

Identifying relevant literature for Systematic Reviews and Meta-Analyses

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Learning objectives

- Why do I need to search systematically for systematic reviews?
- How do I develop a systematic search strategy?
- Where do I find reliable, up-to-date medical research findings?
- When is a search strategy «good enough»?
- How do I document/report a search strategy?

Systematic Reviews (SRs)

are based on the entire evidence on a topic

How do you find all the evidence?

1. Planned approach:

- Accurate formulation of the research question
- Determining the search terms
- Selection of subject-specific databases

2. Allow enough time

3. Acquire database knowledge



Systematic Review Workflow

Where do Information Specialists provide support?

Systematic review workflow

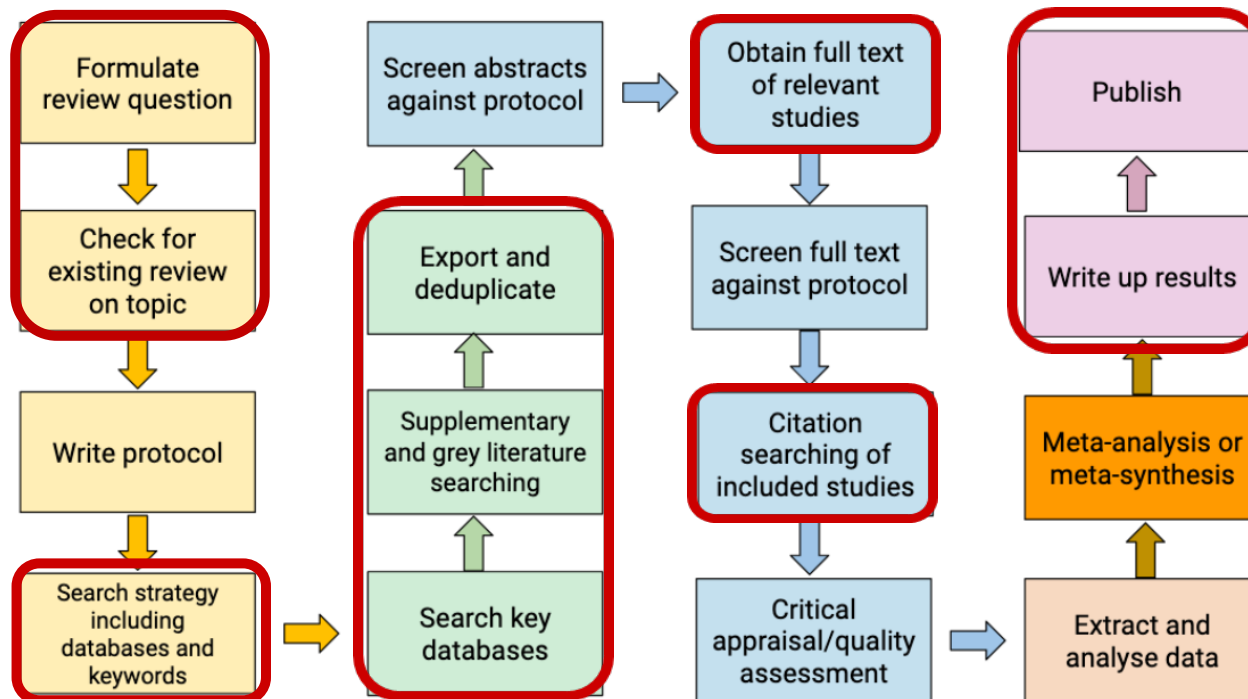


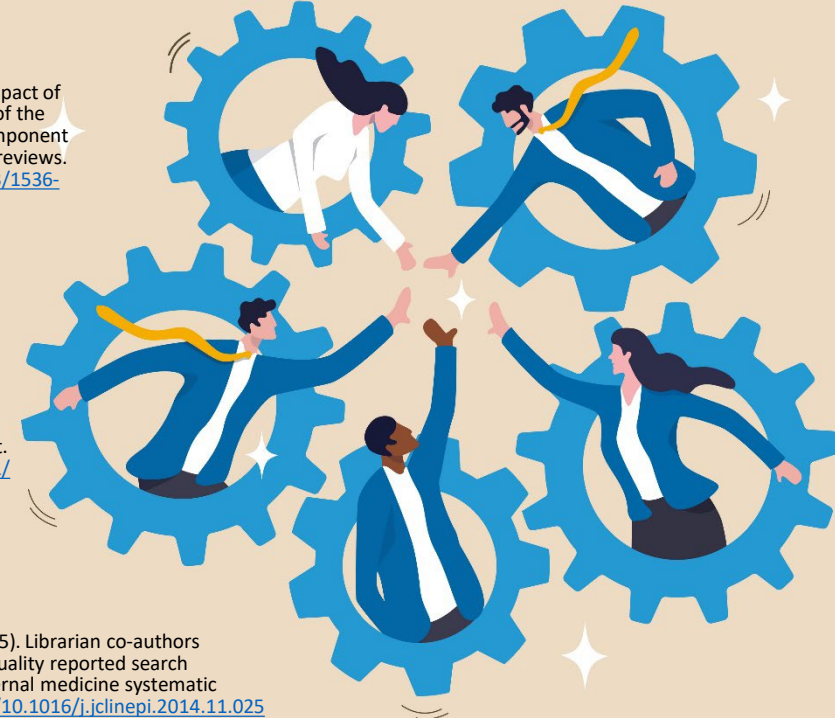
Image source: [LibGuide Monash University](#)

Librarian involvement **enhances search strategy quality and reporting.**

Meert D et al (2016). Impact of librarians on reporting of the literature searching component of pediatric systematic reviews. <https://doi.org/10.3163/1536-5050.104.4.004>

Koffel JB (2015). Use of recommended search strategies in systematic reviews and the impact of librarian involvement. <https://doi.org/10.1371/journal.pone.0125931>

Rethlefsen ML et al (2015). Librarian co-authors correlated with higher quality reported search strategies in general internal medicine systematic reviews. <https://doi.org/10.1016/j.jclinepi.2014.11.025>

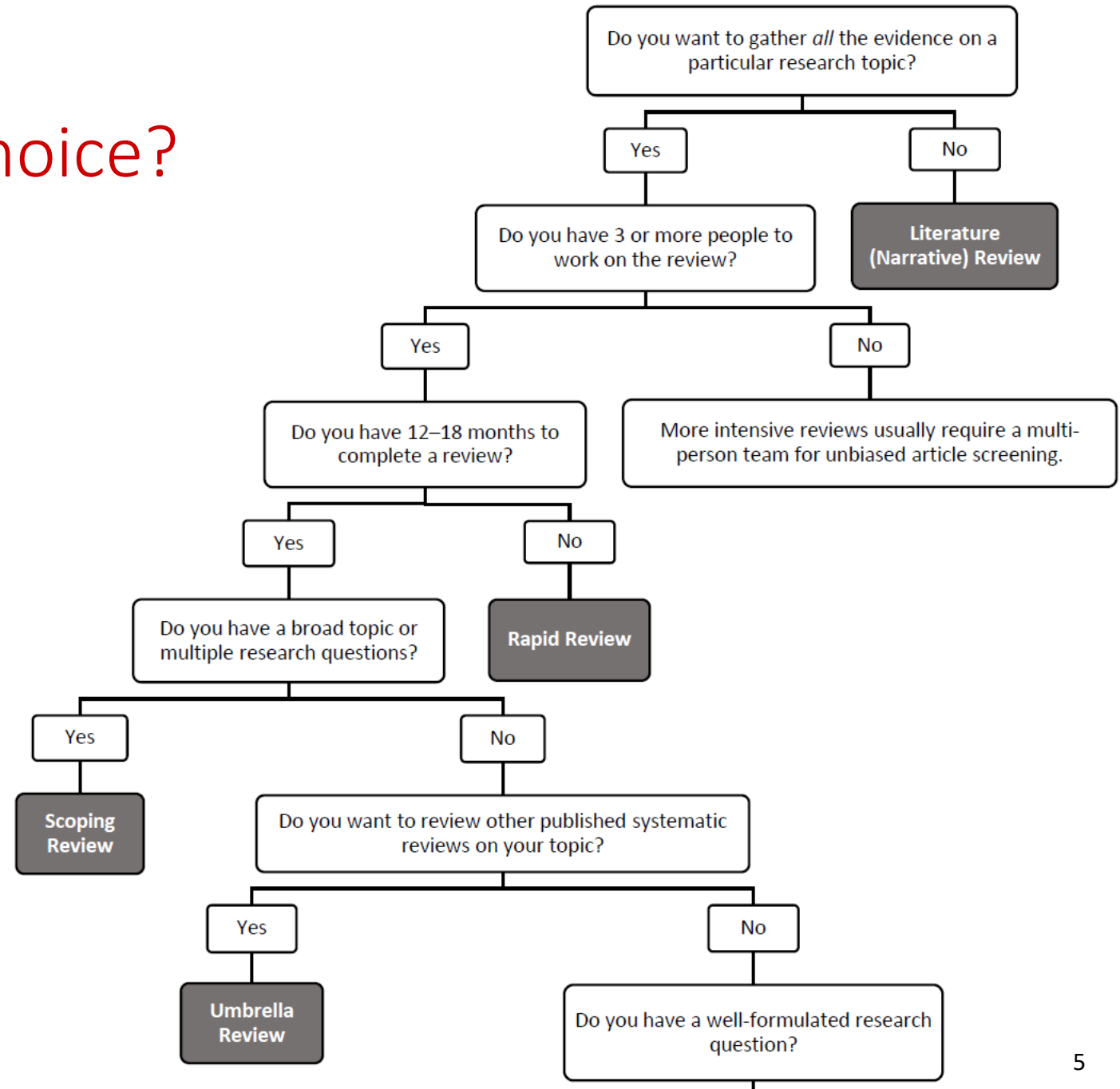


Is a SR always the best choice?

Decision tree



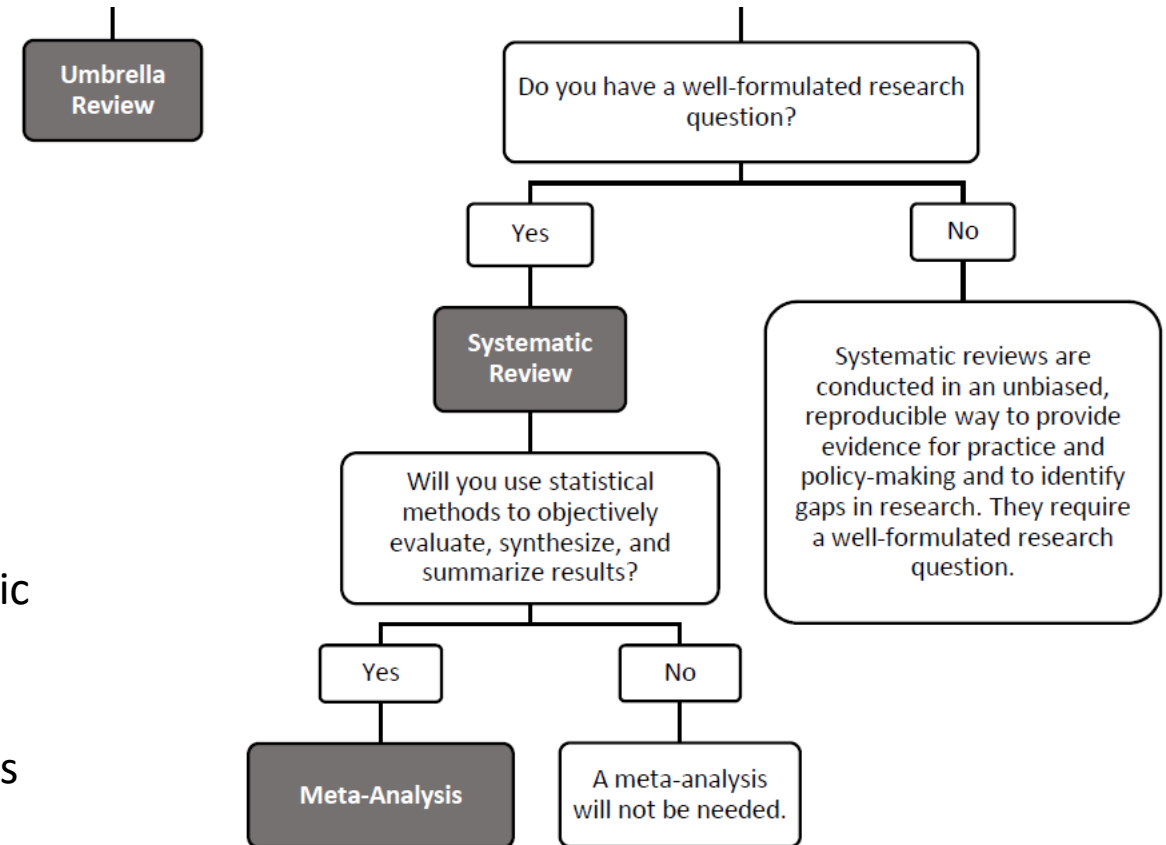
Source: [Cornell University Library](#)

