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The impact of quality improvement initiatives to improve CKD referral patterns: A systematic review protocol

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Abstract

Introduction

Chronic kidney disease (CKD) is a global-health problem. A significant proportion of referrals to nephrologists for CKD management are early and guideline-discordant, which may lead to an excess number of referrals and increased wait-times. Various initiatives have been tested to increase the proportion of guideline-concordant referrals and decrease wait times. This paper describes the protocol for a systematic review to study the impacts of quality improvement initiatives aimed at decreasing the number of non-guideline concordant referrals, increasing the number of guideline-concordant referrals, and decreasing wait times for patients to access a nephrologist.

Methods and analysis

We developed this protocol by using the Preferred Reporting Items for Systematic reviews and Meta-Analyses for Protocols (PRISMA-P 2015). We will search empirical electronic databases (e.g. MEDLINE, Embase, Cochrane Library, CINAHL, Web of Science, PsycINFO) and grey literature for st1udies designed to improve guideline-concordant referrals or to reduce unnecessary referrals of patients with CKD from primary care to nephrology. Our search will include all studies published from database inception to April 2021 with no language restrictions. The studies will be limited to referrals for adult patients to nephrologists. Referrals of CKD patients from non-nephrology specialists (e.g. general internal medicine) will be excluded.

Ethics and dissemination

Ethics approval will not be required, as we will analyze data from studies that have already been published and are publicly accessible. We will share our findings using traditional approaches,

including scientific presentations, open access peer-reviewed platforms, and appropriate government and public health agencies.

PROSPERO registration
CRD42021247756

Article Summary

Strengths and limitations of this study

- Our proposed study will focus on improving referral patterns to specialist kidney care which has the potential to increase the proportion of guideline-concordant referrals and decrease wait times for CKD patients.
- Our study findings can be used to form focus groups in the future that will incorporate opinions of patients, policy makers, and scientific researchers to make the objectives of improving CKD referral patterns more meaningful for all stakeholders.
- Our study may reveal which quality improvement (QI) initiatives best improve patient outcomes (e.g. wait times).
- Given that the definition of appropriate referral is usually not uniform across studies, our analysis will be based on different local guidelines, which might affect the interpretation of our results.
- As we anticipate that few articles will report on healthcare costs as part of QI initiatives, we may not be able to report on how changes in healthcare costs impact QI initiatives.

Introduction

Chronic kidney disease (CKD) has become a serious global health concern. In 2017, CKD was reported as the cause of death for approximately 1.2 million people worldwide,[1] and estimates indicate that the number of patients with end-stage kidney disease (ESKD) requiring kidney replacement therapy (KRT) will continue to increase worldwide, reaching 5.4 million by 2030.[2]

Primary health care (PHC) practitioners play a significant role in managing earlier stages of CKD, when the focus is on addressing the risk factors for CKD progression, such as diabetes, hypertension, and other comorbidities.[3,4] Estimates from Alberta, Canada indicate that up to 95% of people with CKD are managed in the PHC setting.[5] Another study reported that 71.9 per 1,000 patients with advanced CKD (stages 3-5) in Canada are also managed in the PHC setting.[6] CKD management is costly to the healthcare system[7–10] and cost per person increases as CKD progresses.[11,12] Thus, effective CKD management at the PHC level has the potential to greatly reduce costs to the health care system, especially given the significantly high costs associated with KRT.[12–14]

Various guidelines and summary papers,[3,4,15,16] toolkits,[17] and referral pathways[18] are available to help PHC practitioners manage CKD and decide which patients should or should not be referred to nephrologists. The Kidney Disease: Improving Global Outcomes (KDIGO) guidelines include specific recommendations for referral to nephrology, including but not limited to eGFR values, urine protein abnormalities, and CKD progression.[16] Despite these internationally recognized recommendations, referral recommendations are not consistent, and vary between different health care systems.[15,16,19] For example, the Canadian Society of Nephrology recommends

referring CKD patients to nephrology when ACR exceeds 60 mg/mmol whereas KDIGO stipulates that referral should be initiated when ACR exceeds 30 mg/mmol.[15]

Timely referrals to nephrology have been shown to be linked to initiation of CKD-specific therapies and appropriate initiation of KRT.[20,21] Although it is well known that late referrals increase the risk of mortality, worsen post dialysis outcomes, and are associated with lengthy hospital stays and treatment costs,[22–24] not much is known about the implications of early—specifically, non-guideline concordant—referrals. Undoubtedly, non-guideline concordant referrals strain the health care system due to an increase in the number of overall referrals and prolonged wait times, and thereby delay access to specialty care[25] such as nephrology.

It has been shown that approximately 40% of referrals to nephrology for CKD management are unnecessary and not concordant with guidelines.[26,27] There may be various reasons for this. First, primary care physicians may not be comfortable with certain aspects of CKD management. For example, non-nephrology practices tend to adhere less often to monitoring parathyroid hormone, performing follow-up measurements of urine ACR, and various other aspects of CKD care.[28,29] Second, specialty guidelines are continuously being expanded and updated, which places a burden on primary care physicians who must become familiar with each one.[28,30,31] Overall, this is an area where quality improvement (QI) initiatives may add substantial value by improving provider confidence, patient care, and health efficiency

QI analysis is an evolving area in health care with the potential to greatly influence practice patterns and reduce quality gaps in various areas of health care. A quality gap is the difference

between health care outcomes and processes in the current state versus what can be achieved by applying professional expertise and implementing QI initiatives.[32] With regard to CKD referrals, outcome-level gaps include changes in wait times or the total number of referrals, and process-level gaps are reflected in how many primary care referrals are found to be guideline-concordant versus discordant.

QI initiatives are developed to reduce these gaps and inform interventions aimed at improving health outcomes by increasing the rate of effective practices in healthcare. Various taxonomies have been developed to classify QI initiatives into sub-groups based on target focus and delivery method.[32–36] In a previous systematic review, Faulkner et al. examined interventions in PHC focused on influencing referral rates from primary to secondary care in the United Kingdom.[37] The authors found that most interventions targeting referral rates are professional or organizational in nature, and that organizational interventions tend to reduce referrals to specialist care. Researchers also examined referrals from primary care to specialists in an updated Cochrane systematic review published in 2011, and found that educational activities and the use of structured referral sheets are the only interventions that impact referral rates.[38] These methods, however, have not demonstrated the same effectiveness with regard to referrals in the CKD population. A study from Ontario, Canada failed to show a significant change in the proportion of appropriate referrals from primary care after the implementation of a CKD toolkit and educational interventions for PHC providers.[17] Thus, further work is needed to identify which types of interventions have the potential to reduce overall and guideline-discordant referrals, improve wait times to specialist care, and close quality gaps in referral patterns from PHC providers for the CKD population.

The key objective for this review is to determine the impacts of various QI initiatives on process-based measures of CKD referral patterns from PHC to nephrology, including wait times, number of referrals, and/or proportion of guideline-concordant referrals. This is critically important, as PHC plays a prominent role in managing CKD[6] and our group has collected preliminary data indicating that a large proportion of referrals from PHC may be guideline-discordant, thereby potentially contributing to increased wait times.

Methods

Study design

We will conduct a systematic review of studies reporting on the impact of QI initiatives aimed at ensuring appropriate referral of patients with CKD from PHC to clinical nephrology programs. PHC providers are defined as family physicians, family doctors, and general practitioners (including nurse practitioners) in the primary care setting; we will exclude general internists and pediatricians who may be considered PHC providers in certain geographic regions.[38] The protocol for this study is based on Preferred Reporting Items for Systematic reviews and Meta-Analysis for Protocols 2015 (PRISMA-P-2015).[39] We will follow the PRISMA 2020 methodological guidelines (PRISMA 2020) as we conduct and report the findings of our systematic review.[40] The protocol for this study is registered with PROSPERO (CRD42021247756). We have outlined the types of studies to be included based on the nature of participants, interventions applied, outcomes reported, and study designs:

- Types of participants. We will include studies with participants over 18 years of age, regardless of sex, ethnicity, and geographic location who had been diagnosed with CKD but had not initiated KRT when a study intervention was first implemented.
- Types of interventions. We will include any initiative or program designed to ensure guideline-concordant referrals or to reduce unnecessary referrals of patients with CKD from a primary care provider to a nephrology specialist. Various methods have been employed previously, including but not limited to: CKD management/referral pathways, toolkits, electronic referral systems, structured referral forms, and practice facilitation (i.e. consultant-led educational programs for primary care practitioners). We will categorize these studies based on the focus of the intervention, as described in previous studies: [32,41] (a) provider education; (b) provider reminder systems; (c) audit and feedback; (d) organizational change; (e) financial incentives, regulation, and policy; and (f) other. (Table 1).
- Types of studies. We will include randomized trials, controlled clinical trials, controlled before-after studies, interrupted time series studies, QI reports, and descriptive studies.

