# Supplementary Table 1: Prisma Checklist

| Section/topic | # | Checklist item                                                                                                                                                                                                 | Reported on page # |
|---------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| **TITLE**     |   |                                                                                                                                                                                                             |                    |
| Title         | 1 | Identify the report as a systematic review, meta-analysis, or both.                                                                                                                                            | 1                  |
| **ABSTRACT**  |   |                                                                                                                                                                                                             |                    |
| Structured summary | 2 | Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. | 4                  |
| **INTRODUCTION** |   |                                                                                                                                                                                                             |                    |
| Rationale     | 3 | Describe the rationale for the review in the context of what is already known.                                                                                                                                   | 5-7                |
| Objectives    | 4 | Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).                                                        | 7                  |
| **METHODS**   |   |                                                                                                                                                                                                             |                    |
| Protocol and registration | 5 | Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.                                      | N/A                |
| Eligibility criteria | 6 | Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.                                  | 8                  |
| Information sources | 7 | Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.                                       | 8                  |
| Search        | 8 | Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.                                                                                  | 8                  |
| Study selection | 9 | State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).                                                      | 8-9                |
| Data collection process | 10 | Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.                                    | 9                  |
| Data items    | 11 | List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.                                                                               | 9-10               |
| Risk of bias in individual studies | 12 | Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. | 9                  |
| Summary measures | 13 | State the principal summary measures (e.g., risk ratio, difference in means).                                                                                                                                   | 14                  |
Synthesis of results 14 Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., \( I^2 \)) for each meta-analysis. N/A

| Section/topic                | #  | Checklist item                                                                 | Reported on page # |
|-----------------------------|----|-------------------------------------------------------------------------------|-------------------|
| Risk of bias across studies | 15 | Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies). | 8                 |
| Additional analyses         | 16 | Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified. | 14                |

RESULTS

| Section/topic            | #  | Checklist item                                                                 | Reported on page # |
|-------------------------|----|-------------------------------------------------------------------------------|-------------------|
| Study selection         | 17 | Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. | 12                |
| Study characteristics   | 18 | For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. | 15-16             |
| Risk of bias within studies | 19 | Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). | 13-15             |
| Results of individual studies | 20 | For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. | Supplementary file |
| Synthesis of results    | 21 | Present results of each meta-analysis done, including confidence intervals and measures of consistency. | 15-16             |
| Risk of bias across studies | 22 | Present results of any assessment of risk of bias across studies (see Item 15). | 15-16             |
| Additional analysis     | 23 | Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]). | N/A               |

DISCUSSION

| Section/topic          | #  | Checklist item                                                                 | Reported on page # |
|-----------------------|----|-------------------------------------------------------------------------------|-------------------|
| Summary of evidence   | 24 | Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers). | 17-21             |
| Limitations           | 25 | Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). | 21-22             |
| Conclusions           | 26 | Provide a general interpretation of the results in the context of other evidence, and implications for future research. | 23                |

FUNDING

| Section/topic | #  | Checklist item                                                                 | Reported on page # |
|---------------|----|-------------------------------------------------------------------------------|-------------------|
| Funding       | 27 | Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. | 2                 |

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097
For more information, visit: www.prisma-statement.org.
Supplementary Table 2

| STARD criteria number | STARD description                                                                 | Rationale for excluding from STARD analysis                                                                                                                                                                                                 |
|-----------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11                    | Rationale for choosing the reference standard (if alternatives exist)             | In diagnostic accuracy studies, the reference standard is used for establishing the presence or absence of the target condition in study participants. This usually pertains to a gold standard for diagnosis. Here in our case all patients have a formal histopathologic diagnosis of RCC. |
| 22a and 22b           | Time interval and any clinical interventions between index test and reference standard | Studies of diagnostic accuracy are essentially cross-sectional investigations. In most cases, investigators want to know how well the index test classified patients in the same way as the reference standard, when both tests are performed in the same patients, at the same time. Since the patients in this study already have a known diagnosis of RCC and the manuscripts analyzed are looking for blood-based biomarkers, the time between histopathologic diagnosis and patient blood draw for biomarker analysis is not overly relevant. |
| 28                    | Registration number and name of registry                                         | All papers are single-centre and none state registration details.                                                                                                                                                                       |
| 29                    | Where the full study protocol can be accessed                                    | All papers are single-centre and none state registration details.                                                                                                                                                                       |
## Supplementary Table 3