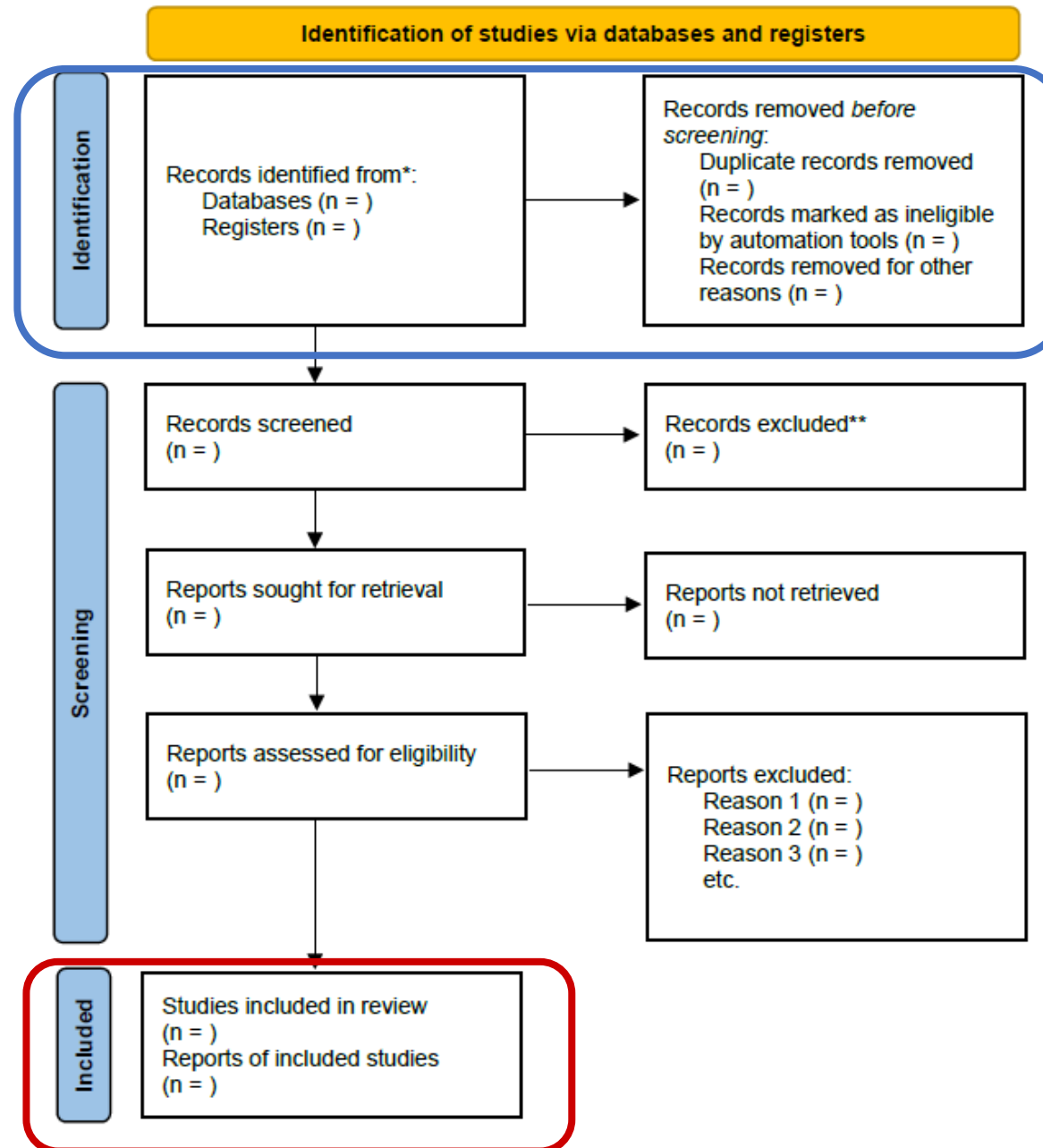
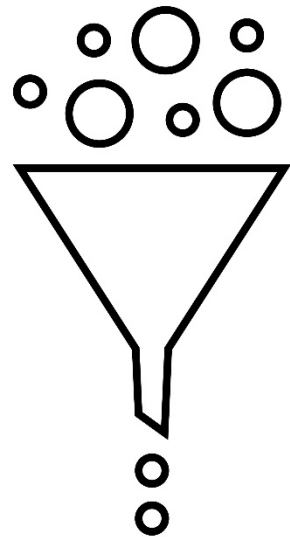


Is a SR always the best choice?

Alternatives:

- Narrative / Literature Review
Evidence, selectively gathered by the authors
- Rapid Review
Focus on speed and timeliness of evidence review
- Scoping Review
Review of a potentially diverse literature on a broad topic
- Umbrella Review
"Review of Reviews" = comparison/evaluation of reviews





New research findings are based on

the papers found with the search strategies.

If important papers were not identified, the results will be different or biased!

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71



Identifying relevant studies in (huge) databases

Example of a complex search strategy

PubMed

((("Diabetes Mellitus, Type 1"[Mesh]) OR (type 1 diabet*[Title/Abstract] OR type I diabet*[Title/Abstract] OR diabetes mellitus type 1[Title/Abstract] OR diabetes mellitus type I[Title/Abstract] OR T1D[Title/Abstract] OR T1DM[Title/Abstract] OR insulin-dependent diabet*[Title/Abstract] OR juvenile-onset diabet*[Title/Abstract] OR sudden-onset diabet*[Title/Abstract] OR IDDM[Title/Abstract] OR autoimmune diabet*[Title/Abstract] OR brittle diabet*[Title/Abstract] OR ketosis-prone diabet*[Title/Abstract])) AND (("Adolescent"[Mesh] OR "Child"[Mesh] OR "Infant"[Mesh]) OR (child*[Title/Abstract] OR infan*[Title/Abstract] OR adolescen*[Title/Abstract] OR newborn*[Title/Abstract] OR preschool*[Title/Abstract] OR pre-school*[Title/Abstract] OR teen*[Title/Abstract] OR pediatric*[Title/Abstract] OR paediatric*[Title/Abstract])) AND (("Insulin Infusion Systems"[Mesh]) OR (insulin pump*[Title/Abstract] OR insulin infus*[Title/Abstract] OR insulin deliver*[Title/Abstract] OR CSII[Title/Abstract]))) AND ((randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tiab] OR clinical trials as topic[mesh:noexp] OR randomly[tiab] OR trial[ti] NOT (animals[mh] NOT humans [mh]))))

Identifying relevant studies in databases

Translation to other database languages

Embase.com

('insulin dependent diabetes mellitus'/exp OR (((diabet*) NEAR/3 ('typ* 1' OR 'typ* I' OR 'insulin*-depend*' OR juvenil* OR sudden-onset OR early-onset OR autoimmun* OR auto-immun* OR brittle* OR ketoacid* OR keto-acid*)) OR T1D OR T1DM OR IDDM OR 'dm 1'):ab,ti) AND ('adolescent'/de OR 'adolescence'/exp OR 'child'/exp OR 'kindergarten'/de OR 'kindergarten'/exp OR 'teen* OR pediatric* OR 'deliver*')) OR CSII):ab,ti
'Double-blind proced NEXT/1 over*) OR pla trial OR groups OR R

ClinicalTrials.gov

Condition or disease:

Type 1 Diabetes OR Insulin-Dependent Diabetes Mellitus OR Juvenile-Onset Diabetes OR Sudden-Onset Diabetes OR Autoimmune Diabetes OR Brittle Diabetes OR Ketosis-Prone Diabetes OR IDDM OR T1D OR T1DM

Intervention:

insulin infusion OR insu

Age Filter:

Child (birth – 17)

Cochrane CENTRAL

(((diabet*) NEAR/3 ("type 1" OR "typ 1" OR "type I" OR "typ I" OR insulin-dependent OR juvenil* OR sudden-onset OR early-onset OR autoimmun* OR auto-immune OR brittle* OR ketoacid* OR keto-acidotic OR keto-acidosis)) OR T1D OR T1DM OR IDDM OR "dm 1"):ab,ti) AND ((child* OR infan* OR adolescen* OR newborn* OR preschool* OR pre NEXT school* OR teen* OR pediatric* OR paediatric*):ab,ti) AND (((insulin NEAR/3 (infus* OR pump* OR deliver*)) OR CSII):ab,ti)



Timeline of a SR, with focus on literature search

Time span (months)

Background

Study other reviews

Specify question

Preliminary search

Protocol

Search

Appraisal

Data extraction

Synthesis

Report

	1	2	3	4	5	6	7	8	9	10	11	12
S = Start E = End												
S	E											
S	E											
S	E											
	S	E										
		S	-	-	E							
					S	-	E					
							S	E				
									S	E		
										S	-	E

Search strategy setup incl. translation into all databases and subsequent adaptations.
(calculate up to 60h!)

Practical example of a research question

01 Research question

Insulin pump therapy
will make your child's and
your life much easier.



Compared to giving
the injections, everything else
will be better, I'm sure.

TRUE? What is the evidence?

Situation / Clinical Question

Acquire background knowledge

Type 1 diabetes, an autoimmune condition in which the pancreas no longer produces the hormone insulin, which is necessary to convert glucose into energy. The therapy is to administer appropriate doses of insulin to keep the sugar levels within a normal range. This can be done by injecting the insulin several times a day, or by carrying a pump that delivers the insulin.

„In children with type 1 diabetes, does insulin pump therapy produce normoglycemia and improve the quality of life (in comparison with daily insulin injections)?“



Check for other (planned / registered) SRs

02 Protocol

PROSPERO (York)

International Prospective
Register of Systematic Reviews

Cochrane Library

(Health Care and Clinical Interventions)

Campbell Collaboration

(Social Interventions)



Search PROSPERO

Search

MeSH search

Help with searching

insulin pump AND children

in

All fields ▾

sort by

Title ▾

Asc ▾

Search

Show history

Filters

Apply

Reset



Record type

☐ Clinical (58)

Review status

☐ Completed (11)

☐ Ongoing (47)

Date of registration

Search term: **insulin pump AND children**

58 results

☐ Select all on this page (0 selected)

Clear all selections

Download selected

Download all

Pages

« ‹ 1 2 3 › »



🔍 Efficacy and Safety of Hybrid Closed-Loop **insulin** Delivery Systems in **Children** Under 7 Years Old with Type 1 Diabetes : A Systematic Review **2025** [CRD420251137957](#) (Ongoing)



🔍 A qualitative systematic meta-synthesis review on the impacts of combining continuous subcutaneous **insulin** infusion with real-time continuous glucose monitoring on life of parents of **children** with Type 1 diabetes **2020** [CRD42020172233](#) (Ongoing)

Protocol development

Relevant points for the literature search

- **Aim and type of review**
- **Exact research question**
- **Details of the search strategy**
(provisional version)
- **Selection of databases**
(incl. trial registries)
- **Inclusion/exclusion criteria**



Databases

Where can I find reliable studies?

02
Databases

Published research (in professional journals):
Subject databases (medical, psychological, etc.)
(Medline, Embase, CINAHL, PsycInfo, LILACS, etc.)

