style="list-style-type: none"> <li>• Percutaneous renal mass biopsy (fine needle aspiration or core biopsy)</li> <li>• Demographic characteristics: age, sex, smoking, race, marital status, education</li> <li>• Clinical characteristics: obesity and comorbidities, tumor characteristics (size, laterality, etc.), biopsy characteristics (pathology results, Fuhrman grade, etc.)</li> <li>• Imaging characteristics: computed tomography, ultrasonography, magnetic resonance imaging</li> </ul> |
| <b>Comparators</b>        | Comparisons are between biopsy results and pathologic diagnosis after surgical intervention  |
| <b>Outcomes</b>           | <p><b>Diagnostic Test-Related Outcomes</b></p> <ul style="list-style-type: none"> <li>• False positives, False negatives</li> <li>• Sensitivity, Specificity</li> <li>• Positive predictive value, Negative predictive value</li> <li>• Radiation exposure</li> </ul> <p><b>Adverse effects of percutaneous renal mass biopsy</b></p> <ul style="list-style-type: none"> <li>• Pain</li> <li>• Hematoma</li> <li>• Hemorrhage</li> <li>• Tumor seeding</li> <li>• Pneumothorax</li> <li>• Other</li> </ul> |
| <b>Type of study</b>      | Any study design except case report  |
| <b>Timing and Setting</b> | Any time point and setting meeting inclusion criteria  |