Search strategy

We have developed a search strategy in consultation with a research librarian. We will search several electronic databases—i.e. MEDLINE, Embase, Cochrane Library, CINAHL, Web of Science, and PsycINFO—using a combination of controlled vocabulary search terms (i.e. Medical Subject Headings), and the MEDLINE search strategy (Supplementary Table S1). We also will manually search the references of publications meeting our criteria to identify any other work relevant to our review. Furthermore, we will search grey literature (conference abstracts

and proceedings, government and organizational reports, working papers, policy papers) in consultation with a librarian.

Study outcomes

Our outcomes of interest are changes to process-based QI measures: wait times, changes in the total number of referrals, and changes in the proportion of guideline-concordant referrals. We anticipate that included studies will have used various guidelines specific to geographic locations and local practice patterns. For studies that do not specify certain guideline referral criteria, we will document that referral criteria were not used.

Data collection and analysis

The PRISMA flow diagram summarizes the recommended study selection process (Figure 1). To screen and select studies to be included, we will use a two-stage collaborative review process. In the first stage, two reviewers (AG and NS) will independently review titles and abstracts of retrieved studies based on the inclusion and exclusion criteria listed in Table 2. In the second stage, full texts of the selected studies will be obtained by these reviewers and analyzed independently to determine eligibility for inclusion in our final review. If necessary, a third reviewer (IO) may be involved to evaluate any discrepancies and advise in cases of disagreement. For any excluded study, we will record at least one reason for exclusion.

Data extraction and management

Two reviewers will independently retrieve data and enter the summarized details into a data extraction form in Microsoft Excel. Data will include type of study, study design, publication year, first author, location of study and local healthcare system (e.g. private vs. public), CKD

stages included in study, assessment of kidney function (eGFR, serum creatinine, and urine albumin levels), referral guidelines/criteria used, a description of the QI intervention utilized, duration of intervention and follow up, wait times, and changes in total number of referrals and the proportion of guideline-concordant referrals.

Assessment of risk of bias in included studies

We will adapt and utilize the Cochrane Effective Practice and Organization of Care (EPOC) risk of bias criteria[42] to assess methodological quality and evaluate risk of bias in our retrieved studies. The risk of bias per study will be displayed in a risk of bias summary table, and any discrepancies will be resolved by a third reviewer.

Data synthesis and analysis

We will report changes in wait times, total referrals, and the proportion of guideline-concordant referrals associated with the QI interventions utilized in each study. Changes in the number of referrals, the proportion of guideline-concordant referrals, and other outcomes associated with QI interventions will be presented as absolute values and reported in the same way across all studies. All wait times will be reported as number of days.

If concerns arise regarding missing or unclear data in the studies analyzed, we will contact the authors to request information related to study methods, referral criteria used, and changes in guideline-concordant referrals. Missing outcome data will be summarized in the data extraction form and noted in the risk of bias section. Characteristics of included studies will be summarized in tables. Intervention effects will be calculated as relative risks (RRs) with 95% CIs for

dichotomous data, and mean differences (MDs) with 95% CIs for continuous variables. If we identify a sufficient number of studies, and clinical and methodological heterogeneity are reasonable, we will perform a meta-analysis to summarize pooled results using a random effects model.[43] Statistical heterogeneity will be quantified using I^2 statistics[44] in each analysis. If heterogeneity between studies is high ($I^2 > 50\%$), then data will be reported descriptively and we will provide a narrative synthesis of included studies using the Synthesis Without Meta-analysis (SWiM) reporting guideline as a framework.[45] We will assess publication bias using a regression-based test[46] and by visually inspecting funnel plots.

We will conduct a stratified meta-analysis by study characteristics. These include: the use of KDIGO guidelines vs. others, CKD stage at referral, and country income group (low and middle income vs. high income). We will perform categorical comparisons of the different types of QI interventions (i.e., provider education; provider reminder systems; audit and feedback; organizational change; financial incentives, regulation, and policy; and other).[32] We will compare the number of QI interventions in each category and the overall impacts of each on wait times, referral numbers, and the proportion of guideline-concordant referrals. This information will be summarized in table format, similar to previous studies that have examined the impacts of QI interventions on referral rates.[37,38]

Patient and public involvement

This protocol for a systematic review will not utilize patient or public involvement. Because no patient data will be collected at this step, this study does not require ethics approval. However, we hope to form focus groups in the future where we will promote patient engagement by

soliciting and incorporating the opinions of CKD patients regarding the relevance and implications of the study protocol and results. We hope to form similar focus groups with PHC providers. We also will involve policy makers at Alberta Health Services who will be interested in analyzing QI measures to enhance local health policies and practices. Furthermore, we will collaborate with scientific researchers at our institutions and others who are interested in this topic and have performed relevant work in this field. These groups will be engaged after the protocol is published and the results of the systematic review have been synthesized.

Timeline

We will collect data and develop our database from August to December 2021, analyze our data and compile our results from January to June 2022, and engage in knowledge translation activities from July to December 2022 (Figure 2).

Ethics and dissemination

Ethics approval will not be needed for our project since we will analyze data from already published studies. Our findings will be shared using traditional approaches, including open access peer-reviewed publication(s), presentations at meetings, and a report.

Discussion

QI initiatives have significant potential to close quality gaps, improve health systems, and enhance patient outcomes. To the best of our knowledge, no systematic reviews have been performed to examine different QI interventions that have been trialed to ensure appropriate referrals of CKD patients from PHC to nephrology. Our analysis will yield a summary of which types of QI interventions improve referral patterns. These results can guide the strategic

implementation of future QI initiatives to improve referral patterns and may ultimately enhance knowledge and CKD management practices in primary care settings, improve referral and triage systems, and increase the proportion of guideline-concordant referrals of CKD patients. These implications are significant, especially for public health care systems which may be burdened by both the costs of chronic disease management and long wait times for patients to access specialist care.

Data statement

We will make data available upon reasonable request.

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Competing interest statement

None

Author contributions

AG, NS, FY, IO, and AB developed the concept and drafted the manuscript. FY produced figures for manuscript. NS registered the study with PROSPERO. All authors were involved in

developing the protocol methods and revising the manuscript. All authors approved the final version to be published.

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Table 1: Taxonomy of interventions used in the systematic review

Intervention type	Definition
Provider education	Interventions aimed at training care providers, including educational workshops/meetings, outreach programs, and distribution of educational materials
Provider reminder systems	Providing specific information about clinical encounters with the aim of prompting clinicians to recall information or promote a certain aspect of care
Audit and feedback	Methods that provide a review of clinical performance for health care providers and institutions to help improve quality of a certain aspect of care
Other	Interventions not covered in the previously listed items, e.g. organizational change initiatives, financial incentives, patient reminder systems, patient education, promotion of self-management, and facilitated relay of clinical data to providers