Ongoing research
Clinical Trials Registries (ClinicalTrials.gov, WHO ICTRP)

Grey literature
E.g. conference papers, doctoral theses (Google, Google Scholar, Web of Science, institutional / company websites)

Non-published research
Direct contact with experts or research leaders, sponsors of the studies (pharmaceutical companies)



Databases: MEDLINE

PubMed vs. Ovid Medline

02
Databases



Access	Freely available to the public worldwide	Requires subscription (library or institution)
Content	MEDLINE, PubMed Central, Bookshelf	MEDLINE ALL (all PubMed content)
Interface	By NLM (only for PubMed content)	Ovid (interface for multiple databases)
Search features	Designed for ease of use (in-built features like automatic term mapping, best match etc.). Performing complex searches involves consulting the separate MeSH database. → PubMed step-by-step tutorial (PDF)	More sophisticated searching options , which can be valuable for comprehensive searching for evidence synthesis projects . The MeSH database is integrated. → Ovid Medline step-by-step tutorial (PDF)

The two largest medical databases



- Produced in the USA
- 1966 to present (OldMedline 1946-65)
- More than 39 million records (incl 4 million PubMed-NOT-Medline records);
> 5200 journals
- Thesaurus: MeSH (over 30'000 terms)
- Contains also Preprints (NIH-funded research)
- Overlap approx. 34%
(topics 10% to 75%)

- Produced in Europe
- 1974 to present (Embase Classic 1947-73)
- 49 million records (incl. Medline); 8300 journals
(> 3000 not covered in Medline)
- Thesaurus: EMTREE (> 100'000 terms)
- Comprehensive inclusion of drug related and medical device information
- Includes also conference abstracts, clinical trials from ClinicalTrials.gov, preprints (from medRxiv and bioRxiv)

Sources: <https://www.nlm.nih.gov/bsd/medline.html>;
<https://pubmed.ncbi.nlm.nih.gov/about/>

<https://www.elsevier.com/products/embase/content>

Other databases

The Cochrane Library

<https://www.cochranelibrary.com/>

Trials = Cochrane Central Register of Controlled Trials (CENTRAL).

Most comprehensive database for finding randomized controlled trials (RCTs). **Sources: Medline, Embase, ClinicalTrials.gov,** and via "handsearching" in printed journals.

Cochrane Reviews = Cochrane Database of Systematic Reviews

These are also included in Medline.

Access provided by: Universitaetsbibliothek Bern

Review language : English Website language : English Sign In

Title Abstract Keyword

Cochrane Reviews Clinical Answers

Cochrane Reviews 8 **Trials** 2564 0 0 0

Filter your results

Date

The last 3 months 0

The last 6 months 0

The last 9 months 0

The last year 1

The last 2 years 1

Custom Range: to

Status 1

8 Cochrane Reviews matching insulin pump* in Title Abstract Keyword

Did you mean: [plump](#) | [bump](#) | [dump](#)

Cochrane Database of Systematic Reviews
Issue 8 of 12, August 2024

☐ Select all (8)

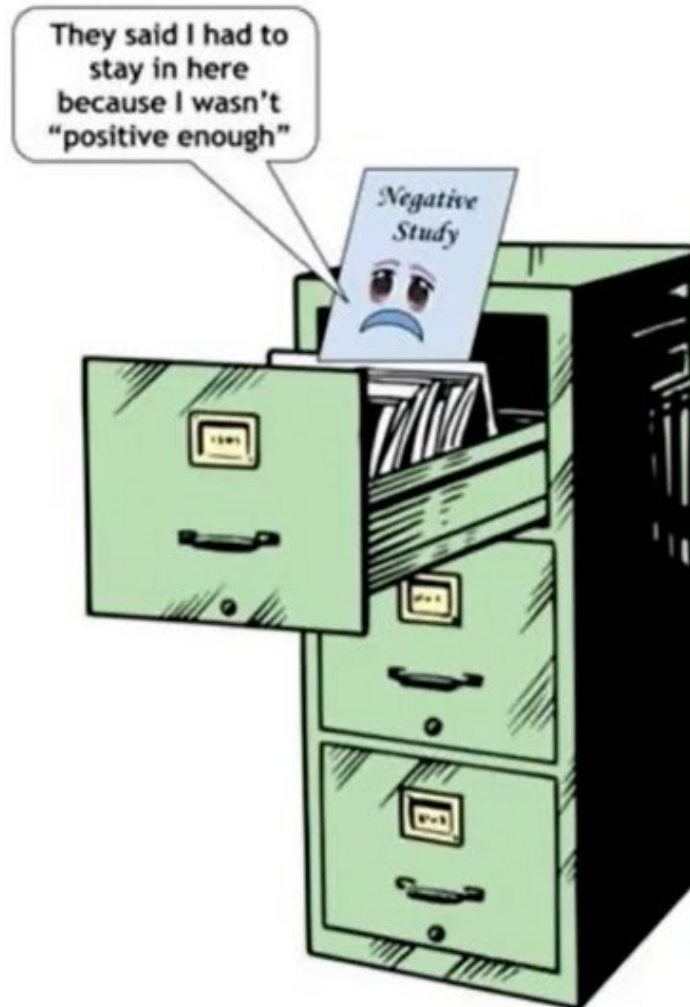
Order by Results per page

1 ☐ **Thermal stability and storage of human insulin**
Bernd Richter, Brenda Bongaerts, Maria-Inti Metzendorf
[Prototype](#) [Review](#) 6 November 2023
[Show PICOs](#) [Show preview](#)

2 ☐ **Continuous subcutaneous insulin infusion versus multiple daily injections of insulin for pregnant women with diabetes**
Diane Farrar, Derek J Tuffnell, Jane West, Helen M West
[Intervention](#) [Review](#) 7 June 2016 [New search](#) [Free access](#)
[Show PICOs](#) [Show preview](#)

Avoid publication bias

[Cochrane Handbook Chapter 4.2.2 Minimizing bias](#)



MECIR Box 4.3.d Relevant expectations for conduct of intervention reviews

C27: Searching trials registers (**Mandatory**)


Search trials registers and repositories of results, where relevant to the topic, through ClinicalTrials.gov, the WHO International Clinical Trials Registry Platform (ICTRP) portal and other sources as appropriate.

Searches for studies should be as extensive as possible in order to reduce the risk of publication bias and to identify as much relevant evidence as possible. Although ClinicalTrials.gov is included as one of the registers within the WHO ICTRP portal, it is recommended that both ClinicalTrials.gov and the ICTRP portal are searched separately due to additional features in ClinicalTrials.gov.

Lefebvre C, Glanville J, Briscoe S, Featherstone R, Littlewood A, Metzendorf M-I, Noel-Storr A, Paynter R, Rader T, Thomas J, Wieland LS. **Chapter 4: Searching for and selecting studies** [last updated March 2025]. In: Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). **Cochrane Handbook for Systematic Reviews of Interventions** version 6.5.1 Cochrane, 2025.

Available from <https://www.cochrane.org/authors/handbooks-and-manuals/handbook/current>

Other sources: Study Registries

**National Library of Medicine**
National Center for Biotechnology Information

PRS Login

ClinicalTrials.gov

About This Site


Find Studies

Data About Studies

Study Basics

PRS Info

ClinicalTrials.gov is a place to learn about clinical studies from around the world.



The U.S. government does not review or approve the safety and science of all studies listed on this website.

Read our full [disclaimer](#) for details.

Focus Your Search (all filters optional)

Condition or disease ⓘ

Other terms ⓘ

[Home](#) [Advanced Search](#) [List By](#) ▶ [Search Tips](#) [UTN](#) ▶ [ICTRP website](#) ▶ [REGTRAC](#) [Contact us](#)

[Search tips](#)

☐ Restrict to COVID-19
☐ Search for [clinical trials in children](#)
☐ Without Synonyms

Phases are

All

Phase 0

Phase 1

Phase 2

Phase 3

☐ With results only
☐ Rare diseases / orphan drugs
☐ Genome editing

**World Health Organization****International Clinical Trials Registry Platform Search Portal**<https://clinicaltrials.gov/><https://trialsearch.who.int/>

Other sources: Grey literature

Grey Matters

Canadian Agency for Drugs and Technologies
in Health (CADTH):

[Grey Matters](#)

Definitionen / Ressourcen & praktische
Anleitungen zum Thema [Grey Literature](#)
(LibGuide Kings College UK)



Search for **Swiss** Grey Literature via
Google and Google Scholar.



More sources

Preprint Server (increased popularity since COVID-19)

A preprint is the version of a scientific paper that often appears before the official publication.

Attention: Mostly this version is not (yet) peer-reviewed and possibly not yet submitted to a journal or accepted for publication.

- Preprint Archives: [medRxiv](#), [bioRxiv](#), [OSF Preprints](#), etc.
- Open access publishing platforms e.g. [F1000](#) Research

Other sources to search

Google Scholar

Google Scholar combines the ease of Google with access to scholarly materials. Google Scholar searches the Web for scholarly articles, abstracts and books, but not popular magazine, newspaper or Internet articles.

Google Scholar	PubMed (Medline)
+ Algorithm ranks relevance for you	+ More relevant results, sorted by relevance or date
- Textword search	+ Textword and subject heading search
+/- All kind of sources	+ Quality management
- Search results NOT reproducible	+ Search reproducible
+ Searches through fulltext	+/- Searches the record fields (ti, ab, sh)
- Very limited filters	+ Filters for a variety of criteria (age, dates,...)
+ Easy to use	- Needs basic training



Google Scholar is a great place to begin your search but **should not be the only place you search**. Think of it as a resource you can **use in addition** to the medical databases.

Mandatory database combinations to be searched for SR

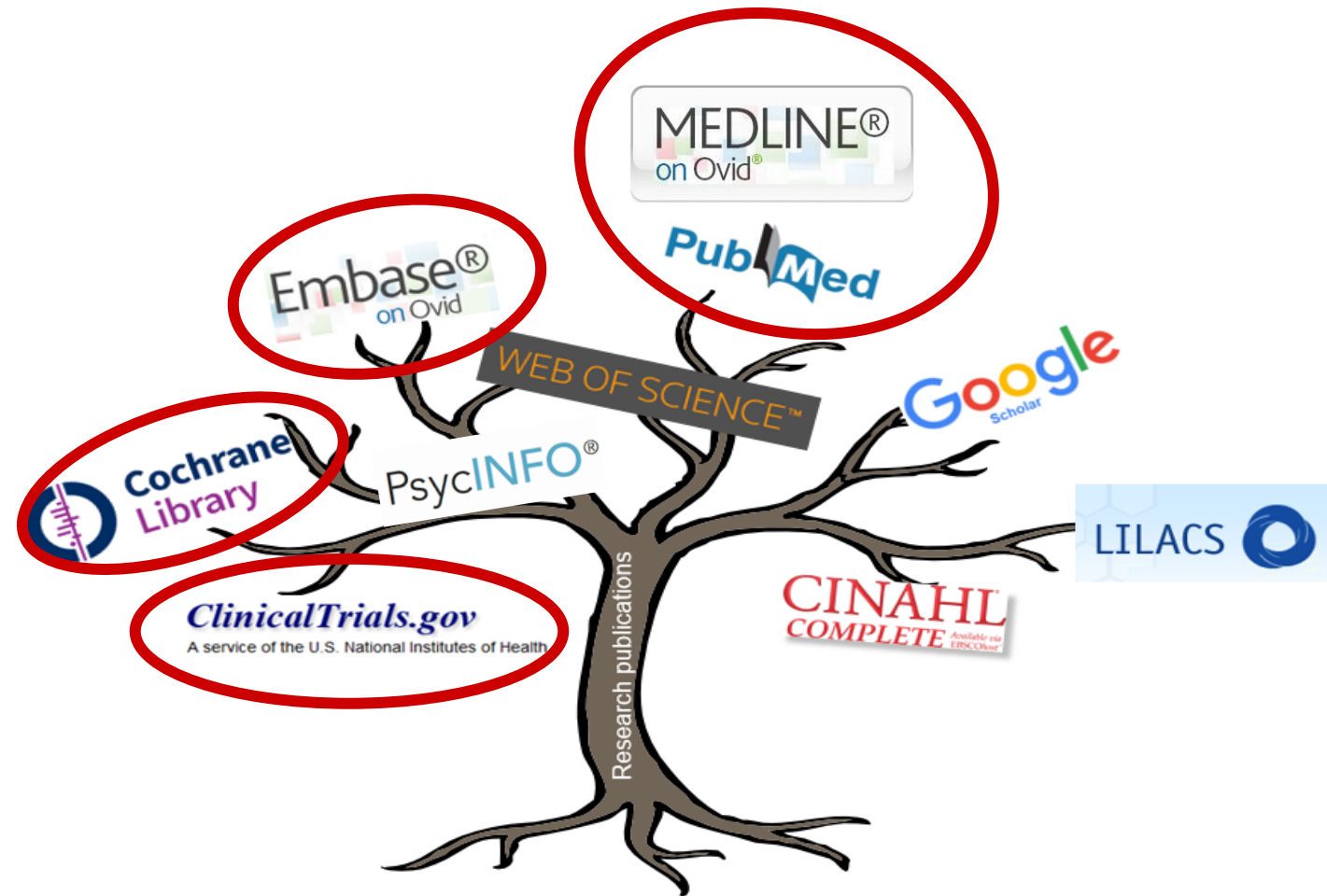
Medline (via PubMed, Ovid, etc.) &
Embase (via Elsevier or Ovid)

If Embase is not accessible:

Medline & Cochrane Library: CENTRAL
(Cochrane Central Register of Controlled Trials)

Additionally: **trials registries**, regional (e.g. **LILACS**) & subject-specific databases (e.g. **CINAHL**, **PsycInfo**), interdisciplinary DB (**WoS**), **Google Scholar**.