| Type of publication | Subjected to STARD analysis | Reference | STARD score |
|---------------------|-----------------------------|-----------|-------------|
| **Cell free DNA**   |                             |           |             |
| Manuscript          | Yes                         | Anticancer Res. 2010 Jul;30(7):2785-9. | 12          |
| Manuscript          | Yes                         | Clin Chim Acta. 2016 Jan 15;452:109-19. | 15.5        |
| **Endothelial cells** |                             |           |             |
| Manuscript          | Yes                         | Br J Cancer. 2011 Jun 28;105(1):112-7. | 9           |
| Manuscript          | Yes                         | Cancer Res. 2006 Mar 15;66(6):2918-22. | 9.5         |
| **Methylated cell free DNA** |                   |           |             |
| Manuscript          | Yes                         | Dis Markers. 2016;2016:3693096. | 16.75       |
| Manuscript          | Yes                         | Anticancer Res. 2013 Oct;33(10):4651-6. | 11.5        |
| **RNA**             |                             |           |             |
| Manuscript          | Yes                         | Oncogenesis. 2016 Feb 15;5:e192. | 13          |
| Manuscript          | Yes                         | Eur Urol Focus. 2018 Apr;4(3):412-419. | 14          |
| Manuscript          | Yes                         | Int J Mol Sci. 2015 Sep 29;16(10):23382-9. | 13.5        |
| Manuscript          | Yes                         | PLoS One. 2015 Apr 24;10(4);e0103258. | 12.25       |
| Manuscript          | Yes                         | Sci Rep. 2015 Jan 5;5:7610. | 15.5        |
| Manuscript          | Yes                         | Tumour Biol. 2014 May;35(5):4057-66. | 12          |
| Manuscript          | Yes                         | Int J Oncol. 2014 Jan;44(1):53-8. | 11.5        |
| Manuscript          | Yes                         | Exp Mol Pathol. 2013 Feb;94(1):115-20. | 12.5        |
| Manuscript          | Yes                         | Cancer Epidemiol. 2012 Aug;36(4):391-4. | 13          |
| Manuscript          | Yes                         | J Transl Med. 2012 Mar 22;10:55. | 11          |
| Manuscript          | Yes                         | Anticancer Res. 2008 Jan-Feb;28(1A):321-6. | 11.5        |
| Manuscript          | Yes                         | Eur Urol Focus. 2018 Mar;4(2):260-266. | 8           |
| Review              | No                          | Expert Rev Mol Diagn. 2016 Oct;16(10):1059-1065. | N/A         |
| Review              | No                          | Int J Mol Sci. 2013 Jul 16;14(7):14785-99. | N/A         |
| Review              | No                          | Clinical Chemistry. Conference: 66th Annual Scientific Meeting of the American Association for Clinical Chemistry, AACC 2014. Chicago, IL United States. Conference Publication: (var.pagings). 60 (10 SUPPL. 1) (pp S14), 2014. Date of Publication: 2014. | N/A         |
| Review              | No                          | Clinical Chemistry and Laboratory Medicine. Conference: 22nd International Congress of Clinical Chemistry and Laboratory Medicine, 22nd Balkan Clinical Laboratory Federation Meeting, BCLF 2014, 26th National Congress of the Turkish Biochemical Society, TBS 2014, IFCC WORLDLAB 2014. Istanbul Turkey. Conference Publication: (var.pagings). 52 (SUPPL. 1) (pp S488), 2014. Date of Publication: July 2014. | N/A         |
| Review              | No                          | Tumour Biol. 2016 May;37(5):5705-14. | N/A         |
| Type        | Abstract/Review | Journal/Conference/Supplement | Date/Publication | Number |
|-------------|----------------|-------------------------------|------------------|--------|
| Abstract    | No             | European Urology, Supplements. Conference: 30th Annual Congress of the European Association of Urology, EAU15. Madrid Spain. Conference Publication: (var.pagings). 14 (2) (pp e861), 2015. Date of Publication: April 2015. | N/A              |        |
| Review      | No             | Clin Biochem. 2013 Jul;46(10-11):846-60. | N/A              |        |
| Abstract    | No             | Journal of Clinical Oncology. Conference: 2012 Genitourinary Cancers Symposium. San Francisco, CA United States. Conference Publication: (var.pagings). 30 (5 SUPPL. 1) (no pagination), 2012. Date of Publication: 10 Feb 2012. | N/A              |        |
| Abstract    | No             | European Journal of Cancer. Conference: 22nd Biennial Congress of the European Association for Cancer Research, EACR 2012. Barcelona Spain. Conference Publication: (var.pagings). 48 (SUPPL. 5) (pp S216), 2012. Date of Publication: July 2012. | N/A              |        |

