Article Selection

Systematic Review Training

Center for Knowledge Management

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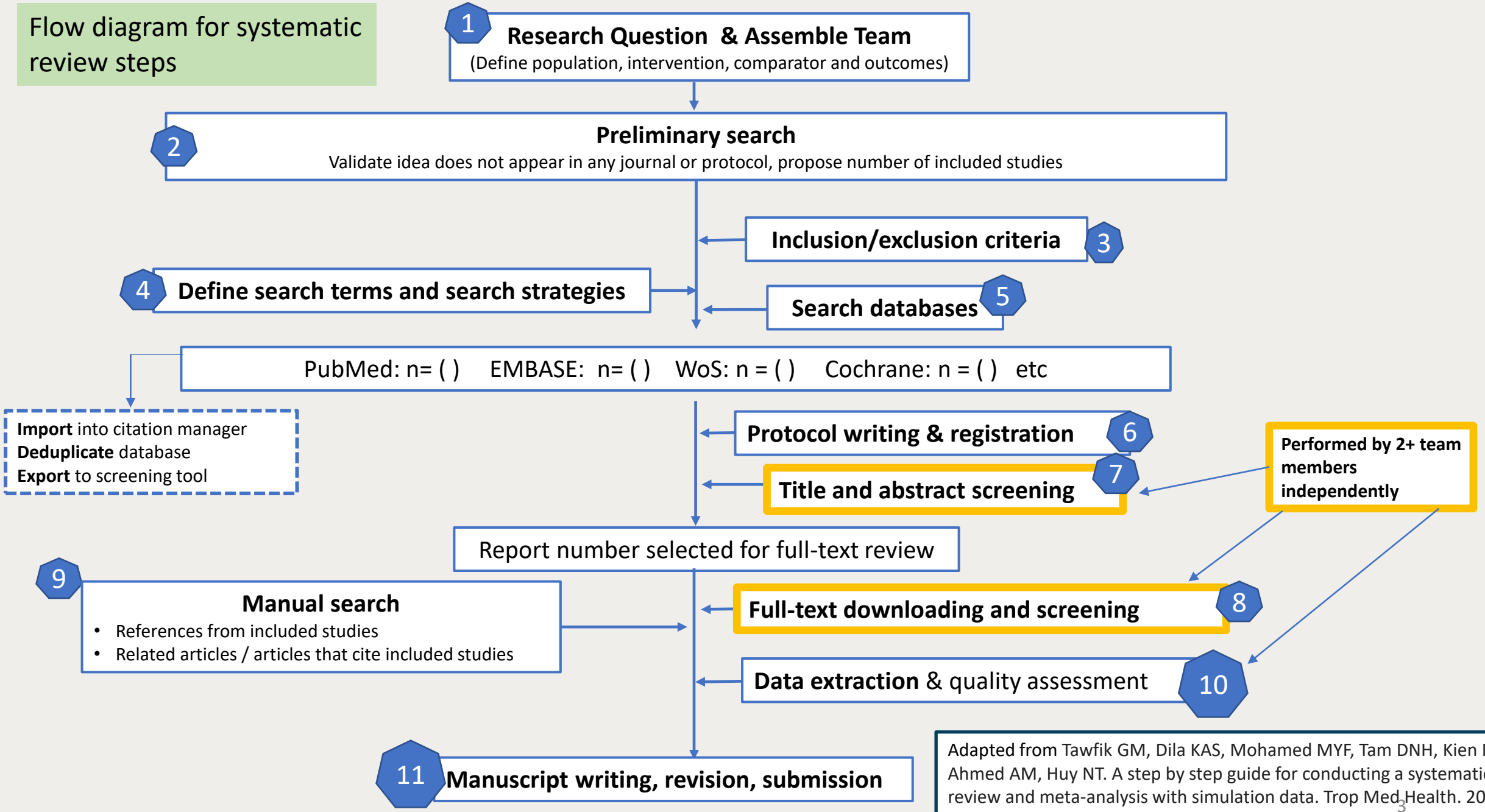
Objectives:

- ✓ Discuss ways to systematically screen articles for inclusion

Flow diagram for systematic review steps



Adapted from Tawfik GM, Dila KAS, Mohamed MYF, Tam DNH, Kien ND, Ahmed AM, Huy NT. A step by step guide for conducting a systematic review and meta-analysis with simulation data. Trop Med Health. 2019 Aug 1;47:46. doi: 10.1186/s41182-019-0165-6. PMID: 31388330

Validation of equations to estimate glomerular filtration rate in South Africans of mixed ancestry

J L Holness [1], K Bezuidenhout, M R Davids, J M Warwick

Affiliations + expand

PMID: 32657701 DOI: 10.7196/SAMJ.2020.v110i3.13995

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Abstract

Background: The Modification of Diet in Renal Disease (MDRD) and Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equations are two commonly used formulae to estimate glomerular filtration rate (GFR) in adults. The CKD-EPI equation is recommended in current international and local guidelines for the diagnosis and management of chronic kidney disease (CKD), unless an alternative equation has been shown to have superior accuracy. Validation and comparison of the equations in local populations are therefore required. Previous studies have reported on the accuracy of these prediction equations in black South Africans and those of Indian ancestry.

Objectives: To evaluate the MDRD and CKD-EPI equations in South African (SA) adults of mixed ancestry.

Methods: In all participants, GFR was measured (mGFR) from plasma clearance of 99mTc-diethylenetetraaminepenta-acetic acid (99mTc-DTPA), using a standardised technique. Serum creatinine assays were isotope dilution mass spectrometry traceable. GFR was estimated (eGFR) using the MDRD and CKD-EPI equations, with and without the black ethnicity factor. The agreement, bias, precision and accuracy of each equation was determined.

Results: Eighty adults were included (30 male, median age 39 years, median GFR 59 mL/min/1.73 m2). Sixty-eight had a diagnosis of CKD, 10 were potential kidney donors, and 2 were healthy volunteers. Both equations, without the black ethnicity factor, had good agreement with measured GFR. The equations tended to overestimate GFR, with bias of 1.6 and 7.9 mL/min/1.73 m2 for the MDRD and CKD-EPI equations, respectively. The interquartile ranges of the differences were 15.9 and 20.2 mL/min/1.73 m2, and as a measure of accuracy, the percentages of estimates that fell within 30% of the mGFR (P30) were 80% and 72.5% (p=0.18). For identification of individuals with a GFR <60 mL/min/1.73 m2, the sensitivity of MDRD eGFR was 97.3% and that of CKD-EPI eGFR was 97.1%.

Conclusions: The MDRD and CKD-EPI equations have shown satisfactory and comparable performance in this SA mixed-ancestry adult population, with the MDRD equation marginally less biased than the CKD-EPI.

Association of the Estimated Glomerular Filtration Rate With vs Without a Coefficient for Race With Time to Eligibility for Kidney Transplant

Leila R Zelnick [1], Nicolae Leca [2], Bessie Young [1 3], Nisha Bansal [1]

Affiliations + expand

PMID: 33443583 PMCID: PMC7809586 DOI: 10.1001/jamanetworkopen.2020.34004

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Abstract

Importance: Kidney transplant is associated with improved survival and quality of life among patients with kidney failure; however, significant racial disparities have been noted in transplant access. Common equations that estimate glomerular filtration rate (eGFR) include adjustment for Black race; however, how inclusion of the race coefficient in common eGFR equations corresponds with measured GFR and whether it is associated with delayed eligibility for kidney transplant listing are unknown.

Objective: To compare eGFR with measured GFR and evaluate the association between eGFR calculated with vs without a coefficient for race and time to eligibility for kidney transplant.

Design, setting, and participants: This prospective cohort study used data from the Chronic Renal Insufficiency Cohort, a multicenter cohort study of participants with chronic kidney disease (CKD). Self-identified Black participants from that study were enrolled between April 2003 and September 2008, with follow-up through December 2018. Statistical analyses were completed on November 11, 2020.