At the end: check **references of included studies**



Developing a focused research question

Divide your question into concepts / blocks

03
Block Building /
PICO

P	I	C	O
Population Patient Problem	Intervention Or Exposure	Comparison	Outcome
Who are the patients? What is the problem?	What do we do to them? What are they exposed to?	What do we compare the intervention with?	What happens? What is the outcome?

The formulation of a clear research question is indispensable for a successful systematic review. If it is formulated too narrowly, there may not be enough studies for an evaluation; if it is too broad, there may be a lack of meaningful results.

Auxiliary schemes, e.g. PICO

Splitting of the question into key components / blocks / concepts

Auxiliary Frameworks

How does a question become searchable?

Other auxiliary schemes / frameworks:

- [SPIDER](#) for qualitative evidence syntheses
- [SPICE](#) - for evidence-based practice
Environment (S) = Setting
Population (P) = Perspective or Population
Intervention (I)
Comparison (C)
Evaluation (E)
- [ECLIPSE](#) for Health Policy

Source for more schemes and their applications: [RefHunter](#) (German)

SPICE Acronym

(Booth 2006)

S	Setting – Where? In what context?
P	Perspective – For who?
I	Intervention – What?
C	Comparison – What else?
E	Evaluation – How well? What result?

The Block Building Approach for public health questions



Example:

«Urban Governance, Multisectoral Action, and Civic Engagement for Population Health, Wellbeing, and Equity in Urban Settings: A Systematic Review»

Approach: We use the block building approach and divide the question into its main concepts (together with the researcher).

Search strategy (concepts / block building approach)

Concept 1:	Subject Heading (MeSH) OR Textwords [Title/Abstract]	Urban setting, metropolitan areas
AND		
Concept 2:	Subject Heading (MeSH) OR Textwords [Title/Abstract]	Urban governance, Health governance, Civic engagement
AND		
Concept 3:	Subject Heading (MeSH) OR Textwords [Title/Abstract]	Health, Wellbeing, Equity

Block building (concepts) always works!

Medline (Ovid)

Concepts 1-4 were combined using 'AND', limits 5) were combined using 'NOT'

1) Cities, urban settings, metropolitan areas
(exp Cities/ or Urban Population/ or (urban setting* OR urban context* OR city OR cities OR metropolitan area* OR superblock* OR town OR towns OR municipal*).ab,ti,kf)
2) Urban governance, Health governance or civic engagement or multisector action
(Health Policy/ or (((urban or health) adj3 govern*) or ((state* or health* or public or built environment*) adj3 polic*) or "health in all polic*" or "healthy public polic*").ab,ti,kf) OR (Social Participation/ or Community Participation/ or Community Networks/ or (((community or public or citizen or civic or resident* or private or social or political) adj3 (particip* OR empower* OR involv* OR collaborat* OR engagement* OR implement* or partnership*)) or (participatory adj2 (approach* or framework*)) or participatory spaces or ((multisector* or multi-sector* or intersector* or inter-sector*) adj3 (action* or collaborat*)) or social citizenship or stakeholder*).ab,ti,kf)
3) Health, Wellbeing, Equity
(Urban Health/ or Health Equity/ or Healthcare Disparities/ or Health Status Disparities/ or "Social Determinants of Health"/ or Health Status Indicators/ or (wellbeing OR well-being OR health equit* OR urban health* OR quality of life OR community health* OR healthy cit* OR "urban HEART" OR health impact assessment* OR SDG11 OR "SDG 11" OR SDG3 OR "SDG 3" OR sustainable development goal* OR population health* OR residents health* OR healthy life OR healthy lives OR liveabil* OR livabil* OR ((city or cities or settlement*) AND (inclusive or safe or resilient or sustainab*))).ab,ti,kf)
4) (validated) theories, models, tools, instruments
(indicator* OR determinant* OR tool OR tools OR instrument* OR factor OR factors OR intervention* OR definition* OR domain* OR model* OR theor* OR framework* OR concept* OR dimension* OR scor* OR index* OR indices OR scal* OR valid* OR value* OR evaluat* OR evidence OR assess* OR measure* OR metric* OR monitor* OR "Urban HEART").ab,ti,kf)
5) Limits: exclusion of animal studies
not (exp animals/ not humans/)

«Urban Governance, Multisectoral Action, and Civic Engagement for Population Health, Wellbeing, and Equity in Urban Settings: A Systematic Review»

Break down the research question into blocks

Exercise example with PICO

"In children with type 1 diabetes, does insulin pump therapy produce normoglycemia and improve the quality of life (in comparison with daily insulin injections)?"

<u>P</u>roblem	Diabetes type I
<u>P</u>opulation	Children / adolescents
<u>I</u>ntervention	Insulin pump
Comparison, if any	(compared to daily insulin injection)
<u>O</u>utcome(s)	produces normoglycemia, improves quality of life

Block Building

How many and which concepts to include in the search

- Not all concepts need to be included in the search strategy
- Always start with the most important and specific concepts (in our example: problem = diabetes, population = children, intervention = insulin pump)



Adding too many concepts to the search will make it too narrow:

- There may not be enough studies to work with in the end.
- Bias may be introduced into the search (e.g. regarding outcomes).
- 'Negative' comparisons are difficult to describe (e.g. no treatment).

Problem

Population

Intervention

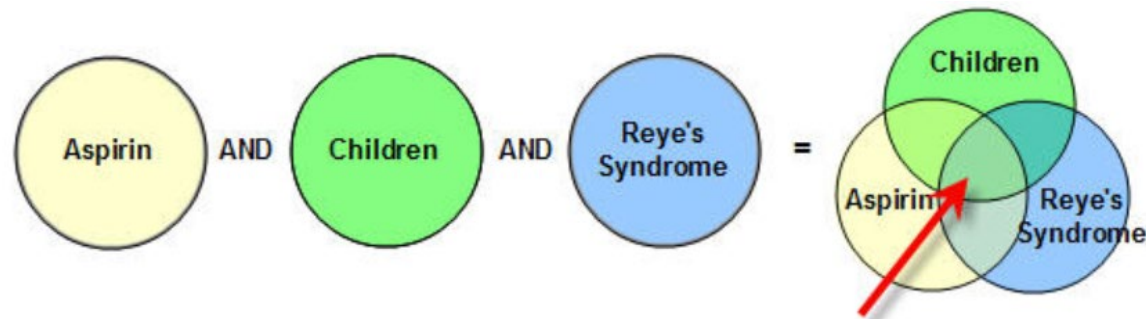
Comparison, if any

Outcome(s)

Combining search terms / concepts

The Boolean Operators

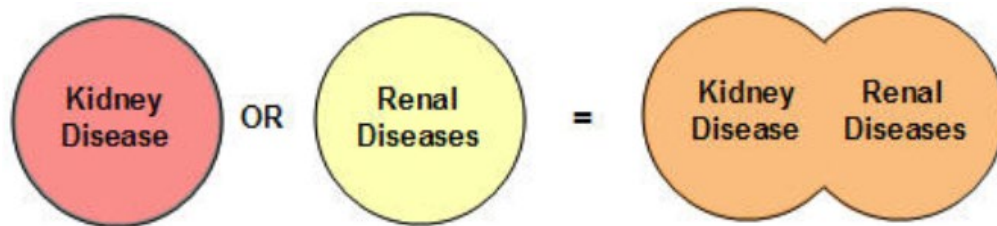
04 Boolean operators



•AND

All terms have to be included in a citation.

= **NARROWING DOWN**



•OR

One of the terms has to appear in the citation.

= **EXPANDING («OR is more!»)**

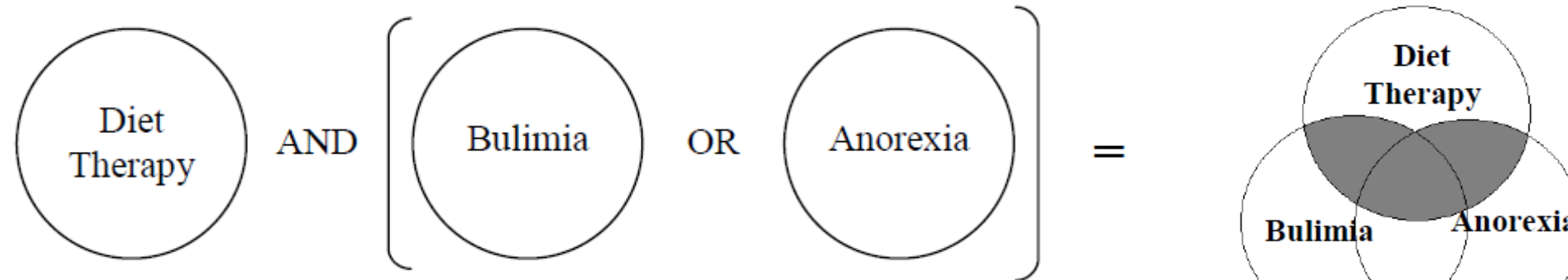


•NOT

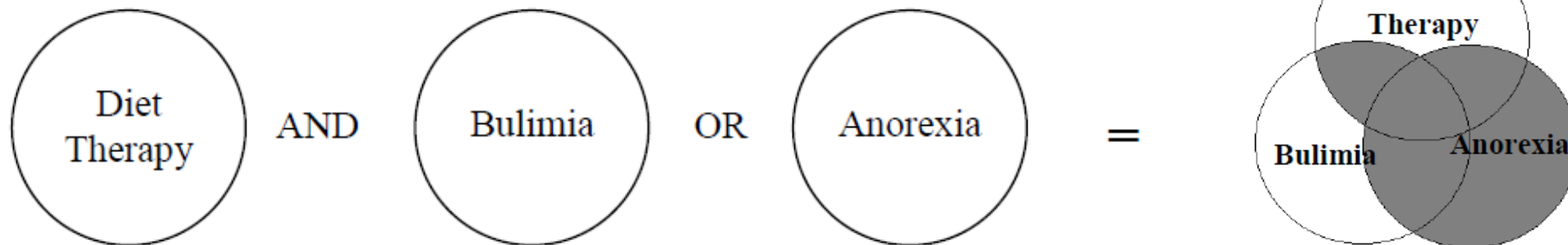
The second term is excluded from the search results. The operator NOT eliminates also results in which both of the terms appear! Therefore: be cautious about using NOT!

The Boolean Operators

Nesting



Terms **inside parentheses** are processed as a unit!



Boolean connectors are processed in a **left to right sequence!**

The Scoping Search

Uncomplicated, intuitive search

05
Scoping Search
Key Papers

- Is there already a recent Systematic Review on my research question?
- Is there a SR in the planning stage (is there a protocol)?
- Approximately how much literature exists on my research question?
- **Goal: overview of existing research on a topic and create a "gold set" of "key papers"**

Source: Gusenbauer M, Haddaway NR. [What every researcher should know about searching](#) - clarified concepts, search advice, and an agenda to improve finding in academia. Res Synth Methods. 2021 Mar;12(2):136-147. doi: 10.1002/jrsm.1457.

Techniques of a Scoping Search to identify the most relevant studies

- The focus is initially on **accuracy**, but is expanded as the iterative search process (learning process) progresses.
- **Techniques:**



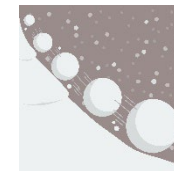
Googling: Brief search; using a few specific terms with the intention of retrieving a few relevant papers (key papers) to work with in the following techniques.



Berry picking: Scanning results of the scoping search to identify key authors, relevant journals, reference lists, cited by (forward citation tracking), and similar articles.



Pearl growing: Using key papers and their database records to harvest search terms for a comprehensive search strategy.



Snowballing: Tracking down related works by using the bibliography or reference list at the end of an article (backward citation tracking).

How to do a scoping search to find top relevant papers (in a nutshell)

1. Enter the most important terms in Google Scholar and / or PubMed.
2. The best results are displayed at the top (Relevance Ranking).
3. Read through the titles/abstracts and export the appropriate ones. They serve as your key papers.