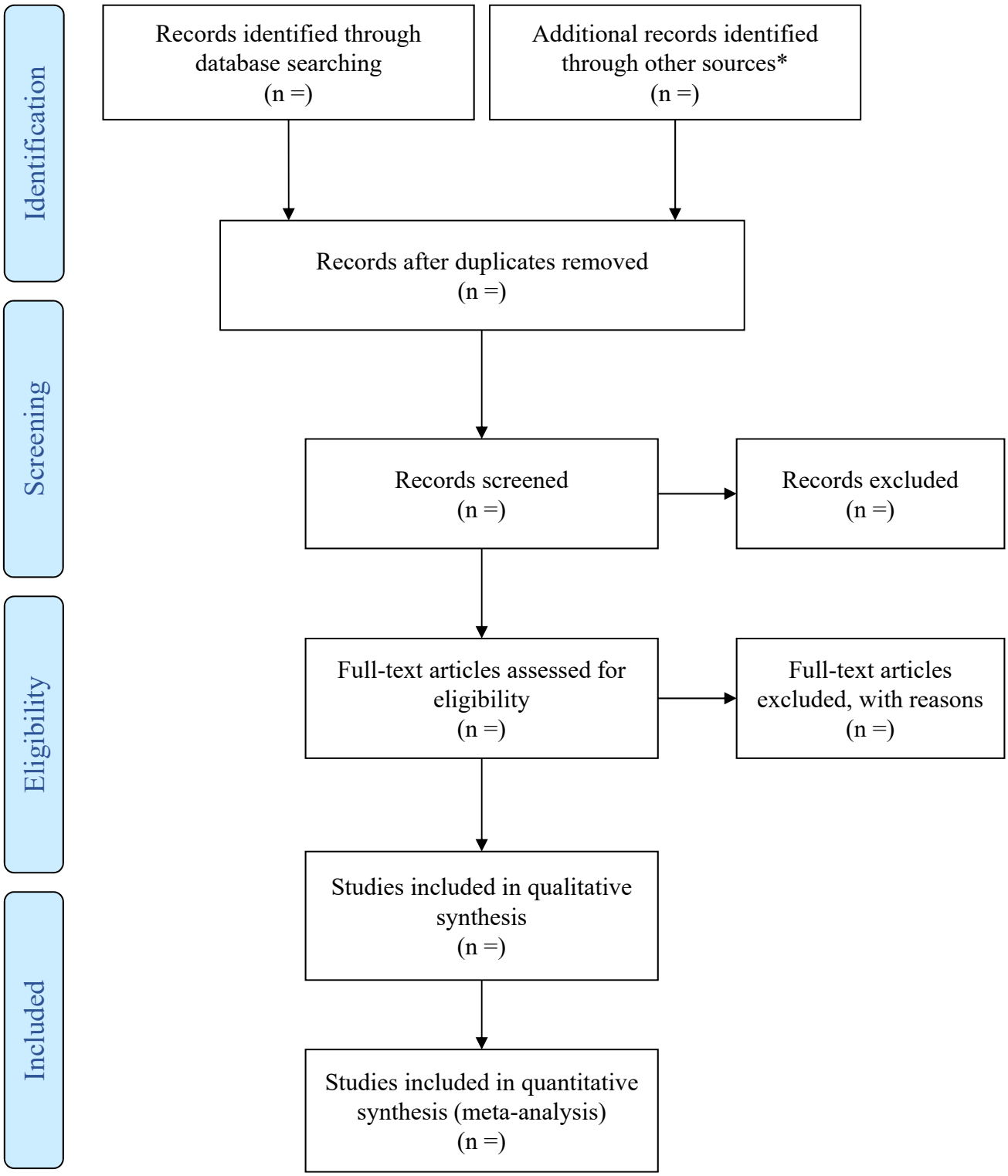
Table 2: Inclusion and exclusion criteria for this study

Inclusion criteria	Exclusion criteria
- Studies involving CKD patients who are not being managed with KRT. - Studies reporting changes in process-based QI measures (wait times, number of referrals, or changes in guideline-concordant referrals) for CKD patients. - Studies reporting at least one outcome measure (referral numbers, rate or proportion of guideline concordant referrals, or wait times). - No restrictions on publication date. - No restrictions on language. - No restrictions on the referral guidelines (e.g. KDIGO vs. local/national guidelines) used.	- Studies where referrals are not from PHC to nephrology (e.g. referrals from or to general internal medicine for CKD). - Review articles, editorials, letters to the editor, commentaries, case studies, case reports, images. - Studies where we cannot obtain relevant data (e.g. method of intervention or outcomes reported) even after contacting authors. - Studies where the outcomes of interest (referral numbers, wait times, guideline-concordant referral rate) are not clearly reported.

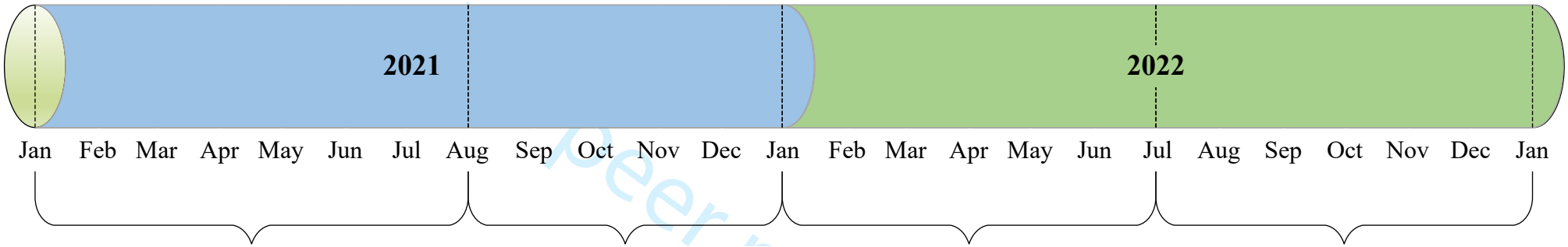
Supplementary Table S1

1. exp Renal Insufficiency, Chronic/
2. Chronic Kidney disease*.mp.
3. chronic kidney insufficienc*.mp.
4. chronic renal disease*.mp.
5. chronic renal insufficienc*.mp.
6. CKD.mp.
7. Renal fail*.mp.
8. Kidney fail*.mp.
9. or/1-8
10. Organizational innovation/
11. clinical audit/ or medical audit/ or nursing audit/
12. Quality Improvement/
13. education/ or education, professional/ or education, continuing/ or education, medical, continuing/ or education, nursing, continuing/ or education, professional, retraining/
14. (Quality* adj2 improv*).mp.
15. ((Provider or doctor* or physician* or nurse* or health personnel* or healthcare personnel*) adj4 (educat* or learn* or "reminder system*")).mp.
16. (Organization* adj3 (change* or restructure* or revamp or reform* or revise* or innovat*)).mp.
17. Audit*.mp.
18. Feedback/
19. feedback.mp.
20. Physician Incentive Plans/
21. (financ* adj2 incentiv*).mp.
22. (incent* adj2 (plan or plans)).mp.
23. social control, formal/ or government regulation/ or mandatory programs/ or social control policies/ or organizational policy/ or public policy/ or health policy/ or health care reform/
24. regulat*.mp.
25. (policy or policies).mp.
26. or/10-25
27. "Referral and Consultation"/ or (referral* or consultation* or consults or consult).mp.
28. 26 and 27
29. (((Improv* or amerlior* or better or enhance* or correct* or increase* or progress or facilitat* or promote* or raise* or augment* or elevate* or appropriate) adj3 (referral* or consultation* or consult or consults)) and (guide* or policy or policies or regulation* or toolkit* or report*)).mp.
30. ((Reduce or reduction* or decrese* or lessen* or minimize* or diminish* or lower* or avoid*) adj3 ((unnecessary or avoidable or superfluous or unneeded or irrelevant or late or traditional) adj2 (referral* or consultation* or consult or consults))).mp.

31. wait* time*.mp. and ((referral* or consultation* or consult or consults).mp. or "Referral and Consultation"/) and (guide* or policy or policies or regulation* or toolkit* or reporting).mp. 32. 28 or 29 or 30 or 31 33. 9 and 32



*other sources (online publications, technical reports, policy briefs, etc.)



Jan 2021 - Jul 2021

- Protocol development
- Identification of relevant QI frameworks
- Selection of studies
- Data extraction tool development/relevance form
- Prospero registration
- Publication of protocol

Aug 2021 - Dec 2021

- Identification of relevant publications
- Data extraction
- Database development
- Risk of bias assessment
- Analysis

Jan 2022 - Jun 2022

- Manuscript writing/ reporting of results
- Publication of original manuscript
- Presentation at scientific meetings

Jul 2022 - Dec 2022

- KT activities and tools development (lay summaries and policy briefs)
- Engagement with relevant policy makers, primary care and referral coordinators to effect practice and/or policy change
- Develop recommendations for guideline developers

Reporting checklist for protocol of a systematic review and meta analysis.

Based on the PRISMA-P guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMA-Preporting guidelines, and cite them as:

Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement. Syst Rev. 2015;4(1):1.