Exposure: Estimated GFR, measured annually and estimated using the creatinine-based Chronic Kidney Disease-Epidemiology (CKD-EPI) equation with and without a race coefficient.

Main outcomes and measures: Iothalamate GFR (iGFR) measured in a subset of participants (n = 311) and time to achievement of an eGFR less than 20 mL/min/1.73 m2, an established threshold for kidney transplant referral and listing.

Results: Among 1658 self-identified Black participants, mean (SD) age was 58 (11) years, 848 (51%) were female, and mean (SD) eGFR was 44 (15) mL/min/1.73 m2. The CKD-EPI eGFR with the race coefficient overestimated iGFR by a mean of 3.1 mL/min/1.73 m2 (95% CI, 2.2-3.9 mL/min/1.73 m2; P

Estimating glomerular filtration rate in black South Africans by use of the modification of diet in renal disease and Cockcroft–Gault equations

Hendrick E van Deventer [1], Jaya A George, Janice E Paiker, Piet J Becker, Ivor J Katz

Affiliations + expand

PMID: 18487286 DOI: 10.1373/clinchem.2007.099085

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Abstract

Background: The 4-variable Modification of Diet in Renal Disease (4-v MDRD) and Cockcroft-Gault (CG) equations are commonly used for estimating glomerular filtration rate (GFR); however, neither of these equations has been validated in an indigenous African population. The aim of this study was to evaluate the performance of the 4-v MDRD and CG equations for estimating GFR in black South Africans against measured GFR and to assess the appropriateness for the local population of the ethnicity factor established for African Americans in the 4-v MDRD equation.

Methods: We enrolled 100 patients in the study. The plasma clearance of chromium-51-EDTA ((51)Cr-EDTA) was used to measure GFR, and serum creatinine was measured using an isotope dilution mass spectrometry (IDMS) traceable assay. We estimated GFR using both the reexpressed 4-v MDRD and CG equations and compared it to measured GFR using 4 modalities: correlation coefficient, weighted Deming regression analysis, percentage bias, and proportion of estimated GFR within 30% of measured GFR (P(30)).

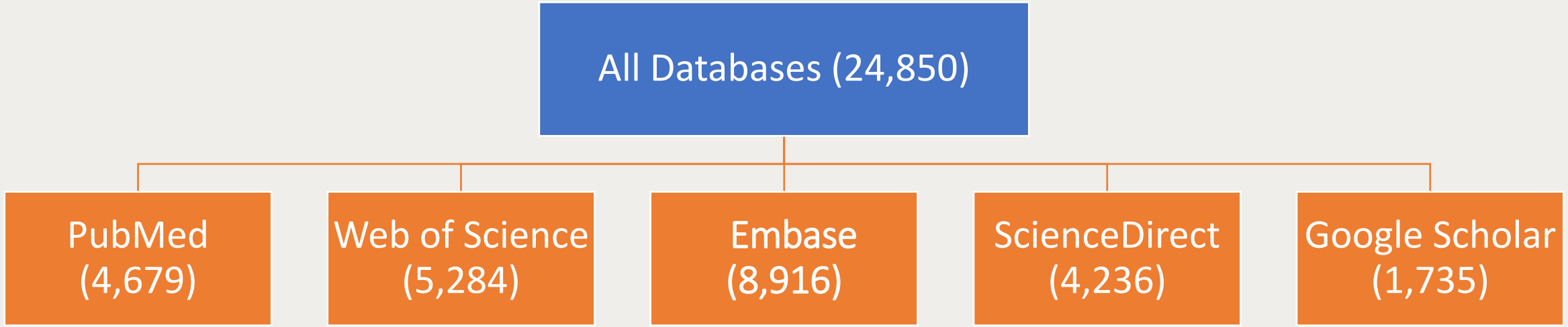
Results: The Spearman correlation coefficient between measured and estimated GFR for both equations was similar (4-v MDRD R(2) = 0.80 and CG R(2) = 0.79). Using the 4-v MDRD equation with the ethnicity factor of 1.212 as established for African Americans resulted in a median positive bias of 13.1 (95% CI 5.5 to 18.3) mL/min/1.73 m(2). Without the ethnicity factor, median bias was 1.9 (95% CI -0.8 to 4.5) mL/min/1.73 m(2).