Scoping Search in PubMed

National Library of Medicine
National Center for Biotechnology Information

Log in

×

Search

[Advanced](#)
[Create alert](#)
[Create RSS](#)
[User Guide](#)

Save

Email

Send to

Sort by: Best match

Display options

MY CUSTOM FILTERS

1,727 results

Page 1 of 9

RESULTS BY YEAR

PUBLICATION DATE

☐ 1 year

☐ 5 years

☐ **The use of automated **insulin** delivery around physical activity and exercise in **type 1 diabetes**: a position statement of the European Association for the Study of Diabetes (EASD) and the International Society for Pediatric and Adolescent Diabetes (ISPAD).**
Moser O, Zaharieva DP, Adolfsson P, Battelino T, Bracken RM, Buckingham BA, Danne T, Davis EA, Dovč K, Forlenza GP, Gillard P, Hofer SE, Hovorka R, Jacobs PG, Mader JK, Mathieu C, Nørgaard K, Oliver NS, O'Neal DN, Pemberton J, Rabasa-Lhoret R, Sherr JL, Sourij H, Tauschmann M, Yardley JE, Riddell MC. *Diabetologia*. 2025 Feb;68(2):255-280. doi: 10.1007/s00125-024-06308-z.
PMID: 39653802 **Free PMC article.** [Review.](#)
Regular physical activity and exercise (PA) are cornerstones of diabetes care for individuals with **type 1 diabetes**. In recent years, the availability of automated **insulin** delivery (AID) systems has improved the ability of people with **type 1** ...

Article type filters: SR / Meta-Analysis

PubMed®

insulin pump AND (children OR adolescents) AND type 1 diabetes

Search

Advanced Create alert Create RSS User Guide

Save Email Send to Sort by: Most recent Display options

MY CUSTOM FILTERS 41 results Page 1 of 1

ARTICLE TYPE

- ☐ Books and Documents
- ☐ Clinical Trial
- ☒ Meta-Analysis
- ☐ Randomized Controlled Trial
- ☐ Review
- ☒ Systematic Review

[See all article type filters](#)

order to guide pediatricians regarding indications and complications. ...The keywords were: **insulin pump, type 1 diabetes** ...

☐ **Systematic literature review: quality of life associated with insulin pump use in Type 1 diabetes.**

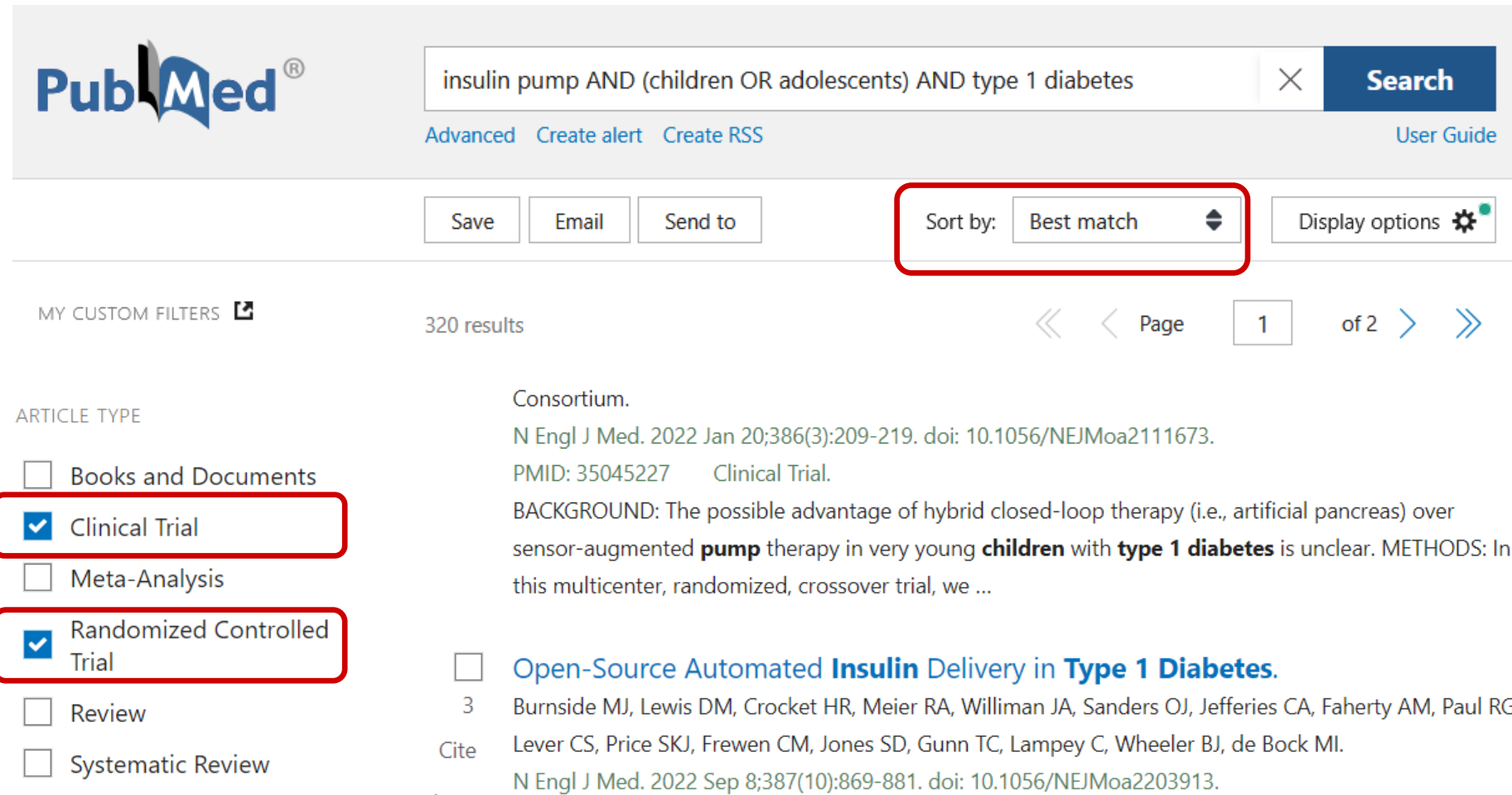
4 Cite Barnard KD, Lloyd CE, Skinner TC. Diabet Med. 2007 Jun;24(6):607-17. doi: 10.1111/j.1464-5491.2007.02120.x. Epub 2007 Mar 15. PMID: 17367304

AIM: To review systematically the published literature addressing whether continuous subcutaneous **insulin** infusion (CSII) provides any quality of life benefits to people with **Type 1 diabetes**. ...CONCLUSIONS: There is conflicting evidence reported in th ...

Sort by (Option):
Wechseln Sie auf
Most recent

Article Type:
Filtern Sie nach
Systematic Review
und Meta-
Analysen

Article type filters: RCT / Clinical Trial



PubMed®

insulin pump AND (children OR adolescents) AND type 1 diabetes

Advanced Create alert Create RSS User Guide

Save Email Send to Sort by: Best match Display options

MY CUSTOM FILTERS 320 results

ARTICLE TYPE

- ☐ Books and Documents
- ☒ Clinical Trial
- ☐ Meta-Analysis
- ☒ Randomized Controlled Trial
- ☐ Review
- ☐ Systematic Review

Consortium.
N Engl J Med. 2022 Jan 20;386(3):209-219. doi: 10.1056/NEJMoa2111673.
PMID: 35045227 Clinical Trial.
BACKGROUND: The possible advantage of hybrid closed-loop therapy (i.e., artificial pancreas) over sensor-augmented **pump** therapy in very young **children** with **type 1 diabetes** is unclear. METHODS: In this multicenter, randomized, crossover trial, we ...

☐ Open-Source Automated **Insulin** Delivery in **Type 1 Diabetes**.
3 Burnside MJ, Lewis DM, Crockett HR, Meier RA, Williman JA, Sanders OJ, Jefferies CA, Faherty AM, Paul RG, Lever CS, Price SKJ, Frewen CM, Jones SD, Gunn TC, Lampey C, Wheeler BJ, de Bock MI.
Cite N Engl J Med. 2022 Sep 8;387(10):869-881. doi: 10.1056/NEJMoa2203913.

Sort by (Option):
Wechseln Sie auf Best match

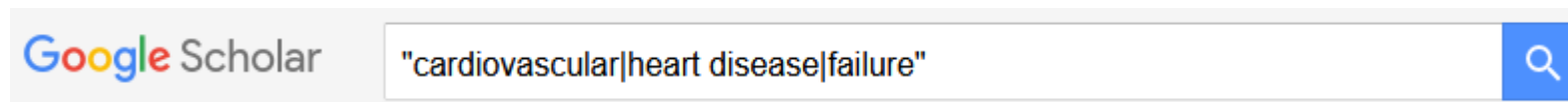
Article Type:
Filtern Sie nach Clinical Trial sowie RCT

Scoping Search: Google Scholar Search Tips

- Use **quotation marks** to keep phrases together: "type 1 diabetes"
- Search terms are automatically combined with **AND**
- Replace **OR** with **|** (pipe sign: Alt Gr + 7 in Windows, alt + 7 in Mac), no spaces!

Advanced technique:

To search phrase variations → use **quotation marks** before and after an **|** combination:



"cardiovascular|heart disease|failure" *finds*: cardiovascular disease, heart disease, heart failure

Scoping search in Google Scholar

Google Scholar "insulin pump"|"insulin delivery" "type 1 diabetes" children|adolescents  SIGN IN

Articles About 17'100 results (0.16 sec)  My profile  My library

Any time

Since 2025

Since 2024

Since 2021

Custom range...

Sort by relevance

Sort by date

Any type

Review articles

☐ include patents

☒ include citations

 Create alert

Safety and effectiveness of insulin pump therapy in children and adolescents with type 1 diabetes [PDF] viamedica.pl
Uni Bern Fulltext

LP Plotnick, LM Clark, FL Brancati... - Clinical ..., 2003 - journals.viamedica.pl

... veness of **insulin pump** therapy in **children** and adolescents with **type 1 diabetes**. MATERIAL

... therapy is safe and effective in selected **children** and **adolescents** with **type 1 diabetes**. ...

☆ Save  Cite **Cited by 374** Related articles All 14 versions Web of Science: 157 

[HTML] Use of **insulin pump** therapy in **children** and **adolescents** with **type 1 diabetes** and its impact on metabolic control: comparison of results from three large ... [HTML] springer.com
Uni Bern Fulltext

JL Sherr, JM Hermann, F Campbell, NC Foster... - Diabetologia, 2016 - Springer

... **insulin pump** ... **children** with **type 1 diabetes**. As science and technology move closer to a mechanical solution to the problems of managing **children** and **adolescents** with **type 1 diabetes**, ...

☆ Save  Cite Cited by 271 Related articles All 11 versions Web of Science: 182

Exercise with and without an insulin pump among children and adolescents with type 1 diabetes mellitus [PDF] aap.org
Uni Bern Fulltext

G Admon, Y Weinstein, B Falk, N Weintrob... - ..., 2005 - publications.aap.org

... a popular technique for **insulin delivery** among patients with **type 1 diabetes** mellitus (T1DM)... and risk of hypoglycemia among **children** and **adolescents** with T1DM when exercising with ...

☆ Save  Cite Cited by 149 Related articles All 7 versions Web of Science: 63 

Search for **more recent** documents

Look at **Cited by** to see closely related work (forward citation tracking)

Create an alert to get notified of new publications

Google Scholar Practical exercise

Perform a scoping search in Google Scholar (<https://scholar.google.com/>):

Choose your own topic or answer the following question:

Insulin pump therapy in type 2 diabetes: are there Systematic Reviews and/or randomized controlled trials (RCTs)?



A possible solution

Research question:

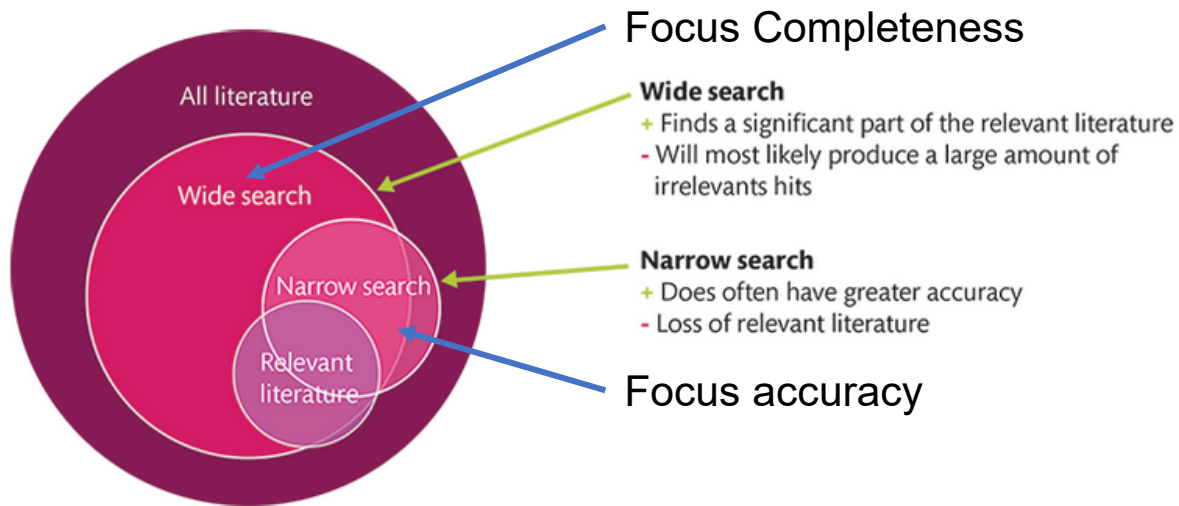
Insulin pump therapy in type 2 diabetes: are there Systematic Reviews and/or randomized controlled trials (RCTs)?