**Tumor cells**

| Type        | Abstract/Review | Journal/Conference/Supplement | Date/Publication | Number |
|-------------|----------------|-------------------------------|------------------|--------|
| Manuscript  | Yes            | Anticancer Res. 2005 Jan-Feb;25(1A):377-81. | 8                |        |
| Manuscript  | Yes            | Cancer. 1999 Aug 1;86(3):492-7. | 9                |        |
| Review      | No             | Future Oncol. 2014 May;10(6):1095-111. | N/A              |        |
| Review      | No             | Postepy Hig Med Dosw (Online). 2012 Dec 7;66:983-90. | N/A |        |

**Tumor DNA**

| Type        | Abstract/Review | Journal/Conference/Supplement | Date/Publication | Number |
|-------------|----------------|-------------------------------|------------------|--------|
| Abstract*   | No             | Canadian Urological Association Journal. Conference: 69th Annual Meeting of the Northeastern Section of the American Urological Association, NSAUA 2017. United States. 11 (9 Supplement 6) (pp S329), 2017. Date of Publication: September 2017. | N/A              |        |
| Abstract*   | No             | Journal of Clinical Oncology. Conference: 2017 Genitourinary Cancers Symposium. United States. 35 (6 Supplement 1) (no pagination), 2017. Date of Publication: February 2017. | N/A              |        |
| Abstract*   | No             | Journal of Urology. Conference: 112th Annual Meeting of the American Urological Association, AUA 2017. United States. 197 (4 Supplement 1) (pp e913-e914), 2017. Date of Publication: April 2017. | N/A              |        |
| Abstract    | No             | Journal of Urology. Conference: 2013 Annual Meeting of the American Urological Association, AUA. San Diego, CA United States. Conference Publication: (var.pagings). 189 (4 SUPPL. 1) (pp e249-e250), 2013. Date of Publication: April 2013. | N/A              |        |
| Review      | No             | Eur Urol. 2002 Jun;41(6):668-76. | N/A              |        |

**Other**

| Type        | Manuscript/Review | Journal/Conference/Supplement | Date/Publication | Number |
|-------------|-------------------|-------------------------------|------------------|--------|
| Manuscript  | Yes               | J Mol Biomark Diagn. 2016 Jun;1(Suppl 2). | 10.5             |        |
| Manuscript  | Yes               | Urol Oncol. 2012 Jul-Aug;30(4):509-15. | 11.5             |        |
| Manuscript  | Yes               | Clin Cancer Res. 1997 Aug;3(8):1427-31. | 7                |        |
| Manuscript  | Yes               | J Natl Cancer Inst. 1999 Dec 1;91(23):2028-32. | 8                |        |
| Manuscript  | Yes               | Br J Cancer. 1993 Jul;68(1):122-4. | 8                |        |
| Manuscript | Yes | PLoS One. 2011;6(5):e19873. | 9.5 |
|-----------|-----|-----------------------------|-----|
| **Abstract** | No | Cancer Research. Conference: 104th Annual Meeting of the American Association for Cancer Research, AACR 2013. Washington, DC United States. Conference Publication: (var.pagings). 73 (8 SUPPL. 1) (no pagination), 2013. Date of Publication: 15 Apr 2013. | N/A |
| **Abstract** | No | Nephrology Dialysis Transplantation. Conference: 50th ERA-EDTA Congress. Istanbul Turkey. Conference Publication: (var.pagings). 28 (SUPPL. 1) (pp i44-i45), 2013. Date of Publication: May 2013. | N/A |