		Reporting Item	Page Number
Title			
Identification	#1a	Identify the report as a protocol of a systematic review	1
Update	#1b	If the protocol is for an update of a previous systematic review, identify as such	N/A

Registration			
	#2	If registered, provide the name of the registry (such as PROSPERO) and registration number	2
Authors			
Contact	#3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contribution	#3b	Describe contributions of protocol authors and identify the guarantor of the review	14
Amendments			
	#4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	N/A
Support			
Sources	#5a	Indicate sources of financial or other support for the review	14
Sponsor	#5b	Provide name for the review funder and / or sponsor	14
Role of sponsor or funder	#5c	Describe roles of funder(s), sponsor(s), and / or institution(s), if any, in developing the protocol	14
Introduction			

Rationale	#6	Describe the rationale for the review in the context of what is already known	3-8
Objectives	#7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	8
Methods			
Eligibility criteria	#8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	8-9, 23
Information sources	#9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	8-9
Search strategy	#10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	9-10, 25
Study records - data management	#11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	10
Study records - selection process	#11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	10

Study records - data collection process	#11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	10
Data items	#12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	9
Outcomes and prioritization	#13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	10
Risk of bias in individual studies	#14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	11
Data synthesis	#15a	Describe criteria under which study data will be quantitatively synthesised	11
Data synthesis	#15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I2, Kendall's τ)	11
Data synthesis	#15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	11

Data synthesis	#15d	If quantitative synthesis is not appropriate, describe the type of summary planned	N/A
Meta-bias(es)	#16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	11
Confidence in cumulative evidence	#17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	N/A

BMJ Open

The impact of quality improvement initiatives to improve CKD referral patterns: A systematic review protocol

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The impact of quality improvement initiatives to improve CKD referral patterns: A systematic review protocol

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Abstract

Introduction

Chronic kidney disease (CKD) is a global-health problem. A significant proportion of referrals to nephrologists for CKD management are early and guideline-discordant, which may lead to an excess number of referrals and increased wait-times. Various initiatives have been tested to increase the proportion of guideline-concordant referrals and decrease wait times. This paper describes the protocol for a systematic review to study the impacts of quality improvement initiatives aimed at decreasing the number of non-guideline concordant referrals, increasing the number of guideline-concordant referrals, and decreasing wait times for patients to access a nephrologist.

Methods and analysis

We developed this protocol by using the Preferred Reporting Items for Systematic reviews and Meta-Analyses for Protocols (PRISMA-P 2015). We will search the following empirical electronic databases: MEDLINE, Embase, Cochrane Library, CINAHL, Web of Science, PsycINFO and grey literature for studies designed to improve guideline-concordant referrals or to reduce unnecessary referrals of patients with CKD from primary care to nephrology. Our search will include all studies published from database inception to April 2021 with no language restrictions. The studies will be limited to referrals for adult patients to nephrologists. Referrals of CKD patients from non-nephrology specialists (e.g., general internal medicine) will be excluded.

Ethics and dissemination

Ethics approval will not be required, as we will analyze data from studies that have already been published and are publicly accessible. We will share our findings using traditional approaches, including scientific presentations, open access peer-reviewed platforms, and appropriate government and public health agencies.

PROSPERO registration
CRD42021247756

Article Summary

Strengths and limitations of this study

- Our proposed study will focus on improving referral patterns to specialist kidney care which has the potential to increase the proportion of guideline-concordant referrals and decrease wait times for CKD patients.
- Our study findings can inform focus groups in the future that will incorporate opinions of patients, policy makers, and scientific researchers to further explore methods in enhancing referral patterns from primary care to nephrologists.
- Our study may reveal which quality improvement (QI) initiatives best improve patient outcomes (e.g., wait times).
- Given that the definition of appropriate referral is usually not uniform across studies, our analysis will be based on different local guidelines, which might affect the interpretation of our results.

Introduction

Chronic kidney disease (CKD) has become a serious global health concern. In 2017, CKD was reported as the cause of death for approximately 1.2 million people worldwide,[1] and estimates indicate that the number of patients with end-stage kidney disease (ESKD) requiring kidney replacement therapy (KRT) will continue to increase worldwide, reaching 5.4 million by 2030.[2]

Primary health care (PHC) practitioners play a significant role in managing earlier stages of CKD, when the focus is on addressing the risk factors for CKD progression, such as diabetes, hypertension, and other comorbidities.[3,4] Estimates from Alberta, Canada indicate that up to 95% of people with CKD are managed in the PHC setting.[5] Another study reported that 71.9 per 1,000 patients with advanced CKD (stages 3-5) in Canada are also managed in the PHC setting.[6] CKD management is costly to the healthcare system[7–10] and cost per person increases as CKD progresses.[11,12] Thus, effective CKD management at the PHC level has the potential to greatly reduce costs to the health care system, especially given the significantly high costs associated with KRT.[12–14]

Various guidelines and summary papers,[3,4,15,16] toolkits,[17] and referral pathways[18] are available to help PHC practitioners manage CKD and decide which patients should or should not be referred to nephrologists. The Kidney Disease: Improving Global Outcomes (KDIGO) guidelines include specific recommendations for referral to nephrology, including but not limited to eGFR values, urine protein abnormalities, and CKD progression.[16] Despite these internationally recognized recommendations, referral recommendations are not consistent, and vary between different health care systems.[15,16,19] For example, the Canadian Society of Nephrology recommends

referring CKD patients to nephrology when ACR exceeds 60 mg/mmol whereas KDIGO stipulates that referral should be initiated when ACR exceeds 30 mg/mmol.[15]

Timely referrals to nephrology have been shown to be linked to initiation of CKD-specific therapies and appropriate initiation of KRT.[20,21] Although it is well known that late referrals increase the risk of mortality, worsen post dialysis outcomes, and are associated with lengthy hospital stays and treatment costs,[22–24] not much is known about the implications of early—specifically, non-guideline concordant—referrals. Non-guideline concordant referrals may strain the health care system due to an increase in the number of overall referrals and prolonged wait times, and thereby delay access to specialty care[25] such as nephrology.

It has been shown that approximately 40% of referrals to nephrology for CKD management are not concordant with guidelines.[26,27] There may be various reasons for this. First, primary care physicians may not be comfortable with certain aspects of CKD management. For example, non-nephrology practices tend to adhere less often to monitoring parathyroid hormone, performing follow-up measurements of urine ACR, and various other aspects of CKD care.[28,29] Second, specialty guidelines are continuously being expanded and updated, which places a burden on primary care physicians who must become familiar with each one.[28,30,31] Overall, this is an area where quality improvement (QI) initiatives may add substantial value by improving provider confidence, patient care, and health efficiency

QI is an evolving area in health care with the potential to greatly influence practice patterns and reduce quality gaps in various areas of health care. A quality gap is the difference between health

care outcomes and processes in the current state versus what can be achieved by applying professional expertise and implementing QI initiatives.[32] With regard to CKD referrals, outcome-level gaps include changes in wait times or the total number of referrals, and process-level gaps are reflected in how many primary care referrals are found to be guideline-concordant versus discordant.

QI initiatives are developed to reduce these gaps and inform interventions aimed at improving health outcomes by increasing the rate of effective practices in healthcare. Various taxonomies have been developed to classify QI initiatives into sub-groups based on target focus and delivery method.[32–36] In a previous systematic review, Faulkner et al. examined interventions in PHC focused on influencing referral rates from primary to secondary care in the United Kingdom.[37] The authors found that most interventions targeting referral rates are professional (defined as interventions such education for PHC, information provision, or guidelines) or organizational (defined as primary healthcare and specialist provider schemes, general practitioner fundholding schemes, and open access referral schemes) in nature, and that organizational interventions tend to reduce referrals to specialist care. Researchers also examined referrals from primary care to specialists in an updated Cochrane systematic review published in 2011, and found that educational activities and the use of structured referral sheets are the only interventions that impact referral rates.[38] These methods, however, have not demonstrated the same effectiveness with regard to referrals in the CKD population. A study from Ontario, Canada failed to show a significant change in the proportion of appropriate referrals from primary care after the implementation of a CKD toolkit and educational interventions for PHC providers.[17] Thus, further work is needed to identify which types of interventions have the potential to reduce

overall and guideline-discordant referrals, improve wait times to specialist care, and close quality gaps in referral patterns from PHC providers for the CKD population.

The key objective for this review is to determine the impacts of various QI initiatives on process-based measures of CKD referral patterns from PHC to nephrology, including wait times, number of referrals, and/or proportion of guideline-concordant referrals. This is critically important, as PHC plays a prominent role in managing CKD[6] and our group has collected preliminary data indicating that a large proportion of referrals from PHC may be guideline-discordant, thereby potentially contributing to increased wait times.