Conclusions: The 4-v MDRD equation, without the ethnicity factor of 1.212, can be used for estimating GFR in black South Africans.

Article Selection

Title and Abstract Screening

Search strategies often retrieve many citations.



Data source: Umeukeje EM, Koonce TY, Kusnoor SV, Ulasi II, Kostelanetz S, Williams AM, Blasingame MN, Epelbaum MI, Giuse DA, Apple AN, Kaur K, González Peña T, Barry D, Eisenstein LG, Nutt CT, Giuse NB. Systematic review of international studies evaluating MDRD and CKD-EPI estimated glomerular filtration rate (eGFR) equations in Black adults. PLoS One. 2022 Oct 18;17(10):e0276252. doi: 10.1371/journal.pone.0276252. PMID: 36256652; PMCID: PMC9578594. ***Results of 1st search conducted on October 23,2020.***

Citations are then prepared for selection.

All the citations needed to reside in the same place.

The citations needed to be moved into their new home.

Image sources: https://unsplash.com/photos/1ddol8rgUH8, https://unsplash.com/photos/is_2lGqtRJg.

There are multiple options for your citation “hub”.

Reference manager software

Flexible database management systems

Systematic review software programs

De-duplication is an important step in managing citations for the systematic review.

Zotero [Internet]. Zotero.org. [cited 2023 Oct 12]. Available from: https://www.zotero.org.
EndNote [Internet]. EndNote.com. [cited 2023 Oct 12]. Available from: https://endnote.com/.
REDCap [Internet]. Project-redcap.org. [cited 2023 Oct 12]. Available from: https://www.project-redcap.org/.
Covidence - Better systematic review management [Internet]. Covidence.org. [cited 2023 Oct 12]. Available from: https://www.covidence.org/.

Conference abstracts require extra considerations.