* These three abstracts are the same abstract presented at three different conferences using slightly different titles and abstract content.
Supplementary Methods 1

The following terms were used to search PubMed (March 23, 2018), Medline (March 29, 2018) and Embase (March 29, 2018) without any limit on date of past publications: “(renal cell carcinoma OR renal cancer OR kidney cancer OR kidney carcinoma) AND circulating AND (biomarkers OR cell free DNA OR tumor DNA OR methylated cell free DNA OR methylated tumor DNA).”

The search terms were selected to capture publications investigating renal cell carcinoma circulating biomarkers. We emphasized new circulating biomarkers undergoing active investigation in other disease sites (e.g. tumor DNA, methylated DNA, etc.) to make the study more poignant towards the latest biomarker developments.

MeSH terms included:

**Renal cell carcinoma**
- Carcinomas, Renal Cell
- Renal Cell Carcinomas
- Adenocarcinoma, Renal Cell
- Adenocarcinomas, Renal Cell
- Renal Cell Adenocarcinoma
- Renal Cell Adenocarcinomas
- Adenocarcinoma Of Kidney
- Adenocarcinoma Of Kidneys
- Kidney, Adenocarcinoma Of
- Kidneys, Adenocarcinoma Of
- Renal Cell Cancer
- Cancer, Renal Cell
- Cancers, Renal Cell
- Renal Cell Cancers
- Adenocarcinoma, Renal
- Adenocarcinomas, Renal
- Renal Adenocarcinoma
- Renal Adenocarcinomas
- Nephroid Carcinoma
- Carcinoma, Nephroid
- Carcinomas, Nephroid
- Nephroid Carcinomas
- Renal Cell Carcinoma
- Chromophobe Renal Cell Carcinoma
- Sarcomatoid Renal Cell Carcinoma
- Papillary Renal Cell Carcinoma
- Renal Cell Carcinoma, Papillary
- Chromophil Renal Cell Carcinoma
- Clear Cell Renal Cell Carcinoma
- Grawitz Tumor
- Tumor, Grawitz
- Clear Cell Renal Carcinoma
- Carcinoma, Hypernephroid
- Carcinomas, Hypernephroid
- Hypernephroid Carcinoma
- Hypernephroid Carcinomas
- Hypernephroma
- Hypernephromas
- Collecting Duct Carcinoma (Kidney)
- Carcinoma, Collecting Duct (Kidney)
- Carcinomas, Collecting Duct (Kidney)
- Collecting Duct Carcinomas (Kidney)
- Collecting Duct Carcinoma of the Kidney
- Renal Collecting Duct Carcinoma
- Collecting Duct Carcinoma
- Carcinoma, Collecting Duct
- Carcinomas, Collecting Duct
- Collecting Duct Carcinomas

Renal cancer
- Kidney Neoplasm
- Neoplasm, Kidney
- Renal Neoplasms
- Neoplasm, Renal
- Neoplasms, Renal
- Renal Neoplasm
- Neoplasms, Kidney
- Cancer of Kidney
- Kidney Cancers
- Renal Cancer
- Cancer, Renal
- Cancers, Renal
- Renal Cancers
- Cancer of the Kidney
- Kidney Cancer
- Cancer, Kidney
- Cancers, Kidney

Kidney cancer
- Kidney Neoplasm
- Neoplasm, Kidney
- Renal Neoplasms
- Neoplasm, Renal
- Neoplasms, Renal
- Renal Neoplasm
- Neoplasms, Kidney
- Cancer of Kidney
- Kidney Cancers
- Renal Cancer
- Cancer, Renal
- Cancers, Renal
- Renal Cancers
- Cancer of the Kidney
- Kidney Cancer
- Cancer, Kidney
- Cancers, Kidney