Methods

Study design

We will conduct a systematic review of studies reporting on the impact of QI initiatives aimed at ensuring appropriate referral of patients with CKD from PHC to clinical nephrology programs. PHC providers are defined as family physicians, family doctors, and general practitioners (including nurse practitioners) in the primary care setting; we will exclude general internists and pediatricians who may be considered PHC providers in certain geographic regions.[38] We will also exclude studies that include general internists and/or pediatricians among eligible referral sources. We chose to exclude such studies given that our focus is to assess the impact of implementing QI on referrals from primary care to nephrology. Including studies with referrals from general internal medicine (GIM) and pediatrics could create heterogeneity among the studies and confound our outcome and conclusions given that GIM and pediatrics, in many places, are considered specialists rather than primary care. It is reassuring that this category of

referrals from general medicine and pediatrics are small (<10% of all referrals to nephrology) based on empirical information available to use, and the referral model within the Canadian health system where primary care providers (family physicians and GPs) constitute the main gatekeepers to specialist care. The protocol for this study is based on Preferred Reporting Items for Systematic reviews and Meta-Analysis for Protocols 2015 (PRISMA-P-2015).[39] We will follow the PRISMA 2020 methodological guidelines (PRISMA 2020) as we conduct and report the findings of our systematic review.[40] The protocol for this study is registered with PROSPERO (CRD42021247756). We have outlined the types of studies to be included based on the nature of participants, interventions applied, outcomes reported, and study designs:

- Types of participants. We will include studies with participants over 18 years of age, regardless of sex, ethnicity, and geographic location who had been diagnosed with CKD but had not initiated KRT when a study intervention was first implemented.
- Types of interventions. We will include any initiative or program designed to ensure guideline-concordant referrals or to reduce unnecessary referrals of patients with CKD from a primary care provider to a nephrology specialist. Various methods have been employed previously, including but not limited to: CKD management/referral pathways, toolkits, electronic referral systems, structured referral forms, and practice facilitation (i.e., consultant-led educational programs for primary care practitioners). We will categorize these studies based on the focus of the intervention, as described in previous studies: [32,41] (a) provider education; (b) provider reminder systems; (c) audit and feedback; (d) organizational change; (e) financial incentives, regulation, and policy; and (f) other. (Table 1).

- Types of studies. We will include randomized trials, controlled clinical trials, controlled before-after studies, interrupted time series studies, QI reports, and descriptive studies.

Search strategy

We have developed a search strategy in consultation with a research librarian (LH) (Appendix 1). We will search the following electronic databases— MEDLINE, Embase, Cochrane Library, CINAHL, Web of Science, and PsycINFO —using a combination of controlled vocabulary search terms ; the MEDLINE search strategy is shown in Supplementary Table S1. We also will manually search the references of publications meeting our criteria to identify any other work relevant to our review. Furthermore, we will search grey literature (conference abstracts and proceedings, government and organizational reports, working papers, policy papers) in consultation with a librarian.

Study outcomes

Our outcomes of interest are changes to process-based QI measures: wait times, changes in the total number of referrals, and changes in the proportion of guideline-concordant referrals. We anticipate that included studies will have used various guidelines specific to geographic locations and local practice patterns. For studies that do not specify certain guideline referral criteria, we will document that referral criteria were not used.

Data collection and analysis

The PRISMA flow diagram summarizes the recommended study selection process (Figure 1). To screen and select studies to be included, we will use a two-stage collaborative review process. In the first stage, two reviewers (AG and NS) will independently review titles and abstracts of

retrieved studies based on the inclusion and exclusion criteria listed in Table 2. In the second stage, full texts of the selected studies will be obtained by these reviewers and analyzed independently to determine eligibility for inclusion in our final review. For both the first and second stages of screening, studies will be included if there is consensus between the two reviewers. If there is a disagreement, a third reviewer (IO) will resolve such conflicts and make decision on eligibility. For any excluded study, we will record at least one reason for exclusion.

Data extraction and management

Two reviewers will independently retrieve data and enter the summarized details into a data extraction form in Microsoft Excel. Data will include type of study, study design, publication year, first author, location of study and local healthcare system (e.g. private vs. public), CKD stages included in study, assessment of kidney function (eGFR, serum creatinine, and urine albumin levels), referral guidelines/criteria used, a description of the QI intervention utilized, duration of intervention and follow up, wait times, and changes in total number of referrals and the proportion of guideline-concordant referrals.

Assessment of risk of bias in included studies

We will adapt and utilize the Cochrane Effective Practice and Organization of Care (EPOC) risk of bias criteria[42] to assess methodological quality and evaluate risk of bias in our retrieved studies. The risk of bias per study will be displayed in a risk of bias summary table, and any discrepancies will be resolved by a third reviewer.

Data synthesis and analysis

We will report changes in wait times, total referrals, and the proportion of guideline-concordant referrals associated with the QI interventions utilized in each study. Changes in the number of referrals, the proportion of guideline-concordant referrals, and other outcomes associated with QI interventions will be presented as absolute values and reported in the same way across all studies. All wait times will be reported as number of days.

If concerns arise regarding missing or unclear data in the studies analyzed, we will contact the authors to request information related to study methods, referral criteria used, and changes in guideline-concordant referrals. Missing outcome data will be summarized in the data extraction form and noted in the risk of bias section. Characteristics of included studies will be summarized in tables. Intervention effects will be calculated as relative risks (RRs) with 95% CIs for dichotomous data, and mean differences (MDs) with 95% CIs for continuous variables. If we identify a sufficient number of studies, and clinical and methodological heterogeneity are reasonable, we will perform a meta-analysis to summarize pooled results using a random effects model.[43] Statistical heterogeneity will be quantified using I^2 statistics[44] in each analysis. If heterogeneity between studies is high ($I^2 > 50\%$), then data will be reported descriptively and we will provide a narrative synthesis of included studies using the Synthesis Without Meta-analysis (SWiM) reporting guideline as a framework.[45] We will assess publication bias using a regression-based test[46] and by visually inspecting funnel plots.

We will conduct a stratified meta-analysis by study characteristics. These include: the use of KDIGO guidelines vs. others, CKD stage at referral, and country income group (low and middle income vs. high income). We will perform categorical comparisons of the different types of QI

interventions (i.e., provider education; provider reminder systems; audit and feedback; organizational change; financial incentives, regulation, and policy; and other).[32] We will compare the number of QI interventions in each category and the overall impacts of each on wait times, referral numbers, and the proportion of guideline-concordant referrals. This information will be summarized in table format, similar to previous studies that have examined the impacts of QI interventions on referral rates.[37,38]

Patient and public involvement

This protocol for a systematic review will not utilize patient or public involvement. Because no patient data will be collected at this step, this study does not require ethics approval. However, we hope to form focus groups in the future where we will promote patient engagement by soliciting and incorporating the opinions of CKD patients regarding the relevance and implications of the study protocol and results. We hope to form similar focus groups with PHC providers. We also will involve policy makers at Alberta Health Services who will be interested in analyzing QI measures to enhance local health policies and practices. Furthermore, we will collaborate with scientific researchers at our institutions and others who are interested in this topic and have performed relevant work in this field. These groups will be engaged after the protocol is published and the results of the systematic review have been synthesized.

Timeline

We will collect data and develop our database from August to December 2021, analyze our data and compile our results from January to June 2022, and engage in knowledge translation activities from July to December 2022 (Figure 2).

Ethics and dissemination

Ethics approval will not be needed for our project since we will analyze data from already published studies. Our findings will be shared using traditional approaches, including open access peer-reviewed publication(s), presentations at meetings, and a report.

Discussion

QI initiatives have significant potential to close quality gaps, improve health systems, and enhance patient outcomes. To the best of our knowledge, no systematic reviews have been performed to examine different QI interventions that have been trialed to ensure appropriate referrals of CKD patients from PHC to nephrology. Our analysis will yield a summary of which types of QI interventions improve referral patterns. These results can guide the strategic implementation of future QI initiatives to improve referral patterns and may ultimately enhance knowledge and CKD management practices in primary care settings, improve referral and triage systems, and increase the proportion of guideline-concordant referrals of CKD patients. These implications are significant, especially for public health care systems which may be burdened by both the costs of chronic disease management and long wait times for patients to access specialist care.