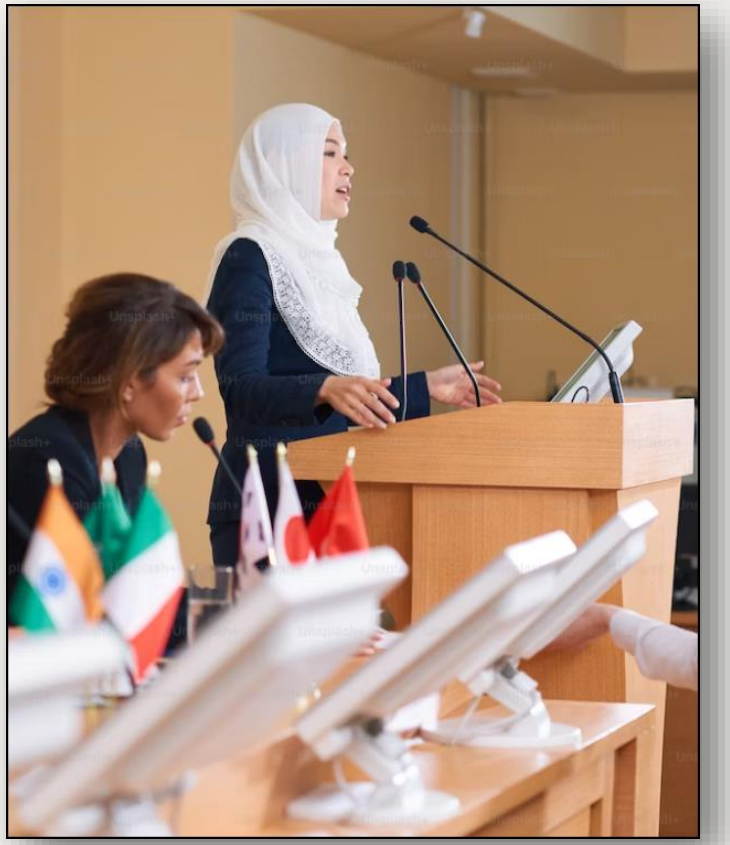


Image source: https://unsplash.com/photos/1YGMSTYnuaw

Inclusion of conference abstracts may help identify emerging research reports not yet published as full journal articles.

Can establishing parameters for date ranges (e.g., exclude conference abstracts older than 5 years old).

Key differences may exist in the quality of data within conference abstract compared to subsequent full paper (e.g., sample sizes, results details)

Scherer RW, Saldanha IJ. How should systematic reviewers handle conference abstracts? A view from the trenches. Syst Rev. 2019 Nov 7;8(1):264. doi: 10.1186/s13643-019-1188-0. PMID: 31699124; PMCID: PMC6836535.

Polyfluoroalkyl chemicals and the risk of kidney stones in US adults: A population-based study

Weipu Mao [1], Qiang Hu [2], Saisai Chen [2], Yu Chen [2], Ming Luo [3], Ziwei Zhang [3], Jiang Geng [4], Jianping Wu [2], Bin Xu [5], Ming Chen [6]

Affiliations + expand

PMID: 33091773 DOI: 10.1016/j.ecoenv.2020.111497

Free article

Abstract

The potential nephrotoxicity of polyfluoroalkyl chemicals (PFCs) have received extensive attention. However, the relationship between PFCs and the risk of kidney stones remain unclear. This study aimed to examine the level of PFCs in the US population and its relationship with the risk of kidney stones. We investigated the serum levels of six PFCs in 8453 adult participants (≥20 years) from the National Health and Nutrition Examination Survey (NHANES) between 2007 and 2016, including perfluorodecanoic acid (PFDE), perfluorohexane sulfonic acid (PFHS), 2-(N-methyl-perfluorooctane sulfonamido) acetate (MPAH), perfluorononanoic acid (PFNA), perfluoroundecanoic acid (PFUA), and perfluorododecanoic acid (PFDO). Logistic regression model was used to evaluate the correlation between PFCs and kidney stones. Of the 8453 participants, 787 self-reported a history of kidney stones. After adjusting for gender, age, race, education, marital status, body mass index (BMI), hypertension, diabetes and estimated glomerular filtration rate (eGFR), we found that total PFCs and PFHS were positively correlated with the risk of kidney stones. Compared with the lowest tertile, the odds ratios with 95% confidence intervals (CI) with increasing tertiles were 1.30 (95% CI,1.08-1.59, p = 0.007) and 1.25 (95 CI%,1.00-1.52, p = 0.024) for total PFCs and 1.24 (95 CI%,1.03-1.51, p = 0.032), and 1.35 (95 CI,1.10-1.68, p = 0.005) for PFHS. Our study shows that total PFCs and PFHS were associated with an increased risk of kidney stones.

The next step is to examine each title and abstract.

When reviewing the citation title and abstract, the goal is to exclude citations that are obviously irrelevant.

At this stage, reviewers should be conservative with exclusion decisions.

Li T, Higgins JPT, Deeks JJ. Chapter 5: Collecting Data. In: Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). *Cochrane Handbook for Systematic Reviews of Interventions* version 6.3 (updated February 2022). Cochrane, 2022. Available from www.training.cochrane.org/handbook.

Eligibility criteria can be used to develop the screening questions.

Key Question: How well does eGFR as estimated by the CKD-EPI, MDRD or AASK equations, with and without the race adjustment, predict measured glomerular filtration rate (GFR) in Black adults across the full range of measured GFRs in the United States and internationally?