**Kidney carcinoma**

- Carcinomas, Renal Cell
- Renal Cell Carcinomas
- Adenocarcinoma, Renal Cell
- Adenocarcinomas, Renal Cell
- Renal Cell Adenocarcinoma
- Renal Cell Adenocarcinomas
- Adenocarcinoma Of Kidney
- Adenocarcinoma Of Kidneys
- Kidney, Adenocarcinoma Of
- Kidneys, Adenocarcinoma Of
- Renal Cell Cancer
- Cancer, Renal Cell
- Cancers, Renal Cell
- Renal Cell Cancers
- Adenocarcinoma, Renal
- Adenocarcinomas, Renal
- Renal Adenocarcinoma
- Renal Adenocarcinomas
- Nephroid Carcinoma
- Carcinoma, Nephroid
- Carcinomas, Nephroid
- Nephroid Carcinomas
- Renal Cell Carcinoma
- Chromophobe Renal Cell Carcinoma
- Sarcomatoid Renal Cell Carcinoma
- Papillary Renal Cell Carcinoma
- Renal Cell Carcinoma, Papillary
- Chromophil Renal Cell Carcinoma
- Clear Cell Renal Cell Carcinoma
- Grawitz Tumor
- Tumor, Grawitz
- Clear Cell Renal Carcinoma
- Carcinoma, Hypernephroid
- Carcinomas, Hypernephroid
- Hypernephroid Carcinoma
- Hypernephroid Carcinomas
- Hypernephroma
- Hypernephromas
- Collecting Duct Carcinoma (Kidney)
- Carcinoma, Collecting Duct (Kidney)
- Carcinomas, Collecting Duct (Kidney)
- Collecting Duct Carcinomas (Kidney)
- Collecting Duct Carcinoma of the Kidney
- Renal Collecting Duct Carcinoma
- Collecting Duct Carcinoma
- Carcinoma, Collecting Duct
- Carcinomas, Collecting Duct
- Collecting Duct Carcinomas

Circulating
- Neoplasm Circulating Cells
- Circulating Neoplastic Cells
- Cell, Circulating Neoplastic
- Cells, Circulating Neoplastic
- Circulating Neoplastic Cell
- Neoplastic Cell, Circulating
- Circulating Tumor Cells
- Cell, Circulating Tumor
- Cells, Circulating Tumor
- Circulating Tumor Cell
- Tumor Cell, Circulating
- Tumor Cells, Circulating
- Cells, Neoplasm Circulating
- Cell, Neoplasm Circulating
- Neoplasm Circulating Cell
- Circulating Cells, Neoplasm
- Tumor Cells, Embolic
- Cell, Embolic Tumor
- Cells, Embolic Tumor
- Embolic Tumor Cell
- Tumor Cell, Embolic
- Embolic Tumor Cells
- Embolism, Tumor
- Embolisms, Tumor
- Tumor Embolism
- DNA, Circulating Tumor
- Tumor DNA, Circulating
- Cell-Free Tumor DNA
- Cell Free Tumor DNA
- DNA, Cell-Free Tumor
• Tumor DNA, Cell-Free
• MicroRNA, Circulating
• Cell-Free MicroRNA
• Cell Free MicroRNA
• MicroRNA, Cell-Free
• Cell Free Nucleic Acids
• Nucleic Acids, Cell-Free
• Circulating Cell-Free Nucleic Acids
• Circulating Cell Free Nucleic Acids
• Circulating Nucleic Acids
• Acids, Circulating Nucleic
• Nucleic Acids, Circulating
• Cell-Free Nucleic Acid
• Cell Free Nucleic Acid
• Nucleic Acid, Cell-Free
• Cell-Free DNA
• Cell Free DNA
• DNA, Cell-Free
• cfDNA
• cirDNA
• Cell-Free Deoxyribonucleic Acid
• Acid, Cell-Free Deoxyribonucleic
• Cell Free Deoxyribonucleic Acid
• Deoxyribonucleic Acid, Cell-Free
• Circulating DNA
• DNA, Circulating
• Cell-Free RNA
• Cell Free RNA
• RNA, Cell-Free
• cfRNA
• cirRNA
• Cell-Free Ribonucleic Acid
• Acid, Cell-Free Ribonucleic
• Cell Free Ribonucleic Acid
• Ribonucleic Acid, Cell-Free
• Circulating RNA
• RNA, Circulating
• Biopsies, Liquid
• Biopsy, Liquid
• Liquid Biopsies