Data statement

We will make data available upon reasonable request.

Funding statement

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Competing interest statement

None

Author contributions

AG, NS, FY, IO, and AB developed the concept and drafted the manuscript. FY produced figures for manuscript. LH drafted the search strategy. NS registered the study with PROSPERO. LH, AGrill, AS, AA, BB, DC, KJ, MC, NS, PR, SS, SB, SK, SC, SShojai, VD, and AW were involved in developing the protocol methods and revising the manuscript. All authors approved the final version to be published.

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Figures

Figure 1: Study selection process

Figure 2: Project timeline

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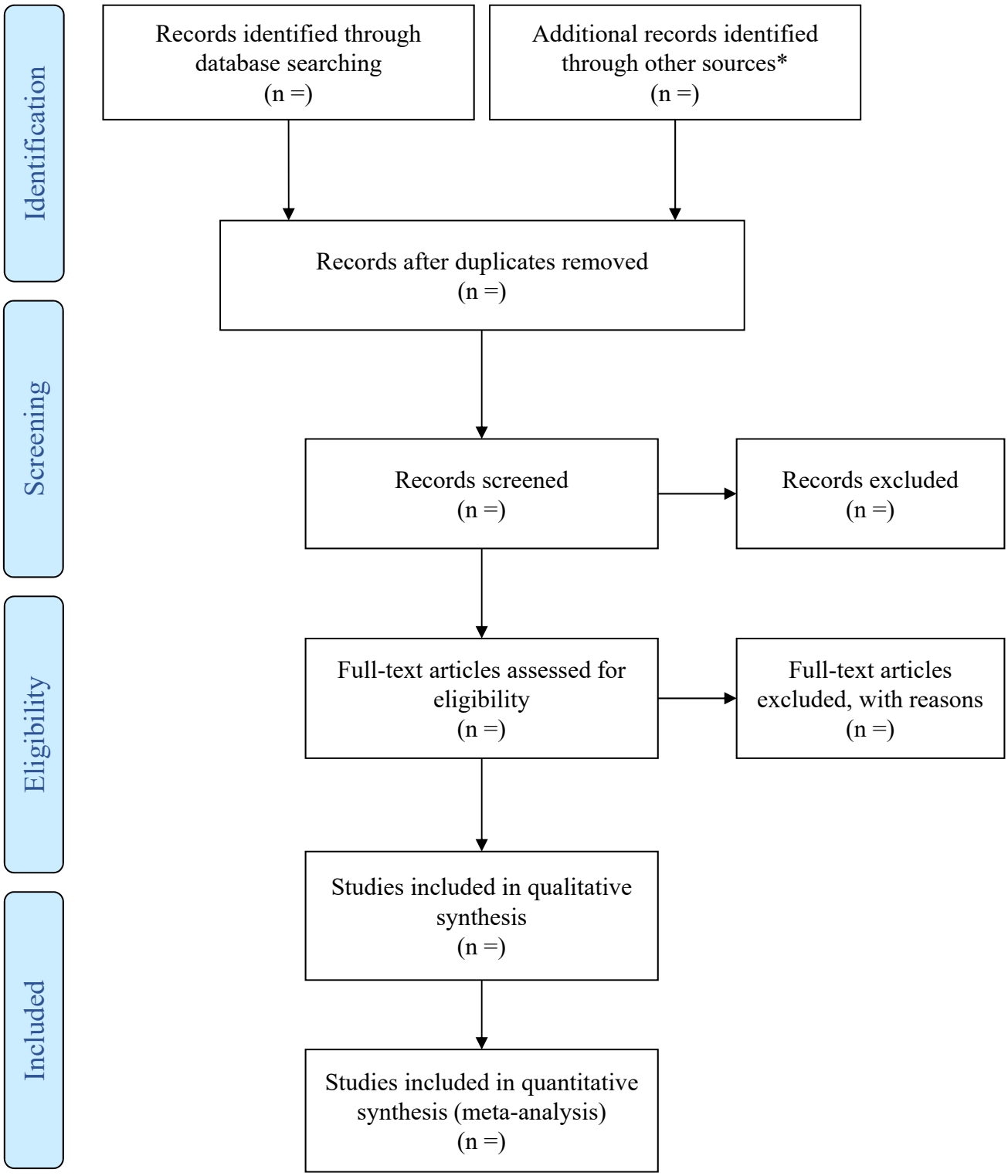
Table 1: Taxonomy of interventions used in the systematic review

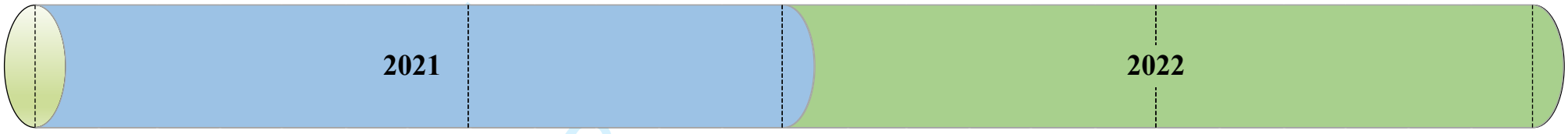
Intervention type	Definition
Provider education	Interventions aimed at training care providers, including educational workshops/meetings, outreach programs, and distribution of educational materials
Provider reminder systems	Providing specific information about clinical encounters with the aim of prompting clinicians to recall information or promote a certain aspect of care
Audit and feedback	Methods that provide a review of clinical performance for health care providers and institutions to help improve quality of a certain aspect of care
Other	Interventions not covered in the previously listed items, e.g. organizational change initiatives, financial incentives, patient reminder systems, patient education, promotion of self-management, and facilitated relay of clinical data to providers

Table 2: Inclusion and exclusion criteria for this study

Inclusion criteria	Exclusion criteria
- Studies involving CKD patients who are not being managed with KRT. - Studies reporting changes in process-based QI measures (wait times, number of referrals, or changes in guideline-concordant referrals) for CKD patients. - Studies reporting at least one outcome measure (referral numbers, rate or proportion of guideline concordant referrals, or wait times). - No restrictions on publication date. - No restrictions on language. - No restrictions on the referral guidelines (e.g. KDIGO vs. local/national guidelines) used.	- Studies where referrals are not from PHC to nephrology (e.g. referrals from or to general internal medicine for CKD). - Review articles, editorials, letters to the editor, commentaries, case studies, case reports, images. - Studies where we cannot obtain relevant data (e.g., method of intervention or outcomes reported) even after contacting authors. - Studies where the outcomes of interest (referral numbers, wait times, guideline-concordant referral rate) are not clearly reported.



*other sources (online publications, technical reports, policy briefs, etc.)



Jan 2021 - Jul 2021

- Protocol development
- Identification of relevant QI frameworks
- Selection of studies
- Data extraction tool development/relevance form
- Prospero registration
- Publication of protocol

Aug 2021 - Dec 2021

- Identification of relevant publications
- Data extraction
- Database development
- Risk of bias assessment
- Analysis

Jan 2022 - Jun 2022

- Manuscript writing/ reporting of results
- Publication of original manuscript
- Presentation at scientific meetings

Jul 2022 - Dec 2022

- KT activities and tools development (lay summaries and policy briefs)
- Engagement with relevant policy makers, primary care and referral coordinators to effect practice and/or policy change
- Develop recommendations for guideline developers