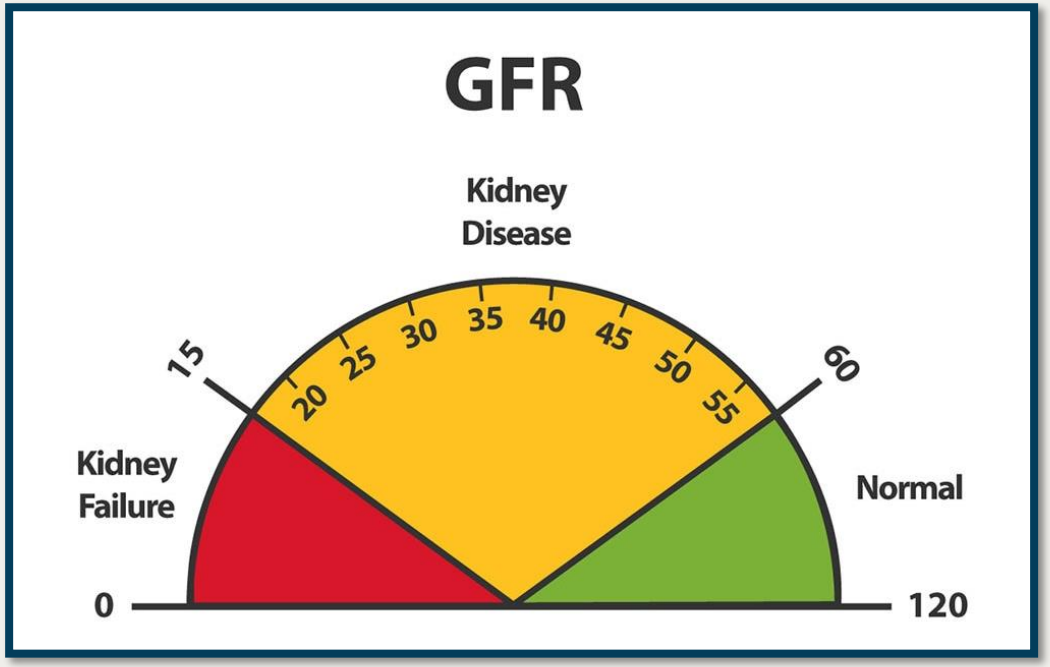
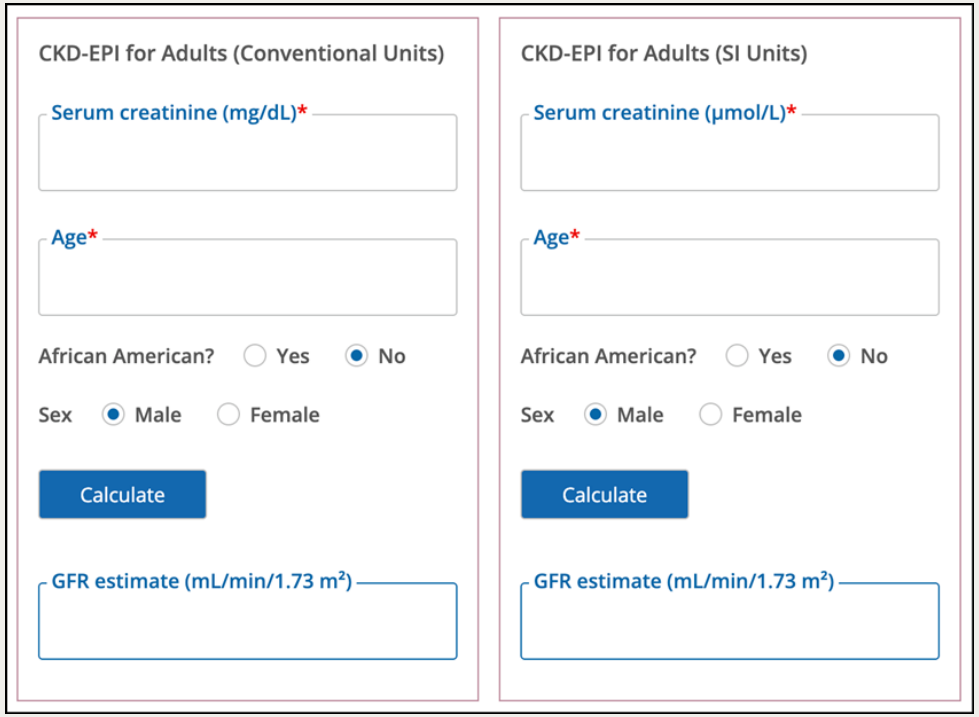