Biomarkers
• Markers, Biological
• Biologic Markers
• Markers, Biologic
• Biologic Marker
• Marker, Biologic
• Marker, Biological
• Biological Marker
• Biological Markers
• Markers, Laboratory
• Laboratory Markers
• Laboratory Marker
• Marker, Laboratory
• Serum Markers
• Markers, Serum
• Marker, Serum
• Serum Marker
• Surrogate Endpoints
• Endpoints, Surrogate
• Surrogate End Points
• End Points, Surrogate
• Surrogate End Point
• End Point, Surrogate
• Surrogate Endpoint
• Endpoint, Surrogate
• Markers, Clinical
• Clinical Markers
• Clinical Marker
• Marker, Clinical
• Viral Markers
• Markers, Viral
• Viral Marker
• Marker, Viral
• Biochemical Marker
• Biochemical Markers
• Markers, Biochemical
• Marker, Biochemical
• Markers, Immunologic
• Immune Markers
• Markers, Immune
• Marker, Immunologic
• Immunologic Markers
• Immune Marker
• Marker, Immune
• Immunologic Marker
• Surrogate Markers
• Markers, Surrogate
• Marker, Surrogate
• Tumor Biomarkers
• Markers, Biological Tumor
• Tumor Markers, Biological
- Markers, Tumor Metabolite
- Tumor Metabolite Markers
- Metabolite Markers, Tumor
- Marker, Tumor Metabolite
- Metabolite Marker, Tumor
- Tumor Metabolite Marker
- Tumor Markers, Biologic
- Biologic Tumor Markers
- Markers, Biologic Tumor
- Marker, Biologic Tumor
- Biologic Tumor Marker
- Tumor Marker, Biologic
- Biochemical Tumor Markers
- Markers, Biochemical Tumor
- Marker, Biochemical Tumor
- Biochemical Tumor Marker
- Tumor Marker, Biochemical
- Carcinogen Markers
- Markers, Carcinogen
- Markers, Neoplasm Metabolite
- Neoplasm Metabolite Markers
- Marker, Neoplasm Metabolite
- Metabolite Marker, Neoplasm
- Neoplasm Metabolite Marker
- Metabolite Markers, Neoplasm
- Biological Tumor Markers
- Biological Tumor Marker
- Tumor Marker, Biological
- Marker, Biological Tumor
- Markers, Tumor
- Tumor Markers
- Biomarkers, Cancer
- Cancer Biomarkers

**Cell free DNA**
- Cell Free Nucleic Acids
- Nucleic Acids, Cell-Free
- Circulating Cell-Free Nucleic Acids
- Circulating Cell Free Nucleic Acids
- Circulating Nucleic Acids
- Acids, Circulating Nucleic
- Nucleic Acids, Circulating
- Cell-Free Nucleic Acid
- Cell Free Nucleic Acid
- Nucleic Acid, Cell-Free
• Cell-Free DNA
• Cell Free DNA
• DNA, Cell-Free
• cfDNA
• cirDNA
• Cell-Free Deoxyribonucleic Acid
• Acid, Cell-Free Deoxyribonucleic
• Cell Free Deoxyribonucleic Acid
• Deoxyribonucleic Acid, Cell-Free
• Circulating DNA
• DNA, Circulating
• Cell-Free RNA
• Cell Free RNA
• RNA, Cell-Free
• cfRNA
• cirRNA
• Cell-Free Ribonucleic Acid
• Acid, Cell-Free Ribonucleic
• Cell Free Ribonucleic Acid
• Ribonucleic Acid, Cell-Free
• Circulating RNA
• RNA, Circulating