Supplementary Table S1: Medical Subject Headings for MEDLINE database search

1. exp Renal Insufficiency, Chronic/
2. Chronic Kidney disease*.mp.
3. chronic kidney insufficienc*.mp.
4. chronic renal disease*.mp.
5. chronic renal insufficienc*.mp.
6. CKD.mp.
7. Renal fail*.mp.
8. Kidney fail*.mp.
9. or/1-8
10. Organizational innovation/
11. clinical audit/ or medical audit/ or nursing audit/
12. Quality Improvement/
13. education/ or education, professional/ or education, continuing/ or education, medical, continuing/ or education, nursing, continuing/ or education, professional, retraining/
14. (Quality* adj2 improv*).mp.
15. ((Provider or doctor* or physician* or nurse* or health personnel* or healthcare personnel*) adj4 (educat* or learn* or "reminder system*")).mp.
16. (Organization* adj3 (change* or restructure* or revamp or reform* or revise* or innovat*)).mp.
17. Audit*.mp.
18. Feedback/
19. feedback.mp.
20. Physician Incentive Plans/
21. (financ* adj2 incentiv*).mp.
22. (incent* adj2 (plan or plans)).mp.
23. social control, formal/ or government regulation/ or mandatory programs/ or social control policies/ or organizational policy/ or public policy/ or health policy/ or health care reform/
24. regulat*.mp.
25. (policy or policies).mp.
26. or/10-25
27. "Referral and Consultation"/ or (referral* or consultation* or consults or consult).mp.
28. 26 and 27
29. (((Improv* or amerlior* or better or enhance* or correct* or increase* or progress or facilitat* or promote* or raise* or augment* or elevate* or appropriate) adj3 (referral* or consultation* or consult or consults)) and (guide* or policy or policies or regulation* or toolkit* or report*)).mp.
30. ((Reduce or reduction* or decrese* or lessen* or minimize* or diminish* or lower* or avoid*) adj3 ((unnecessary or avoidable or superfluous or unneeded or irrelevant or late or traditional) adj2 (referral* or consultation* or consult or consults))).mp.
31. wait* time*.mp. and ((referral* or consultation* or consult or consults).mp. or "Referral and Consultation"/) and (guide* or policy or policies or regulation* or toolkit* or reporting).mp.
32. 28 or 29 or 30 or 31
33. 9 and 32

Appendix: Search strategies for all databases in protocol

All searches were conducted with no additional filters or limits.

Medline – 431 results
Ovid MEDLINE(R) ALL

1. exp Renal Insufficiency, Chronic/
2. Chronic Kidney disease*.mp.
3. chronic kidney insufficienc*.mp.
4. chronic renal disease*.mp.
5. chronic renal insufficienc*.mp.
6. CKD.mp.
7. Renal fail*.mp.
8. 12.mp.
9. or/1-8
10. Organizational innovation/
11. clinical audit/ or medical audit/ or nursing audit/
12. Quality Improvement/
13. education/ or education, professional/ or education, continuing/ or education, medical, continuing/ or education, nursing, continuing/ or education, professional, retraining/
14. (Quality adj2 improv*).mp.
15. ((Provider or doctor* or physician* or nurse* or health personnel* or healthcare personnel*) adj4 (educat* or learn* or "reminder system*")).mp.
16. (Organization* adj3 (change* or restructure* or revamp* or reform* or revise* or innovat*)).mp.
17. Audit*.mp.
18. Feedback/
19. feedback.mp.
20. Physician Incentive Plans/
21. (financ* adj2 incentiv*).mp.
22. (incent* adj2 (plan or plans)).mp.
23. social control, formal/ or government regulation/ or mandatory programs/ or social control policies/ or organizational policy/ or public policy/ or health policy/ or health care reform/
24. regulat*.mp.
25. (policy or policies).mp.
26. or/10-25
27. "Referral and Consultation"/ or (referral* or consultation* or consults or consult).mp.
28. 26 and 27
29. (((Improv* or amerlior* or better* or enhance* or correct* or increase* or progress* or facilitat* or promote* or raise* or augment* or elevate* or appropriate) adj3 (referral* or consultation* or consult or consults)) and (guide* or policy or policies or regulation* or toolkit* or report*)).mp.
30. ((Reduc* or decrese* or lessen* or minimize* or diminish* or lower* or avoid*) adj3 ((unnecessary or avoidable or superfluous or unneeded or irrelevant or late or traditional) adj2 (referral* or consultation* or consult or consults))).mp.
31. wait* time*.mp. and ((referral* or consultation* or consult or consults).mp. or "Referral and Consultation"/) and (guide* or policy or policies or regulation* or toolkit* or reporting).mp.

32. 28 or 29 or 30 or 31
33. 9 and 32

Embase – 1322 results
Ovid platform

1. exp chronic kidney failure/
2. Chronic Kidney disease*.mp.
3. chronic kidney insufficienc*.mp.
4. chronic renal disease*.mp.
5. chronic renal insufficienc*.mp.
6. CKD.mp.
7. Renal fail*.mp.
8. Kidney fail*.mp.
9. or/1-8
10. clinical audit/ or nursing audit/
11. total quality management/
12. education/ or adult education/ or continuing education/ or vocational education/
13. (Quality adj2 improv*).mp.
14. ((Provider or doctor* or physician* or nurse* or health personnel* or healthcare personnel*) adj4 (educat* or learn* or "reminder system*")).mp.
15. (Organization* adj3 (change* or restructure* or revamp* or reform* or revise* or innovat*)).mp.
16. Audit*.mp.
17. feedback.mp.
18. (financ* adj2 incentiv*).mp.
19. (incent* adj2 (plan or plans)).mp.
20. social control/ or government regulation/ or mandatory program/ or organizational policy/ or public policy/ or health care policy/
21. regulat*.mp.
22. (policy or policies).mp.
23. or/10-22
24. exp consultation/ or patient referral/ or (referral* or consultation* or consults or consult).mp.
25. 23 and 24
26. (((Improv* or amerlior* or better* or enhance* or correct* or increase* or progress* or facilitat* or promote* or raise* or augment* or elevate* or appropriate) adj3 (referral* or consultation* or consult or consults)) and (guide* or policy or policies or regulation* or toolkit* or report*)).mp.
27. ((Reduce* or decrese* or lessen* or minimize* or diminish* or lower* or avoid*) adj3 ((unnecessary or avoidable or superfluous or unneeded or irrelevant or late or traditional) adj2 (referral* or consultation* or consult or consults))).mp.
28. wait* time*.mp. and ((referral* or consultation* or consult or consults).mp. or exp consultation/ or patient referral/) and (guide* or policy or policies or regulation* or toolkit* or reporting).mp.
29. 25 or 26 or 27 or 28
30. 9 and 29

PsycINFO – 15 results
APA PsycInfo, Ovid platform

1. kidney diseases/

2. Chronic Kidney disease*.mp.
3. chronic kidney insufficienc*.mp.
4. chronic renal disease*.mp.
5. chronic renal insufficienc*.mp.
6. CKD.mp.
7. Renal fail*.mp.
8. Kidney fail*.mp.
9. or/1-8
10. clinical audits/
11. education/
12. (Quality adj2 improv*).mp.
13. ((Provider or doctor* or physician* or nurse* or health personnel* or healthcare personnel*) adj4 (educat* or learn* or "reminder system*")).mp.
14. (Organization* adj3 (change* or restructure* or revamp* or reform* or revise* or innovat*)).mp.
15. Audit*.mp.
16. feedback.mp.
17. (financ* adj2 incentiv*).mp.
18. (incent* adj2 (plan or plans)).mp.
19. monetary incentives/
20. policy making/ or government policy making/ or health care policy/ or social control/ or health care reform/
21. regulat*.mp.
22. (policy or policies).mp.
23. or/10-22
24. professional consultation/ or professional referral/ or (referral* or consultation* or consults or consult).mp.
25. 23 and 24
26. (((Improv* or amerlior* or better* or enhance* or correct* or increase* or progress* or facilitat* or promote* or raise* or augment* or elevate* or appropriate) adj3 (referral* or consultation* or consult or consults)) and (guide* or policy or policies or regulation* or toolkit* or report*)).mp.
27. ((Reduce* or decrese* or lessen* or minimize* or diminish* or lower* or avoid*) adj3 ((unnecessary or avoidable or superfluous or unneeded or irrelevant or late or traditional) adj2 (referral* or consultation* or consult or consults))).mp.
28. wait* time*.mp. and ((referral* or consultation* or consult or consults).mp. or professional consultation/ or professional referral/) and (guide* or policy or policies or regulation* or toolkit* or reporting).mp.
29. 25 or 26 or 27 or 28
30. 9 and 29

Cochrane – 314 results
Cochrane Central

#1 MeSH descriptor: [Renal Insufficiency, Chronic] explode all trees
#2 "Chronic Kidney" NEXT disease*
#3 "chronic kidney" NEXT insufficienc*
#4 "chronic renal" NEXT disease*
#5 "chronic renal" NEXT insufficienc*
#6 CKD

