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Common Barriers to Replicability and Retrieval in Systematic Review Search Strategies

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Common Barriers to Replicability and Retrieval in Systematic Review Search Strategies

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Taubman Health Sciences Library, University of Michigan



Background

The National Academies of

SCIENCES ENGINEERING MEDICINE

REPORT AT A GLANCE

Standards for Systematic Reviews

STANDARD 3.1

Conduct a comprehensive systematic search for evidence

- 3.1.1 Work with a librarian or other information specialist trained in performing systematic reviews to plan the search strategy
- 3.1.2 Design the search strategy to address each key research question
- 3.1.3 Use an independent librarian or other information specialist to peer review the search strategy
- 3.1.4 Search bibliographic databases
- 3.1.5 Search citation indexes
- 3.1.6 Search literature cited by eligible studies
- 3.1.7 Update the search at intervals appropriate to the pace of generation of new information for the research question being addressed
- 3.1.8 Search subject-specific databases if other databases are unlikely to provide all relevant evidence
- 3.1.9 Search regional bibliographic databases if other databases are unlikely to provide all relevant evidence

- 10.1371/journal.pone.0125931.
- Libr Assoc. 2016 Oct;104(4):267-277.
- 10.5195/jmla.2017.189. Epub 2017 Jul 1.



Rethlefsen ML, Farrell AM, Osterhaus Trzasko LC, Brigham TJ. Librarian coauthors correlated with higher quality reported search strategies in general internal medicine systematic reviews. J Clin Epidemiol. 2015 Jun;68(6):617-26. doi: 10.1016/j.jclinepi.2014.11.025.

Koffel JB. Use of recommended search strategies in systematic reviews and the impact of librarian involvement: a cross-sectional survey of **recent authors.** PLoS One. 2015 May 4;10(5):e0125931. doi:

Meert D, Torabi N, Costella J. Impact of librarians on reporting of the literature searching component of pediatric systematic reviews. J Med

Koffel JB, Rethlefsen ML. Reproducibility of Search Strategies Is Poor in Systematic Reviews Published in High-Impact Pediatrics, Cardiology and Surgery Journals: A Cross-Sectional Study. PLoS One. 2016 Sep 26;11(9):e0163309. doi: 10.1371/journal.pone.0163309.

Townsend WA, Anderson PF, Ginier EC, MacEachern MP, Saylor KM, Shipman BL, Smith JE. A competency framework for librarians involved in systematic reviews. J Med Libr Assoc. 2017 Jul;105(3):268-275. doi:



Background

Systematic Reviews: Opportunities for Librarians

- Funded with Federal funds from the National Library of Medicine, National Institutes of Health, Department of Health and Human Services, under Contract HHSN-276-2011-00005-C with the University of Illinois at Chicago.
- Flipped Classroom Model: 2 weeks online asynchronous followed by 2 day in-person
- Data from 4 cohorts of 20-25 each spread over 1 calendar year
- IRB exempt





Our Question

What are the most common barriers to replicability and retrieval that we should target in systematic review instruction?





Participants provided with a case scenario:

- Standardized topic with clear population and intervention 1. concept blocks (based on a published SR with 10 included studies)
- 2. Researcher requests:
 - Limit search to the last 10 years
 - Limit search to Human studies
 - Particular outcomes of interest
- 3. Three sentinel articles that fit inclusion criteria (3 of the 10 included studies from the published SR)



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Assignment Instructions:

"Create a replicable search strategy using PubMed for the systematic review topic and scenario listed below. Use the information provided at your discretion as you formulate your search; for example, if the research team wants to limit to English language studies but you don't feel that's appropriate, you don't need to do so in your search."

Submit: Search Strategy, Number of results



Instructors reviewed submitted draft strategies for:

- Replicability
- Application of Limits
- Retrieval of 3 sentinel articles provided
- Retrieval of 10 included studies from published SR
 - PMIDs for identified articles and missed articles



IMPORTANT!

Good to know (aka limitations):

- Searches are DRAFTS; done in 2 weeks
- Results guide in-person discussions
- Cohort search analysis is used as an instructional exercise





How replicable are strategies?



Replicability

- N= 79
- Difficult to define
- Multiple reasons for nonreplicable strategies

Generous definitions due to draft search status



Which limits do searchers apply?



Date limit

- 10 year limit requested by scenario team
- Not required to comply
 - "Last 10 years"
 - Custom Date range
 - Others



Which limits do searchers apply?



Human Limit

- Yes Cochrane Human limit (NOT NOT)
- Yes Humans[MeSH]



Which limits do searchers apply?



