Additional File 1:

Supplemental 1:

	PubMed	SCOPUS	Web of Science
1	"carcinoma, renal cell"[MeSH Terms] OR "carcinoma"[All Fields] AND "renal"[All Fields] AND "cell"[All Fields] OR "renal cell carcinoma"[All Fields] OR "renal"[All Fields] AND "cell"[All Fields] AND "carcinoma"[All Fields] OR "renal neoplasms"[All Fields] OR "renal cancer"[All Fields] OR "kidney carcinoma"[All Fields] OR "kidney neoplasms"[MeSH Terms] OR "kidney"[All Fields] AND "neoplasms"[All Fields] OR "kidney neoplasms"[All Fields] OR "kidney cancer"[All Fields]	(TITLE("renal cancer") OR TITLE("kidney neoplasm") OR TITLE("renal cell carcinoma"))	((((TS=("kidney cancer")) OR TS=("renal cancer")) OR TS=("renal cell carcinoma")) OR TS=("kidney neoplasm")) OR TS=("renal carcinoma")
2	“biomarkers”[All Fields] OR “biomarkers”[MeSH Terms] OR “biological marker”[All Fields] OR “biological markers”[All Fields]	(TITLE("biomarkers") OR TITLE("biological markers"))	(((TS=("biomarkers")) OR TS=("biomarker")) OR TS=("biological marker")) OR TS=("biological markers")
3	"diagnosis"[Subheading] OR "diagnosis"[All Fields] OR "diagnosis"[MeSH Terms] OR "cancer diagnosis"[All Fields] OR "cancer screening"[All Fields] OR "screening"[All Fields]	(TITLE("diagnosis") OR TITLE("diagnostic") OR TITLE("screening") OR TITLE("cancer diagnosis"))	(((((TS=("diagnosis")) OR TS=("diagnostic")) OR TS=("diagnostic test")) OR TS=("screening")) OR TS=("diagnostic screening")) OR TS=("cancer diagnosis")
4	“urine”[MeSH Terms] OR “urine collection”[All Fields] OR “liquid biopsy”[MeSH Terms] OR “liquid biopsy”[All Fields] OR “Liquid Biopsies”[All Fields]	(TITLE("urine") OR TITLE("urine collection") OR TITLE("urinary"))	(((TS=("urine")) OR TS=("urine collection")) OR TS=("urinary"))
5			((((TS=("hereditary")) OR TS=("pediatric")) OR TS=("children")) OR TS=("von-Hippel Lindau disease")) OR TS=("Birt-Hogg-Dubé disease")
6	"urinary bladder neoplasms"[MeSH Terms] OR "prostatic neoplasms"[MeSH Terms]		(TS=("bladder cancer")) OR TS=("prostate cancer")
7			(((TS=("plasma")) OR TS=("serum")) OR TS=("blood")) OR TS=("tissue")
8			((((TS=("prognostic")) OR TS=("prognosis")) OR TS=("predictive")) OR TS=("prediction")) OR TS=("treatment response")
Search	**1 AND 2 AND 3 AND 4 NOT 6**	**1 AND 2 AND 3 AND 4**	**1 AND 2 AND 3 AND 4 NOT 5 NOT 6 NOT 7 NOT 8**

Supplemental 2:

<table>
<tr><td colspan="2">Main details</td></tr>
<tr><td>Author</td><td></td></tr>
<tr><td>Year</td><td></td></tr>
<tr><td>Type of biomarker</td><td></td></tr>
<tr><td>Biomarker(s)</td><td></td></tr>
<tr><td>Country</td><td></td></tr>
<tr><td>Aims/objectives</td><td></td></tr>
<tr><td colspan="2">Methods</td></tr>
<tr><td>Experimental techniques</td><td></td></tr>
<tr><td>Study design</td><td></td></tr>
<tr><td>Year(s) sample collection</td><td></td></tr>
<tr><td>Time of urine collection</td><td></td></tr>
<tr><td>Urine processing</td><td></td></tr>
<tr><td>Confounders</td><td></td></tr>
<tr><td>Sample size</td><td></td></tr>
<tr><td>Tumor type</td><td></td></tr>
<tr><td>TNM</td><td></td></tr>
<tr><td>ISUP</td><td></td></tr>
<tr><td>Stage</td><td></td></tr>
<tr><td>Grade (Fuhrman’s)</td><td></td></tr>
<tr><td>Inclusion criteria</td><td></td></tr>
<tr><td>Exclusion criteria</td><td></td></tr>
<tr><td>Recruitment method</td><td></td></tr>
<tr><td colspan="2">Results</td></tr>
<tr><td>Baseline characteristics (example)</td><td>
<table>
<tr><th></th><th>RCC patients</th><th>Healthy Subjects / controls</th><th>Others</th></tr>
<tr><td>Sample Size</td><td>…. RCC

…M + …F</td><td>…. RCC

…M + …F</td><td></td></tr>
<tr><td>Mean Age</td><td>… mean age (± …SD)</td><td>… mean age (± …SD)</td><td></td></tr>
<tr><td>Other</td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Study results (example)</td><td>
<table>
<tr><th></th><th>Statistical test</th><th>Sign.</th><th>Diagnostic properties</th></tr>
<tr><td>RCC vs Healthy Biomarker 1</td><td>Biomarker:</td><td>P =</td><td>AUC =
95%CI