Image source: National Institute of Diabetes and Digestive and Kidney Diseases



The MDRD and CKD-EPI equations were commonly used to estimate glomerular filtration rate.

Umeukeje EM, Koonce TY, Kusnoor SV, Ulasi II, Kostelanetz S, Williams AM, Blasingame MN, Epelbaum MI, Giuse DA, Apple AN, Kaur K, González Peña T, Barry D, Eisenstein LG, Nutt CT, Giuse NB. Systematic review of international studies evaluating MDRD and CKD-EPI estimated glomerular filtration rate (eGFR) equations in Black adults. PLoS One. 2022 Oct 18;17(10):e0276252. doi: 10.1371/journal.pone.0276252. PMID: 36256652; PMCID: PMC9578594.

Historical EGFR calculator - NIDDK [Internet]. U.S. Department of Health and Human Services; 2022 [cited 2023 Sept 11]. Available from: https://www.niddk.nih.gov/health-information/professionals/clinicaltools-patient-management/kidney-disease/laboratory-evaluation/glomerular-filtration-rate-calculators/historical

Eligibility criteria is used to develop the screening questions.

Key Question: How well does eGFR as estimated by the CKD-EPI, MDRD or AASK equations, with and without the race adjustment factor, predict measured glomerular filtration rate (GFR) in Black adults across the full range of measured GFRs in the United States and internationally?

- language: English, French, Spanish, and Portuguese
- Black adults (aged 18 and older) undergoing glomerular filtration rate assessment via estimating equations
- kidney function assessment via our pre-defined estimating equations with or without the inclusion of the race adjustment
- validation studies and comparison studies
- comparison of multiple estimated GFR equations and/or comparison of an estimated GFR equation to a measured GFR
- studies in all countries inclusive of clinical and research environments

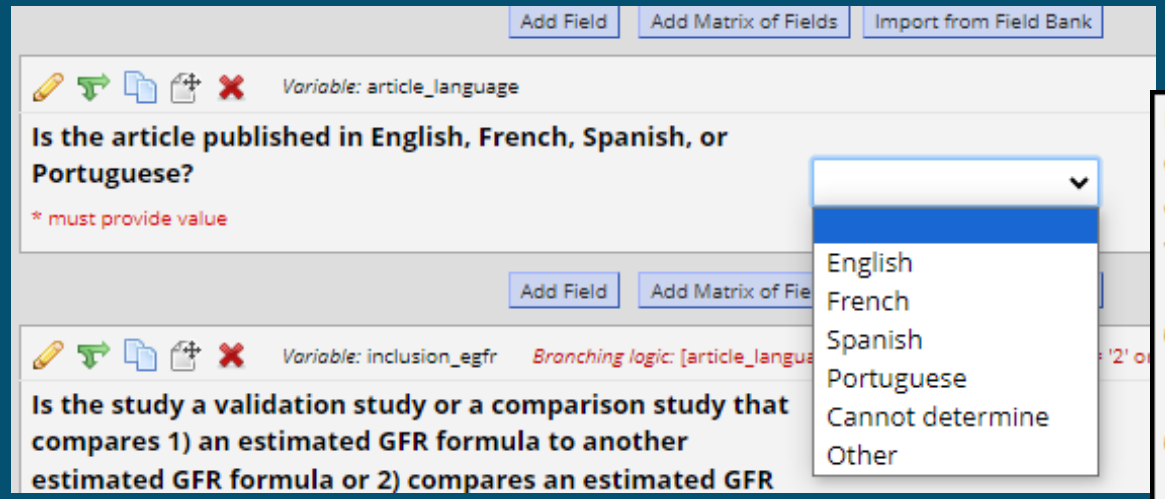
Umeukeje EM, Koonce TY, Kusnoor SV, Ulasi II, Kostelanetz S, Williams AM, Blasingame MN, Epelbaum MI, Giuse DA, Apple AN, Kaur K, González Peña T, Barry D, Eisenstein LG, Nutt CT, Giuse NB. Systematic review of international studies evaluating MDRD and CKD-EPI estimated glomerular filtration rate (eGFR) equations in Black adults. PLoS One. 2022 Oct 18;17(10):e0276252. doi: 10.1371/journal.pone.0276252. PMID: 36256652; PMCID: PMC9578594.