Included outcomes • Highly topic dependent Not all outcomes are reported in the abstract





How well are known citation retrieved?



Retrieval of all 3 sentinel articles:





How well are all citations retrieved?



Retrieval of all 10 included studies:

10%



Which papers were most commonly missed?

Missed Citations (PMID)	% Participants
7609106	81%
1773291	78%
2317671	71%
16413349	64%
17850374	50%
24660833	28%
18367097	17%
24989847	13%
24601996	7%
27159369	7%



Why were these papers missed?

Missed Citations (PMID)		% Participants
	7609106	81%
	1773291	78%
	2317671	71%
	16413349	64%
	17850374	50%
	24660833	28%
	18367097	17%
	24989847	13%
	24601996	7%
	27159369	7%

Outside of the 10 year date range limit for all cohorts, regardless of limiting technique

Outside of the 10 year date range limit for some cohorts

7609106

Intraoperative blood loss and prognosis in prostate cancer patients undergoing radical retropubic prostatectomy.

Oefelein MG (1995)

Survival Rate

To assess more thoroughly the prognostic significance of perioperative transfusions, we examined a previously ignored factor, namely intraoperative blood loss.

Univariate and multivariate stepwise regression analysis was performed on results of a 10-year series of 251 consecutive men who underwent radical retropubic prostatectomy for clinically localized carcinoma.

Gleason score, operative blood loss and pathological stage were significantly (p < 0.0001) associated wi ratio of 1.08 (95% confidence interval 1.05 to 1.10) was demonstrated for every 100 ml. of operative bloo

The operative blood loss but not the type (autologous or allogeneic) of blood transfused was significantly survival after radical retropubic prostatectomy. This finding implies that the operative events necessitating significant than the immunological effects of the transfusion.

Adult Aged	
Blood Loss, Surgical*	
Disease-Free Survival	
Follow-Up Studies	
Humans	
Male Middle Aged Multivariate Analysis	
Postoperative Complications / epidemiology Prognosis Prostatectomy* Prostatic Neoplasms / mortality Prostatic Neoplasms / surgery*	
Regression Analysis	

WHAT HAPPENED? No transfusion MeSH term or "blood transfusion" phrase Transfusions[tw] Transfusion[tw] Transfus*[tw] Transfused[tw] "Blood loss"[tw] "Blood loss, surgical"[mesh]





1773291

Peri-operative blood transfusion in relation to tumour recurrence and death after surgery for prostatic cancer.

Eickhoff JH (1991)

Several reports have suggested that peri-operative blood transfusion promotes tumour recurrence and death after surgery for cancer. We have studied the effect of transfusion in 156 patients operated on for prostatic cancer. A retrospective review was made of the clinical, histopathological and transfusion data in their hospital records. Sixty patients received blood transfusions and 96 did not. The 5-year prostatic cancer specific survival rate was 0.56 in the transfused patients and 0.69 in the non-transfused group. The transfused patients had a higher prevalence of risk factors than did the non-transfused. When the differences in risk factors were accounted for by Cox regression analysis, peri-operative blood transfusion reduced the prostatic cancer death intensity by 36%. The study does not support the hypothesis that blood transfusion promotes recurrence following surgery for prostatic cancer.

Aged Aged, 80 and over

Blood Transfusion / adverse effects*

Humans

Male Middle Aged

Neoplasm Recurrence, Local* / mortality

Prospective Studies Prostate / surgery Prostatic Neoplasms / mortality* Prostatic Neoplasms / surgery

Retrospective Studies Risk Factors

Surgical Procedures, Operative / mortality Survival Rate

WHAT HAPPENED?

No prostatectomy term (MeSH or keyword) Prostate/surgery[mesh] Prostatic Neoplasms/surgery[mesh] • Surgical Procedures, Operative[mesh] "prostatic cancer" [tw] AND surgery [tw]

Table: Yale MeSH Analyzer



PMID	2317671			
Title	Blood transfusion and survival following surgery for prostatic carcinoma.			
Journal Title	The British journal of surgery			
Author Year	McClinton S (1990)			
Abstract	Blood transfusion in the perioperative period has been reported to have a detrim survival in many types of cancer. Other studies have failed to confirm this. We have retrospectively the records of 246 patients with prostatic carcinoma who underwore resection of the prostate (TURP) in Aberdeen Royal Infirmary between 1977 and orchiectomy (BLO) was performed in 193 patients. Of these patients, 71 of 246 (2) received perioperative blood transfusion. After controlling for differences due to variables, transfusion of non-autologous blood was shown to be associated with negative effect on survival. Perioperative transfusion of non-autologous blood sh in patients with malignancy, unless there are clear overriding clinical indications. are needed urgently.			
MeSH Headings	Aged	WHAT HAPPE		
	Humans	Survival the o		
	Intraoperative Period	keyword)		
	Male	 Specific 		
	Orchiectomy	not indi		
	Prostatectomy	to all of		
	Prostatic Neoplasms / mortality			
	Prostatic Neoplasms / pathology Prostatic Neoplasms / surgery*			
	Retrospective Studies			
	Scotland / epidemiology Survival Rate			
	Transfusion Reaction*			

nental effect on ave examined vent transurethral 1982. Bilateral 29 per cent) a number of a significant ould be avoided Prospective trials