Suggested solution:

"insulin pump|infusion" "type 2 diabetes" | NIDDM "systematic review" | RCT | randomised | randomized

Defining the aim of the literature search

Getting an overview or going into depth?



Modified figure from the SBU handbook, p. 34

Accuracy vs. completeness

- Get an *overview* of a complex of topics by entering *precise search terms* in a *search engine* (e.g. Google Scholar) = **scoping search**. Goal: *find some top relevant papers*
- *In-depth* examination of a topic by means of **systematic research** in *specialist databases*. Aim: to find *ALL relevant papers*

Scoping Search & Systematic Search

Scoping Search / Initial Search (Google Scholar):

- Focus on **accuracy (Precision*)** = no claim to completeness
- For the overview / identifying key papers
- Complex search structure only possible to a limited extent



Systematic research (specialized databases):

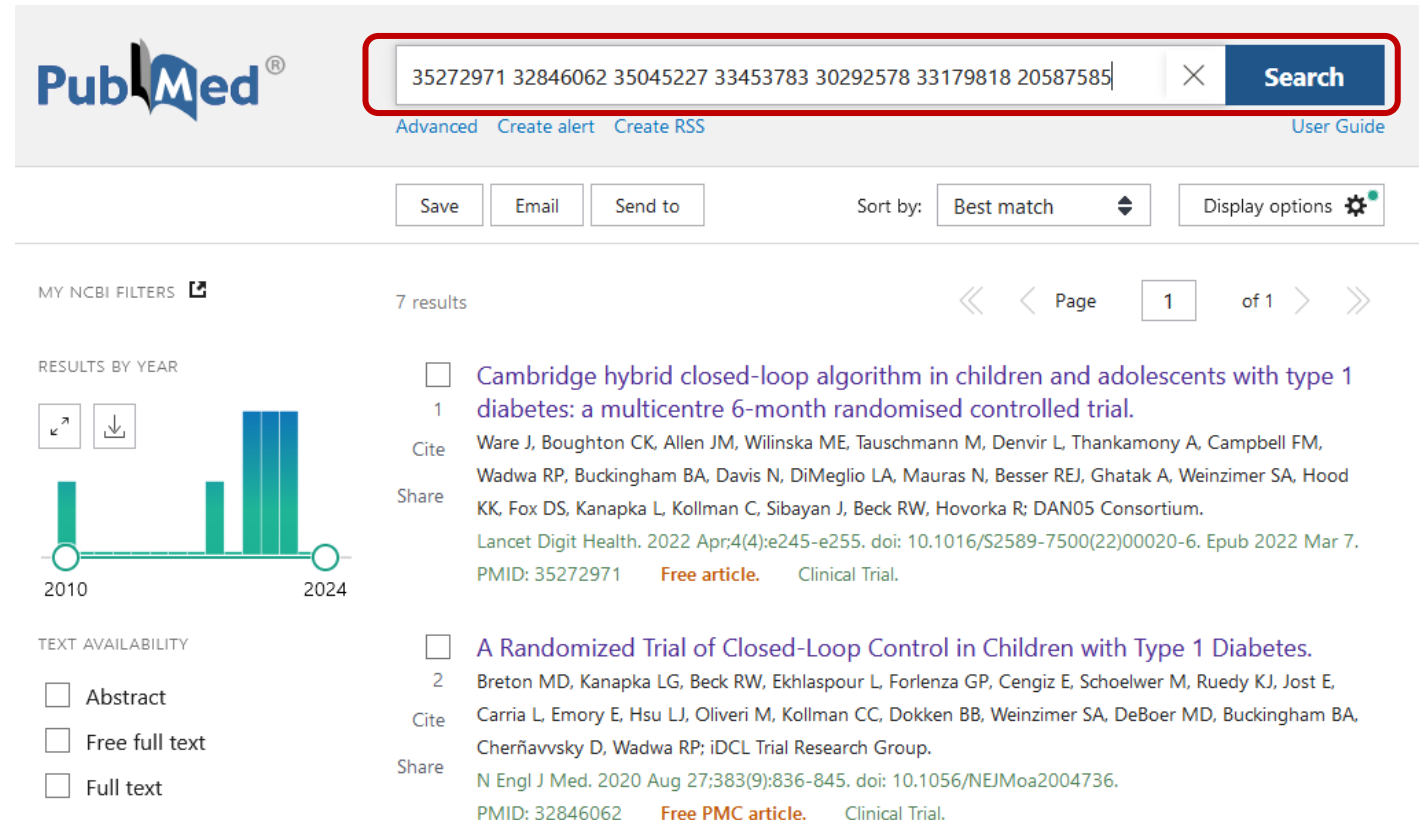
- Focus on **completeness (recall*/sensitivity)** =
Find as much evidence as possible
(systematic reviews / guidelines)
- Complex search / Reproducible



How to use key papers for building a systematic search strategy

Harvest search terms from key papers (title, abstracts, author keywords, MeSH)

Example:
PubMed IDs (PMIDs) of key papers:
35272971 32846062 35045227
33453783 30292578 33179818
20587585



PubMed®

35272971 32846062 35045227 33453783 30292578 33179818 20587585

Advanced Create alert Create RSS User Guide

Save Email Send to Sort by: Best match Display options

MY NCBI FILTERS

7 results

RESULTS BY YEAR

2010 2024

TEXT AVAILABILITY

☐ Abstract
☐ Free full text
☐ Full text

☐ Cambridge hybrid closed-loop algorithm in children and adolescents with type 1 diabetes: a multicentre 6-month randomised controlled trial.

1
Cite
Share
Ware J, Boughton CK, Allen JM, Wilinska ME, Tauschmann M, Denvir L, Thankamony A, Campbell FM, Wadwa RP, Buckingham BA, Davis N, DiMeglio LA, Mauras N, Besser REJ, Ghatak A, Weinzimer SA, Hood KK, Fox DS, Kanapka L, Kollman C, Sibayan J, Beck RW, Hovorka R; DAN05 Consortium. Lancet Digit Health. 2022 Apr;4(4):e245-e255. doi: 10.1016/S2589-7500(22)00020-6. Epub 2022 Mar 7. PMID: 35272971 Free article. Clinical Trial.

☐ A Randomized Trial of Closed-Loop Control in Children with Type 1 Diabetes.

2
Cite
Share
Breton MD, Kanapka LG, Beck RW, Ekhlaspour L, Forlenza GP, Cengiz E, Schoelwer M, Ruedy KJ, Jost E, Carria L, Emory E, Hsu LJ, Oliveri M, Kollman CC, Dokken BB, Weinzimer SA, DeBoer MD, Buckingham BA, Cherňavsky D, Wadwa RP; iDCL Trial Research Group. N Engl J Med. 2020 Aug 27;383(9):836-845. doi: 10.1056/NEJMoa2004736. PMID: 32846062 Free PMC article. Clinical Trial.

Identify search terms through text mining

Analyze your key papers
(entering the PubMed IDs)
in [PubMed PubReMiner](#)

- Get ideas of search terms to include from the **Word and MeSH columns** (listed from most often used to lesser use)
- Note popular journals, most publishing authors and the development of your research topic throughout the years
- Other textmining tools:
[Termine](#) Upload a pdf or URL
[MeSH on Demand](#)

PubMed PubReMiner

Your query resulted in 7 references

[Goto PubMed with query](#) [Create CV output](#)

Manual adjustment: 35272971 32846062 35045227 33453783 30292578 33179818 20587585

AbstractLimit: 1000 [Search with Manual Adjustment](#)

Click on a hyperlink to add that element to your query and Re-Mine or select terms (OR boxes) and press 'Search Again'
Click on the P to directly goto PubMed and view ALL references for that element
[Save the results as a txt-file](#)

Operator: AND Merge similar words: YES Minimalcount: 2 Force update: false [Search Again](#)

# OR Year	# OR Journal	# OR Author	# Count OR Word(ti_ab)	# OR Mesh	# OR Substances	# OR publication type	# OR Country
2 <input type="checkbox"/> 2022	3 <input type="checkbox"/> N Engl J Med	4 <input type="checkbox"/> BECK RW	7 36 - DIABETE *	7 - /administration & dosage	6 <input type="checkbox"/> Insulin	6 <input type="checkbox"/> JOURNAL ARTICLE	4 <input type="checkbox"/> UNITED STATES
2 <input type="checkbox"/> 2021	2 <input type="checkbox"/> Lancet	4 <input type="checkbox"/> SIRAYAN J	7 29 - GLUCOSE	7 - /analysis	6 <input type="checkbox"/> Glycated Hemoglobin A	6 <input type="checkbox"/> MULTICENTER STUDY	2 <input type="checkbox"/> UNITED KINGDOM
1 <input type="checkbox"/> 2020	1 <input type="checkbox"/> Lancet Digit Health	3 <input type="checkbox"/> ALLEN JM	7 23 - INSULIN	6 <input type="checkbox"/> Diabetes Mellitus_Type 1	4 <input type="checkbox"/> Hypoglycemic Agents	6 <input type="checkbox"/> RANDOMIZED CONTROLLED TRIAL	1 <input type="checkbox"/> CANADA
1 <input type="checkbox"/> 2018	1 <input type="checkbox"/> Pediatr Diabetes	3 <input type="checkbox"/> BERGENSTAL RM	7 25 - MEAN	6 <input type="checkbox"/> Female	3 <input type="checkbox"/> Blood Glucose	6 <input type="checkbox"/> RESEARCH SUPPORT NON-U.S. GOVT	1 <input type="checkbox"/> GERMANY
1 <input type="checkbox"/> 2010		3 <input type="checkbox"/> HOVORKA R	7 31 - PUMP *	6 <input type="checkbox"/> Humans		3 <input type="checkbox"/> COMPARATIVE STUDY	1 <input type="checkbox"/> ISRAEL
		3 <input type="checkbox"/> KOLLMAN C	7 23 - RANDOMISE *	6 <input type="checkbox"/> Insulin Infusion Systems		3 <input type="checkbox"/> RESEARCH SUPPORT N.I.H. EXTRAMURAL	1 <input type="checkbox"/> SLOVENIA
		3 <input type="checkbox"/> TAUSCHMANN M	7 19 - TRIAL	6 <input type="checkbox"/> Insulin			
		3 <input type="checkbox"/> WEINZIMER SA	7 30 - TYPE	6 <input type="checkbox"/> Male			
		3 <input type="checkbox"/> WILINSKA ME	7 18 - YEAR *	6 <input type="checkbox"/> /drug therapy			
		2 <input type="checkbox"/> BOUGHTON CK	6 6 BACKGROUND	5 <input type="checkbox"/> Child			
		2 <input type="checkbox"/> BUCKINGHAM BA	6 6 CLINICAL TRIAL *	4 <input type="checkbox"/> Adolescent			
		2 <input type="checkbox"/> CAMPBELL FM	6 11 COMPARE *	4 <input type="checkbox"/> Diabetes Mellitus_Type 1/drug therapy			
		2 <input type="checkbox"/> CRIEGO A	6 6 FUND *	4 <input type="checkbox"/> Glycated Hemoglobin A/analysis			
		2 <input type="checkbox"/> HARTNELL S	6 56 GROUP *	4 <input type="checkbox"/> Glycated Hemoglobin A			
		2 <input type="checkbox"/> HOOD KK	6 6 METHOD *	4 <input type="checkbox"/> Hypoglycemic Agents			
		2 <input type="checkbox"/> THAKAMONY A	6 22 SD	4 <input type="checkbox"/> Insulin/administration & dosage			
		2 <input type="checkbox"/> WADIWARP	6 18 SENSOR *	2 - Insulin/administration & dosage/adverse effects			
		2 <input type="checkbox"/> WARE J	6 6 SEVERE	4 <input type="checkbox"/> /adverse effects			
		1 <input type="checkbox"/> ACERINI CL	5 5 AGE *	3 <input type="checkbox"/> Adult			
		1 <input type="checkbox"/> AHMANN A	5 5 ANALYSE *	3 <input type="checkbox"/> Blood Glucose/analysis			
		1 <input type="checkbox"/> ALBANESE-ONEILL	5 11 AUG *	3 <input type="checkbox"/> Blood Glucose			
		1 <input type="checkbox"/> BAILEY RJ	5 10 BASELINE	3 <input type="checkbox"/> Diabetic Ketoacidosis			
			5 23 CHILDREN	3 <input type="checkbox"/> Hypoglycemia			
			5 58 CLOSE *				

Search terms

What are textwords?