#7 Renal NEXT fail*
#8 Kidney NEXT fail*
#9 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8
#10 MeSH descriptor: [Organizational Innovation] this term only
#11 MeSH descriptor: [Clinical Audit] this term only
#12 MeSH descriptor: [Medical Audit] this term only
#13 MeSH descriptor: [Nursing Audit] this term only
#14 MeSH descriptor: [Quality Improvement] this term only
#15 MeSH descriptor: [Education] this term only
#16 MeSH descriptor: [Education, Professional] in all MeSH products
#17 MeSH descriptor: [Education, Continuing] this term only
#18 MeSH descriptor: [Education, Medical, Continuing] this term only
#19 MeSH descriptor: [Education, Nursing, Continuing] this term only
#20 MeSH descriptor: [Education, Professional, Retraining] this term only
#21 Quality NEXT improv*
#22 (Provider OR doctor* OR physician* OR nurse* OR (health NEXT personnel*) OR (healthcare NEXT personnel*)) NEAR/4 (educat* OR learn* OR (reminder NEXT system*))
#23 Organization* NEAR/3 (change* OR restructure* OR revamp* OR reform* OR revise* OR innovat*)
#24 audit*
#25 MeSH descriptor: [Feedback] this term only
#26 Feedback
#27 MeSH descriptor: [Physician Incentive Plans] this term only
#28 financ* NEAR/2 incentiv*
#29 incent* NEAR/2 (plan OR plans)
#30 MeSH descriptor: [Social Control, Formal] this term only
#31 MeSH descriptor: [Government Regulation] this term only
#32 MeSH descriptor: [Mandatory Programs] this term only
#33 MeSH descriptor: [Social Control Policies] this term only
#34 MeSH descriptor: [Organizational Policy] this term only
#35 MeSH descriptor: [Public Policy] this term only
#36 MeSH descriptor: [Health Policy] this term only
#37 MeSH descriptor: [Health Care Reform] this term only
#38 regulat*
#39 policy OR policies
#40 {OR #10-#39}
#41 MeSH descriptor: [Referral and Consultation] this term only
#42 referral* OR consultation* OR consults OR consult
#43 #41 OR #42
#44 #40 AND #43
#45 ((Improv* OR amerlior* OR better* OR enhance* OR correct* OR increase* OR progress* OR facilitat* OR promote* OR raise* OR augment* OR elevate* OR appropriate) NEAR/3 (referral* OR consultation* OR consult OR consults)) AND (guide* OR policy OR policies OR regulation* OR toolkit* OR report*)
#46 ((Reduc* OR decrese* OR lessen* OR minimize* OR diminish* OR lower* OR avoid*) NEAR/3 ((unnecessary OR avoidable OR superfluous OR unneeded OR irrelevant OR late OR traditional) NEAR/2 (referral* OR consultation* OR consult OR consults)))

#47 (wait* NEXT time*) AND (#43 AND (guide* OR policy OR policies OR regulation* OR toolkit* OR reporting))
#48 {OR #44-#47}
#49 #9 AND #48

314 results

CINAHL – 251 results
CINAHL Plus with Full Text, EBSCO platform

S1 (MH "Kidney Failure, Chronic")
S2 "Chronic Kidney disease*"
S3 "chronic kidney insufficienc*"
S4 "chronic renal disease*"
S5 "chronic renal insufficienc*"
S6 CKD
S7 "Renal fail*"
S8 "Kidney fail*"
S9 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8
S10 (MH "Nursing Audit") OR (MH "Audit")
S11 (MH "Quality Improvement")
S12 (MH "Education")
S13 (MH "Refresher Courses")
S14 (MH "Education, Continuing+") OR (MH "Education, Medical, Continuing") OR (MH "Education, Nursing, Continuing") OR (MH "Education, Continuing (Credit)")
S15 Quality N2 improv*
S16 (Provider OR doctor* OR physician* OR nurse* OR "health personnel*" OR "healthcare personnel*") N4 (educat* OR learn* OR "reminder system*")
S17 Organization* N3 (change* OR restructure* OR revamp* OR reform* OR revise* OR innovat*)
S18 Audit*
S19 (MH "Feedback")
S20 Feedback
S21 (MH "Physician Incentive Plans")
S22 financ* N2 incentiv*
S23 incent* N2 (plan OR plans))
S24 (MH "Social Control") OR (MH "Public Policy") OR (MH "Health Policy")
S25 (MH "Government Regulations")
S26 (MH "Organizational Policies") OR (MH "Hospital Policies")
S27 (MH "Health Care Reform")
S28 regulat*
S29 (policy OR policies)
S30 S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29
S31 (MH "Referral and Consultation")
S32 referral* OR consultation* OR consults OR consult
S33 S31 OR S32
S34 S30 AND S33

S35 (((Improv* OR amerlior* OR better* OR enhance* OR correct* OR increase* OR progress* OR 6facilitate* OR promote* OR raise* OR augment* OR elevate* OR appropriate) N3 (referral* OR consultation* OR consult OR consults)) AND (guide* OR policy OR policies OR regulation* OR toolkit* OR report*))

S36 ((Reduc* OR decrese* OR lessen* OR minimize* OR diminish* OR lower* OR avoid*) N3 ((unnecessary OR avoidable OR superfluous OR unneeded OR irrelevant OR late OR traditional) N2 (referral* OR consultation* OR consult OR consults)))

S37 "wait* time*" AND (S33 AND (guide* OR policy OR policies OR regulation* OR toolkit* OR reporting))

S38 S34 OR S35 OR S36 OR S37

S39 S9 AND S38

WoS – 589 results
Web of Science – All databases

1. TS=("Chronic Kidney disease*" OR "chronic kidney insufficienc*" OR "chronic renal disease*" OR "chronic renal insufficienc*" OR "CKD" OR "Renal fail*" OR "Kidney fail*")
2. TS=(((((Quality NEAR/2 improv*) OR ((Provider OR doctor* OR physician* OR nurse* OR "health personnel*" OR "healthcare personnel*") NEAR/4 (educat* OR learn* OR "reminder system*")) OR (Organization* NEAR/3 (change* OR restructure* OR revamp* OR reform* OR revise* OR innovat*)) OR Audit* OR Feedback OR (financ* NEAR/2 incentiv*) OR (incent* NEAR/2 (plan OR plans)) OR regulat* OR policy OR policies) AND (referral* OR consultation* OR consults OR consult))))
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5. TS=(((Reduc* OR decrese* OR lessen* OR minimize* OR diminish* OR lower* OR avoid*) NEAR/3 ((unnecessary OR avoidable OR superfluous OR unneeded OR irrelevant OR late OR traditional) NEAR/2 (referral* OR consultation* OR consult OR consults))))
6. #2 OR #3 OR #4 OR #5
7. #1 AND #6

Reporting checklist for protocol of a systematic review and meta analysis.

Based on the PRISMA-P guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

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In your methods section, say that you used the PRISMA-Preporting guidelines, and cite them as:

Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement. Syst Rev. 2015;4(1):1.

		Reporting Item	Page Number
Title			
Identification	#1a	Identify the report as a protocol of a systematic review	1
Update	#1b	If the protocol is for an update of a previous systematic review, identify as such	N/A

Registration			
	#2	If registered, provide the name of the registry (such as PROSPERO) and registration number	2
Authors			
Contact	#3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contribution	#3b	Describe contributions of protocol authors and identify the guarantor of the review	14
Amendments			
	#4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	N/A
Support			
Sources	#5a	Indicate sources of financial or other support for the review	14
Sponsor	#5b	Provide name for the review funder and / or sponsor	14
Role of sponsor or funder	#5c	Describe roles of funder(s), sponsor(s), and / or institution(s), if any, in developing the protocol	14
Introduction			

Rationale	#6	Describe the rationale for the review in the context of what is already known	3-8
Objectives	#7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	8
Methods			
Eligibility criteria	#8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	8-9, 23
Information sources	#9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	8-9
Search strategy	#10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	9-10, 25
Study records - data management	#11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	10
Study records - selection process	#11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	10

Study records - data collection process	#11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	10
Data items	#12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	9
Outcomes and prioritization	#13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	10
Risk of bias in individual studies	#14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	11
Data synthesis	#15a	Describe criteria under which study data will be quantitatively synthesised	11
Data synthesis	#15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I2, Kendall's τ)	11
Data synthesis	#15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	11

Data synthesis	#15d	If quantitative synthesis is not appropriate, describe the type of summary planned	N/A
Meta-bias(es)	#16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	11
Confidence in cumulative evidence	#17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	N/A