ENED? only outcome term (MeSH or

coutcomes of interest to team are icated (although survival is related f them!)





Limitations

- Draft Searches! \bullet
- Required to use PubMed
- At present, don't have data on experience levels of participants
- Refine definitions of replicable lacksquare
- Small changes to course over time (additional online instruction in • searching, form for assignment submission)
- This is only one topic; limits have very different effects on retrieval for other topics
- Changes in indexing over time affect replicability





Changes in Indexing

Most frequently missed articles at the time

(after removal of all search limits)

Spring 2017







27159369

Perioperative Blood Transfusion as a Significant Predictor of Biochemical Recurrence and Survival after Radical Prostatectomy in Patients with Prostate Cancer.

Kim JK (2016)

There have been conflicting reports regarding the association of perioperative rates and survival outcomes in prostate cancer. We aimed to evaluate whethe free survival (BRES), cancer-specific survival (CSS), and overall survival (OS) for

A total of 2,713 patients who underwent RP for clinically localized prostate cancer between 1993 and 2014 were retrospectively analyzed. We performed a comparative analysis based on receipt of transfusion (PBT group vs. no-PBT group) and transfusion type (autologous PBT vs. allogeneic PBT). Univariate and multivariate Cox-proportional hazard regression analysis were performed to evaluate variables associated with BRFS, CSS, and OS. The Kaplan-Meier method was used to calculate survival estimates for BRFS, CSS, and OS, and log-rank test was used to conduct comparisons between the groups.

The number of patients who received PBT was 440 (16.5%). Among these patients, 350 (79.5%) received allogeneic transfusion and the other 90 (20.5%) received autologous transfusion. In a multivariate analysis, allogeneic PBT was found to be statistically significant predictors of BRFS, CSS, and OS; conversely, autologous PBT was not. The Kaplan-Meier survival analysis showed significantly decreased 5-year BRFS (79.2% vs. 70.1%, log-rank, p = 0.001), CSS (98.5% vs. 96.7%, log-rank, p = 0.012), and OS (95.5% vs. 90.6%, log-rank, p < 0.001) in the allogeneic PBT group compared to the noallogeneic PBT group. In the autologous PBT group, however, none of these were statistically significant compared to the no-autologous PBT group.

We found that allogeneic PBT was significantly associated with decreased BRFS, CSS, and OS. This provides further support for the immunomodulation hypothesis for allogeneic PBT.



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No MeSH terms! Hadn't been indexed yet; keyword only

Table: Yale MeSH Analyzer





Changes in Indexing

1773291 Peri-operative blood transfusion in relation to tumour recurrence and death after surgery for prostatic cancer.		PMID Title	17732 Peri-c
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291

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Spring 2018



Changes in Indexing

Transfusion Reaction

Complications of BLOOD TRANSFUSION. Included adverse reactions are common allergic and febrile reactions; hemolytic (delayed and acute) reactions; and other non-hemolytic adverse reactions such as infections and adverse immune reactions related to immunocompatibility. Year introduced: 2015

Previous Indexing:

• Hemolysis (1964-2014)

See Also:

Blood Safety

All MeSH Categories Diseases Category Hemic and Lymphatic Diseases Hematologic Diseases

Transfusion Reaction

Transfusion-Related Acute Lung Injury

All MeSH Categories Diseases Category Immune System Diseases Transfusion Reaction

Transfusion-Related Acute Lung Injury



Changes in Indexing: Effects

When searches were re-run in May 2018:

22% of participants added citations to their results

8% of participants lost citations from their results



So what does it all mean?

Key areas of educational need:

- Adequate term generation
- Testing searches and peer review
- Best practices for limiting searches
- Talking points with teams
- PRESS yourself before you wreck yourself! www.cadth.ca/resources/finding-evidence/press





The Future...

- More data, more problems
- Effects of specific limits on retrieval
- PRESS of Capstone draft searches
- Data cleaning and further analysis at RTI



LIBRARY

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