Textword searching means using terms you choose yourself to search the "record" of a database. The record does not include the fulltext article. It mainly includes the title, abstract and author provided keywords.

Textwords are often referred to as keywords or freetext terms or natural language terms.

Use textbooks and dictionaries to find additional textwords.

Review > Expert Opin Drug Deliv. 2017 Dec;14(12):1367-1377.
doi: 10.1080/17425247.2017.1360866. Epub 2017 Aug 18.

Words from
the title

Insulin delivery and nocturnal glucose control in children and adolescents with type 1 diabetes

Martin Tauschmann^{1 2}, Roman Hovorka^{1 2}

Affiliations + expand

PMID: 28819992 PMCID: PMC5942151 DOI: 10.1080/17425247.2017.1360866

Free PMC article

06
Text words

Abstract

Nocturnal glucose control remains challenging in children and adolescents with type 1 diabetes due to highly variable overnight insulin requirements. The issue may be addressed by glucose responsive insulin delivery based on real-time continuous glucose measurements. Areas covered: This review outlines recent developments of glucose responsive insulin delivery systems from a paediatric perspective. We cover threshold-based suspend application, predictive low glucose suspend, and dual-hormone closed-loop systems. Application to nocturnal glucose control particularly during outpatient randomised controlled trials. Conclusion: Significant progress translating research from controlled clinical centre settings to free-living unsupervised home studies have been achieved over the past decade. Nocturnal glycaemic control can be improved whilst reducing the risk of hypoglycaemia with closed-loop systems. Following the US regulatory approval of the first hybrid closed-loop system in non-paediatric population, large multinational closed-loop clinical trials and pivotal studies including paediatric populations are underway or in preparation to facilitate the use of closed-loop systems in clinical practice.

Words from
the abstract

Keywords: Threshold-based insulin interruption; artificial pancreas; closed-loop system; continuous glucose monitor; control algorithm; insulin pump; low glucose suspension; type 1 diabetes.

Additional keywords
assigned keywords 49

Text word search

Stumbling blocks

British vs. American English:

- pediatric / paediatric, analyze / analyse

Synonyms / Antonyms:

- doctor / physician / clinician
- success / failure, fertility / infertility

Acronyms:

- total knee arthroplasty = TKA



Truncation

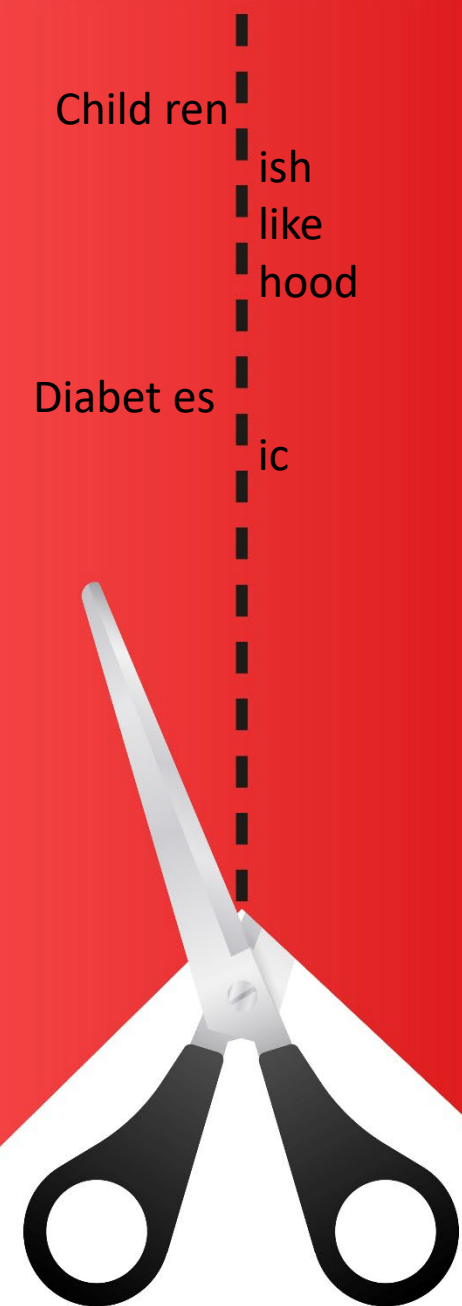
Shorten to the root

The word ending is truncated and replaced by a symbol (*, ?, \$).

Advantage: Many word variants can be searched for at one go, and the number of hits increases.

child* finds
child, children, childish, childlike, childhood, etc.

diabet* finds
diabetes, diabetic



From textwords to subject terms

The benefits of database thesauri

07
Thesaurus terms

Synonyms for diabetes type 1:

- type I diabetes (mellitus)
- insulin-dependent diabetes mellitus
- juvenile-onset diabetes mellitus
- sudden-onset diabetes mellitus
- autoimmune diabetes
- brittle diabetes mellitus
- ketosis-prone diabetes mellitus



Problem

- With a text word search you can never cover 100% of all synonyms and possible spellings. What now?



- **Thesauri of the subject databases:**
MeSH terms in Medline
Emtree terms in Embase

Subject Headings

What are subject headings?

Subject heading searching means using preassigned terms to search for articles labelled with that term. Each database uses its own subject headings - MEDLINE's are called **MeSH**.

Other expressions for subject headings are **thesaurus terms**, **index terms** or **controlled vocabulary**.

Big Plus: subject headings cover a lot of different expressions authors use in their articles to describe the same concept.

MeSH terms

- > Adolescent
- > Algorithms
- > Blood Glucose
- > Child
- > Diabetes Mellitus, Type 1 / drug therapy*
- > Humans
- > Hypoglycemia / chemically induced
- > Hypoglycemic Agents / administration & dosage*
- > Hypoglycemic Agents / therapeutic use
- > Insulin / administration & dosage*
- > Insulin / therapeutic use
- > Insulin Infusion Systems*
- > Translational Medical Research

MeSH terms of the following PubMed record: **Insulin delivery and nocturnal glucose control in children and adolescents with type 1 diabetes.**

Searching with subject headings

Advantages and disadvantages

Advantages of searching with MeSH Terms:

- MeSH describe the content (fulltext not searchable)
- MeSH cover many different synonyms and spellings
- higher precision
(fewer irrelevant hits than with text word search)

Disadvantages:

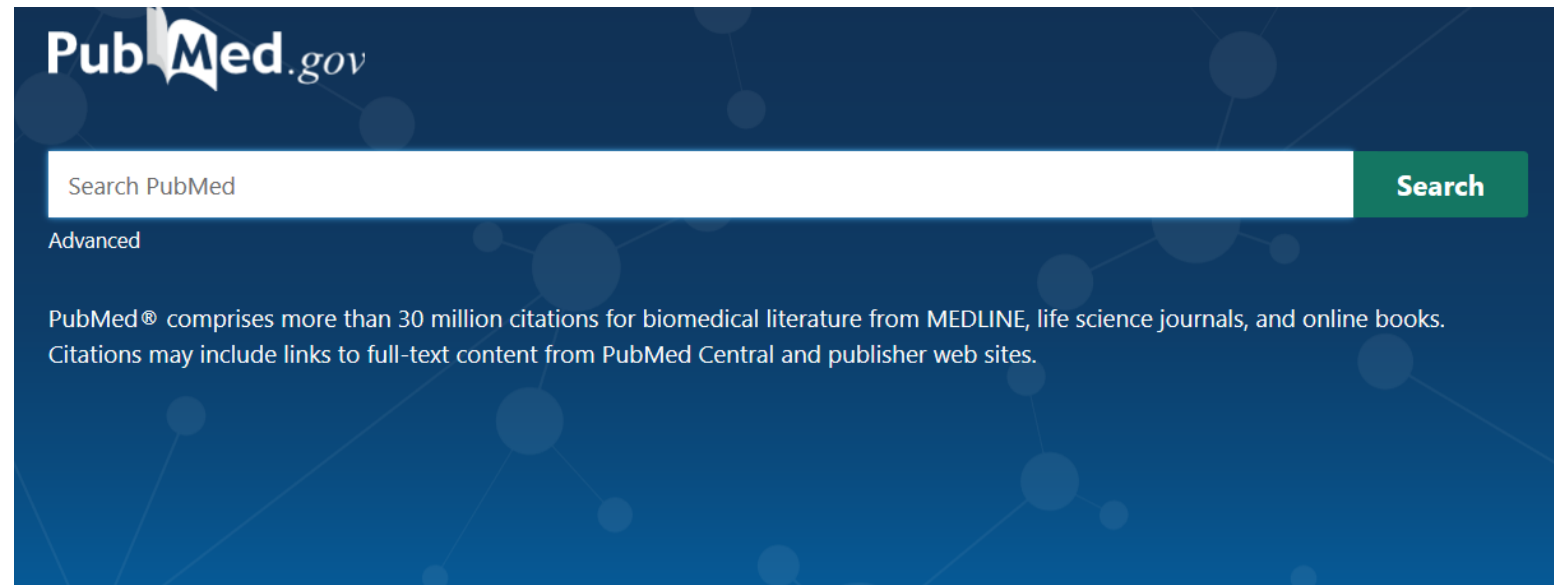
- MeSH Thesaurus = complicated query
- Not every intervention/disease has an appropriate MeSH



Where can I find MeSH Terms?

MeSH Thesaurus in PubMed

Access to the
MeSH
database via
the [PubMed](#)
homepage.



Explore

MeSH Database



Learn

About PubMed



Find

Advanced Search



Download

E-utilities API



Explore

MeSH Database

MeSH terms: Hierarchical structure

Example diabetes type 1

NCBI Resources ☒ How To ☒

MeSH

[Create alert](#) [Limits](#) [Advanced](#)

Full Send to:

Diabetes Mellitus, Type 1

A subtype of DIABETES MELLITUS that is characterized by INSULIN deficiency, the sudden onset of severe HYPERGLYCEMIA, rapid progression to DIABETES and DEATH unless treated with insulin. The disease may occur at any age, but is most common in childhood or adolescence.

Year introduced: 2005 (1984)

MeSH terms are organized in a tree structure (hierarchically from the most general to the most specific area)

All MeSH Categories

Diseases Category

Nutritional and Metabolic Diseases

Metabolic Diseases

Glucose Metabolism Disorders

Diabetes Mellitus

Diabetes Mellitus, Type 1

Wolfram Syndrome

Structure of the search in the Concepts Sheet

Word document as a helpful tool

08
Concepts Sheet

MeSH MeSH Search Limits Advanced Help

Full Send to:

Diabetes Mellitus, Type 1

A subtype of DIABETES MELLITUS that is characterized by INSULIN deficiency. It is manifested by the sudden onset of severe HYPERGLYCEMIA, rapid progression to DIABETIC KETOACIDOSIS, and DEATH unless treated with insulin. The disease may occur at any age, but is most common in childhood or adolescence.

Year introduced: 2005 (1984)

PubMed search builder options
[Subheadings:](#)

PubMed Search Builder

"Diabetes Mellitus, Type 1"[Mesh]

Add to search builder AND Search PubMed

Search strategy (concepts / block building)

Concept 1:	<div>Subject Heading (MeSH)</div> <div>OR</div> <div>Textwords [Title/Abstract]</div>
	AND
Concept 2:	<div>Subject Heading (MeSH)</div> <div>OR</div> <div>Textwords [Title/Abstract]</div>
	AND
	<div>Subject Heading (MeSH)</div> <div>OR</div> <div>Textwords [Title/Abstract]</div>



The Concepts Sheet

Build up your search

For each thematic block:

Search for matching **MeSH** terms in the MeSH database;

Identify as many **textwords** as possible (from title/abstract of relevant studies, reference books, entry terms in the MeSH Thesaurus, etc.), then combine both search approaches with **OR**.