As much as possible, standardize screening form responses.

- ***Data analysis is easier*** – especially if using software programs to analyze the data
- ***Ensures consistency across respondents*** – is easier to compare and contrast answers
- ***More efficient reporting*** – is more easily summarized and presented in graphs & charts
- ***Improved data quality*** – ensures complete and accurate responses; reduces the likelihood of missing or incomplete data

Photo credit: https://unsplash.com/photos/M3cxjDNiLlQ

Each citation was assessed by only a few questions.



Is the study a validation study or a comparison study that compares 1) an estimated GFR formula to another estimated GFR formula or 2) compares an estimated GFR formula to a measured GFR?

(NOTE: If a systematic review, select "No")

Reminder: the estimated GFR formulas include **MDRD** (Modification of Diet in Renal Disease), **CKD-EPI** (Chronic Kidney Disease Epidemiology Collaboration), and **AASK** (African American Study of Kidney Disease).

- ○ Yes
- ○ No
- ○ Cannot determine

Does the study include black participants?

NOTE: "Black" defined as 1) the paper reports the population as "black," 2) uses a term associated with black persons (e.g., African American), or 3) If the paper specifies applying the race correction to their population.

- ○ Yes
- ○ No
- ○ Cannot determine

Does the study include individuals aged 18 and older?

(NOTE: If the study includes individuals younger than 18 AND includes aged 18 and older, mark "Yes.")

- ○ Yes
- ○ No
- ○ Cannot determine

Dual-review is critical for the process.

- Reduces selection bias and minimizes differences in perspective between reviewers
- Reduces mistakes and random error in article selection
- Increases consistency in the application of screening and eligibility criteria to studies
- Ensure comprehensiveness in the detection of all relevant items

Image source: https://unsplash.com/photos/dip9IIwUK6w

ポケモンゲットだぜ

"Given the importance of a precise study selection process for the quality and results of a systematic review, review performers should carefully consider the potential impact of performing anything other than a complete dual review process for study selection."[1]

[1]Stoll CRT, Izadi S, Fowler S, Green P, Suls J, Colditz GA. The value of a second reviewer for study selection in systematic reviews. Res Synth Methods. 2019 Dec;10(4):539-545. doi: 10.1002/jrsm.1369. Epub 2019 Jul 18. PMID: 31272125; PMCID: PMC6989049.

After title and abstract screening there can be up to three article groups:

Both reviewers agree that article does not meet eligibility criteria -- > excluded

Both reviewers agree that the article meets eligibility criteria, or both agree eligibility cannot be determined -- > full-text review

The two reviewers disagree; next step -- > 3rd party adjudication

Image source: Photo by Quaritsch Photography on Unsplash

The full-text review process is similar to title/abstract screening.

- No longer “screening”; full-text of papers are read
- Dual-review is still key
- Questions are drawn from eligibility criteria and outcomes
- This phase allows reviewers to be more specific

Photo credit: https://unsplash.com/photos/x-8DF-Ry0Zo

Objectives:

- ✓ Discuss ways to systematically screen articles for inclusion

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