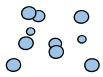
Se=
Sp =</td></tr>
<tr><td>RCC vs Healthy Biomarker Panel</td><td>Biomarker panel:</td><td>P =</td><td>AUC =
95%CI

Se=
Sp =</td></tr>
</table>
</td></tr>
<tr><td>Additions</td><td></td></tr>
<tr><td>Subgroup analysis</td><td>• Yes
• No</td></tr>
<tr><td>Specify subgroup analysis</td><td></td></tr>
</table>

Supplemental 3:

Item number	Recommendation	Scoring
Title and Abstract		
1. Title and abstract	a) Indicate the study's design with a commonly used term in the title or the abstract b) Provide in the abstract an informative and balanced summary of what was done and what was found	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
Introduction		
2. Background / rationale	Explain the scientific background and rationale for the investigation being reported	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
3. Objectives	State specific objectives, including any pre-specified hypotheses	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
Methods		
4. Study design	Present key elements of study design early in the paper	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
5. Setting	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
6. Participants	Give the eligibility criteria, and the sources and methods of selection of participants	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
7. Variables	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
8. Data sources / measurements	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
9. Bias	Describe any efforts to address potential sources of bias	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
10. Study size	Explain how the study size was arrived at	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
11. Quantitative variables	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
12. Statistical methods	a) Describe all statistical methods, including those used to control for confounding b) If applicable, describe any methods used to examine subgroups and interactions c) Explain how missing data were addressed d) Describe any sensitivity analyses	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
Results		
13. Descriptive data	Give characteristics of study participants (e.g. demographic, clinical, social)	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
14. Outcome data	Report numbers of outcome events or summary measures	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
15. Main results	a) Give confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included b) Do the results give diagnostic parameters? (Se, Sp, AUC)	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
Discussion		
16. Key results	Summarize key results with reference to study objectives	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
17. Limitations	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
18. Interpretation	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
19. Generalizability	Discuss the generalizability (external validity) of the study results	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points
Other Information		
20. Funding	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Clear / Present = 1 point Incomplete = 0.5 points Unclear / Not present = 0 points

Supplemental 8:

Type of biomarker	***Individual Biomarker***	***Biomarker Panel***
Proteins 	14-3-3 protein β/α (24) **PLIN2*** [16-18] **AQP1*** [16-20] Arrestin [29] CAIX [19] CETP [30] COX5B [30] CP [19] DKK4 [19] EMMPRIN [19] MMP9 [19] PODXL [19] Recoverin [29] SEZ6L2 [30]	4-protein panel [31] *(C3, FABP4, ANGPTL6 and PKHD1L1)* 2-protein panel [18] *(AQP1 and PLIN2)* 3-protein panel [30] *(CETP, SEZ6L2, COX5B)* 2-cancer retina antigen panel [29] *(Arrestin and recoverin)*
Metabolites 	*N*-jasmonoyltyrosine [9] tetrahydroaldosterone-3-glucuronide [9] androstenedione [9] 3,5-dihydroxyphenylvaleric acid [11] *N*-acetylglutamine [11] ᴅ-sedoheptulose-7-phosphate (10)	9-metabolite panel [9] *(N-jasmonoyltyrosine, tetrahydroaldosterone-3-glucuronide, androstenedione, dopamine 4-sulfate, 3-methylazelaic acid, cortolone-3-glucuronide,7α-hydroxy-3oxochol-4-en-24-oic acid, lithocholyltaurine and 11-dodecenoic acid)* 15-metabolite panel [11] *(heptanol, 3-methylene-indolenine, 2-methyl-3-hydroxy-5-formylpyridine-4-carboxylate, phosphodimethyl-ethanolamine, 4-methoxyphenylacetic acid, N-acetylglutamine, 3,5-dihydroxyphenylvaleric acid, hydroxyhexanoylglycine, ValLeu, LeuHis, oleamide, trihydroxyoctadecenoic acid, stearidonyl carnitine and squalene)* 5-metabolite panel (10) *(l-glutamic acid, lactate, ᴅ-sedoheptulose-7-phosphate, 2-hydroxyglutarate and myoinositol)* 3-metabolite panel [12] *(aminoadipic acid, 2-(formamido)-N1-(5-phospho-d-ribosyl) acetamidine and alpha-N-phenylacetyl-l-glutamine)*
miRNA 	Let-7a [38] **miR-122-5p*** [36, 37] miR-15a [33] miR-30c-5p [34]	2-miR-panel [35] *(miR-126-3p and miR-449a)* 3-miR-panel (39) *(miR-200a-3p, miR-34a-5p and miR-365a-3p)* **7p-urinary score*** [36, 37] *(miR-122-5p, miR-1271-5p and miR-15b-5p in combination with internal controls)* Let-7 miRNA panel [38] *(let-7a, 7b, 7c, 7d, 7e, 7g)*
DNA Methylation Markers	-	300 DMRs [41]
Others 	Percentage full-length CAIX mRNA (47) DSGb5 [54]	5 and 7 phosphosite signature [5] *(NS)* 8-VOC-panel [52] *(NS)* 6-volatile metabolite panel (51) *(octanal, 3-methylbutanal, benzaldehyde, 2-furaldehyde, 4-heptanone and p-cresol)*