Tumor DNA
• DNA, Circulating Tumor
• Tumor DNA, Circulating
• Cell-Free Tumor DNA
• Cell Free Tumor DNA
• DNA, Cell-Free Tumor
• Tumor DNA, Cell-Free

Methylated cell free DNA
• No MeSH terms listed

Methylated tumor DNA
• No MeSH terms listed
Supplementary Box 1

Publications not examining RCC circulating prognostic biomarkers

| Publications not examining RCC circulating prognostic biomarkers = 438 |
|-----------------------------------------------------------------------|
| ◆ Air pollution = 1                                                   |
| ◆ Aging = 1                                                          |
| ◆ Acute/chronic kidney disease = 11                                   |
| ◆ Amyloidosis = 1                                                     |
| ◆ Bioenergetics and metabolism = 2                                     |
| ◆ Biomarker(s) for > 1 disease (not including RCC) = 20               |
| ◆ Breast cancer = 3                                                   |
| ◆ Case report\(^a\) = 25                                              |
| ◆ Calcium homeostasis = 4                                             |
| ◆ Cardiovascular = 5                                                  |
| ◆ Cytomegalovirus = 1                                                 |
| ◆ Colorectal cancer = 4                                               |
| ◆ Commentary letter = 1                                               |
| ◆ Conference proceeding introduction = 2                              |
| ◆ Cushing’s disease = 1                                               |
| ◆ Diabetes = 2                                                       |
| ◆ Endocrine diseases (multiple conditions) = 1                        |
| ◆ Endometrial cancer = 1                                              |
| ◆ Gastric cancer = 1                                                  |
| ◆ Hematology (malignant) = 5                                          |
| ◆ Hepatitis = 1                                                      |
| ◆ HIF-1α pathway = 1                                                  |
| ◆ HIV = 1                                                            |
| ◆ Limb ischemia = 1                                                  |
| ◆ Liver cancer = 3                                                   |
| ◆ Lung cancer = 3                                                    |
| ◆ Melanoma = 6                                                       |
| ◆ Membranous nephropathy = 1                                          |
| ◆ Methodology and instrumentation = 50                                |
| ◆ Nasopharyngeal cancer = 1                                           |
| ◆ Neuroendocrine tumors = 3                                           |
| ◆ Neurofibromatosis = 1                                               |
| ◆ Non-RCC renal cancer biomarkers = 2                                 |
| ◆ No diagnostic, predictive or prognostic biomarkers = 129            |
| ◆ Obesity = 2                                                        |
| ◆ Oncolytic virus therapy = 1                                         |
| ◆ Ovarian cancer = 1                                                  |
| ◆ Pancreatic cancer = 2                                               |
| ◆ Prostate cancer = 5                                                 |
| ◆ Proximal tubular secretion = 1                                      |
| ◆ Pulmonary fibrosis = 1                                              |
| ◆ RCC predictive circulating biomarkers = 33                          |
| ◆ RCC prognostic circulating biomarkers = 69\(^b\)                    |
| ◆ RCC tumor biomarkers = 1                                            |
| ◆ RCC urinary biomarkers = 6                                          |
| ◆ Sarcoma = 1                                                        |
| ◆ Sepsis = 1                                                         |
| ◆ Trauma = 1                                                         |
| ◆ Thyroid cancer = 2                                                 |
| ◆ Transitional cell carcinoma = 3                                     |
| ◆ Trials in progress or to be performed = 10                         |
| ◆ Transplantation = 3                                                |
| ◆ Uncertain if RCC predictive or prognostic biomarker study = 5       |
| ◆ Vascular damage = 1                                                |

\(^a\) Papers are classified in this section regardless if they are reporting on biomarkers or RCC.

\(^b\) In total, 5 publications examined RCC prognostic circulating biomarkers and RCC diagnostic circulating biomarkers. These 5 studies were tallied in the “Publications examining RCC circulating diagnostic biomarkers” section in Figure 1.