Combine thematic blocks with AND

(concept 1 AND concept 2 AND concept 3) in order to only have records containing all topics in the results list.

<p>Concept 1:</p> <p>Type 1 Diabetes</p>	<p>Subject Heading [MeSH]</p> <p>"Diabetes Mellitus, Type 1"[Mesh]</p> <p>OR</p> <p>Textwords [Title/Abstract]</p> <p>type 1 diabet* OR type I diabet* OR diabetes mellitus type 1 OR diabetes mellitus type I OR T1D OR T1DM OR insulin-dependent diabet* OR juvenile-onset diabet* OR sudden-onset diabet* OR IDDM OR autoimmune diabet* OR brittle diabet* OR ketosis-prone diabet*</p>
AND	
<p>Concept 2:</p> <p>Children/Adolescents (age: up to 18 years)</p> <p><i>Please note: If you create a search for a systematic review, make sure to include even more terms, like: youth*, schoolchild*, girl*, boy* etc.</i></p>	<p>Subject Heading [MeSH]</p> <p>"Adolescent"[Mesh] OR "Child"[Mesh] OR "Infant"[Mesh]</p> <p>OR</p> <p>Textwords [Title/Abstract]</p> <p>child* OR infan* OR adolescen* OR newborn* OR preschool* OR teen* OR pediatric* OR paediatric*</p>
AND	
<p>Concept 3:</p> <p>Insulin pump <i>continuous subcutaneous insulin infusion (CSII)</i></p>	<p>Subject Heading [MeSH]</p> <p>"Insulin Infusion Systems"[Mesh]</p> <p>OR</p> <p>Textwords [Title/Abstract]</p> <p>insulin pump* OR insulin infus* OR CSII</p>

Does AI help? Strategy of ChatGPT-4.0

Give precise instructions!

I need a PubMed search string for the following topic: insulin pump for children or adolescents with type 1 diabetes. I need a combined search with MeSH terms and textwords.

Here's a comprehensive PubMed search string that combines **MeSH terms** and **text words** for your topic:

PubMed Search String:

plaintext

Copy code

```
((("Insulin Infusion Systems"[Mesh] OR "insulin pump"[tiab] OR "insulin pumps"[tiab] OR "continuous
AND
("Diabetes Mellitus, Type 1"[Mesh] OR "type 1 diabetes"[tiab] OR T1D[tiab])
AND
("Child"[Mesh] OR "Adolescent"[Mesh] OR child*[tiab] OR adolescen*[tiab] OR teen*[tiab] OR pediatri
```



✓ Explanation of Terms Used:

• Insulin Pump Terms:

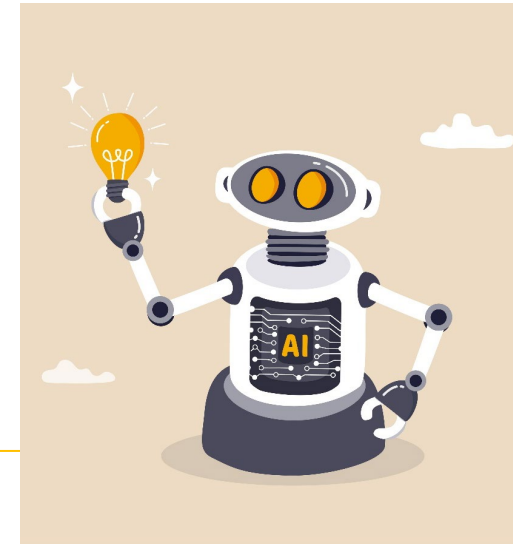
- MeSH: "Insulin Infusion Systems"[Mesh]
- Text words: "insulin pump", "insulin pumps", "continuous subcutaneous insulin infusion", CSII

• Type 1 Diabetes Terms:

- MeSH: "Diabetes Mellitus, Type 1"[Mesh]
- Text words: "type 1 diabetes", T1D

• Population (Children/Adolescents):

- MeSH: "Child"[Mesh], "Adolescent"[Mesh]
- Text words: child*, adolescen*, teen*, pediatric*, paediatric*
(Using wildcards to capture variations like "children", "adolescents", etc.)



Code supplied by ChatGPT

To insert in PubMed (date searched: 9 Oct 2025; 2716 results)

((("Insulin Infusion Systems"[Mesh] OR
"insulin pump"[tiab] OR "insulin
pumps"[tiab] OR "continuous
subcutaneous insulin infusion"[tiab] OR
CSII[tiab]))

AND

("Diabetes Mellitus, Type 1"[Mesh] OR
"type 1 diabetes"[tiab] OR T1D[tiab]))

AND

("Child"[Mesh] OR "Adolescent"[Mesh]
OR child*[tiab] OR adolescen*[tiab] OR
teen*[tiab] OR pediatric*[tiab] OR
paediatric*[tiab]))

NIH National Library of Medicine
National Center for Biotechnology Information

PubMed®

] OR adolescen*[tiab] OR teen*[tiab] OR pediatric*[tiab] OR paediatric*[tiab]))

Search

Advanced Create alert Create RSS User Guide

Save Email Send to Sort by: Best match Display options

2,716 results

MY CUSTOM FILTERS

RESULTS BY YEAR

1979 2025

PUBLICATION DATE

1 year 5 years

1 State of **Type 1 Diabetes** Management and Outcomes from the **T1D** Exchange in 2016-2018.
Cite Foster NC, Beck RW, Miller KM, Clements MA, Rickels MR, DiMeglio LA, Maahs DM, Tamborlane WV, Bergenstal R, Smith E, Olson BA, Garg SK.
Diabetes Technol Ther. 2019 Feb;21(2):66-72. doi: 10.1089/dia.2018.0384. Epub 2019 Jan 18.
PMID: 30657336 Free PMC article.
OBJECTIVE: To provide a snapshot of the profile of adults and youth with **type 1 diabetes (T1D)** in the United States and assessment of longitudinal changes in **T1D** management and clinical outcomes in the **T1D** Exchange registry. ...Mean HbA1c ...

2 Simplified Meal Announcement Versus Precise Carbohydrate Counting in **Adolescents With Type 1 Diabetes** Using the MiniMed 780G Advanced Hybrid60

Human-made PubMed search string

PubMed (search date: 9 Oct 2025; 3289 results)

```
("Diabetes Mellitus, Type 1"[Mesh]) OR (type 1 diabet*[Title/Abstract] OR type I  
diabet*[Title/Abstract] OR diabetes mellitus type 1[Title/Abstract] OR diabetes mellitus  
type I[Title/Abstract] OR T1D[Title/Abstract] OR T1DM[Title/Abstract] OR insulin-  
dependent diabet*[Title/Abstract] OR juvenile-onset diabet*[Title/Abstract] OR sudden-  
onset diabet*[Title/Abstract] OR IDDM[Title/Abstract] OR autoimmune  
diabet*[Title/Abstract] OR brittle diabet*[Title/Abstract] OR ketosis-prone  
diabet*[Title/Abstract])) AND ("Adolescent"[Mesh] OR "Child"[Mesh] OR  
"Infant"[Mesh]) OR (child*[Title/Abstract] OR infan*[Title/Abstract] OR  
adolescen*[Title/Abstract] OR newborn*[Title/Abstract] OR preschool*[Title/Abstract]  
OR pre-school*[Title/Abstract] OR teen*[Title/Abstract] OR pediatric*[Title/Abstract]  
OR paediatric*[Title/Abstract])) AND ("Insulin Infusion Systems"[Mesh]) OR (insulin  
pump*[Title/Abstract] OR insulin infus*[Title/Abstract] OR insulin  
deliver*[Title/Abstract] OR CSII[Title/Abstract]))
```

What are the obvious differences?

- Longer (more MeSH terms, more textwords)
- Inconsistent truncation
- More results

And what's in common?

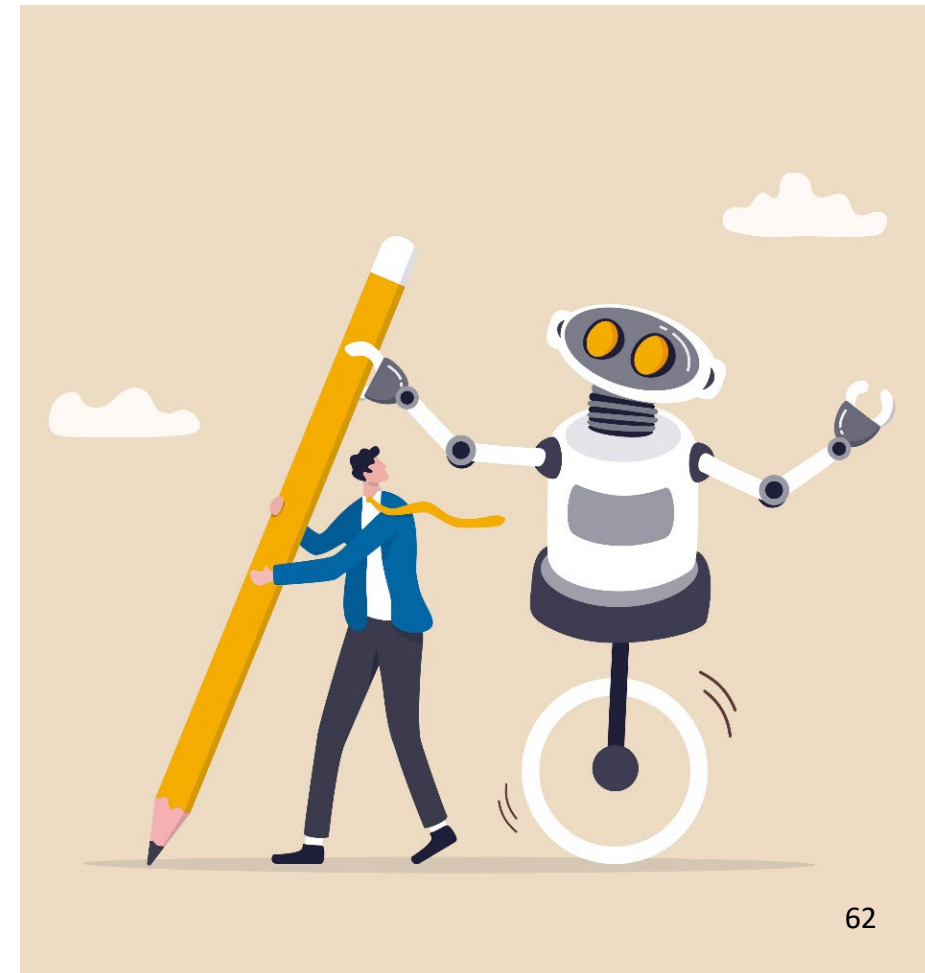
- Block-building
- Combination of MeSH terms and textwords

Use code by ChatGPT as a starting point

```
((("Insulin Infusion Systems"[Mesh] OR "insulin pump"[tiab] OR "insulin pumps"[tiab] OR "continuous subcutaneous insulin infusion"[tiab] OR CSII[tiab]) AND ("Diabetes Mellitus, Type 1"[Mesh] OR "type 1 diabetes"[tiab] OR T1D[tiab]) AND ("Child"[Mesh] OR "Adolescent"[Mesh] OR child*[tiab] OR adolescen*[tiab] OR teen*[tiab] OR pediatric*[tiab] OR paediatric*[tiab]))
```

Important:

- Check if the MeSH terms provided are appropriate and actually exist.
- Check textwords and truncate them if appropriate.
- Add more textwords and more MeSH terms.
- Check for American/British spelling.
- Check the correct application of Boolean Operators.



And if there are too many hits?

Limits / Filters

Filter search results by:

- Dates
- Languages
- Study type (RCTs, etc.)
- Population (age)

Watch out for database filters!

Many **filters** are based solely on MeSH terms.

Consequence: Studies are missed

Exceptions:

systematic reviews, languages & publication dates

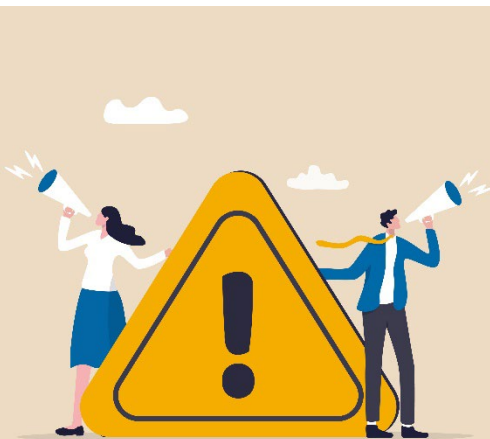
09
Filters / Limits



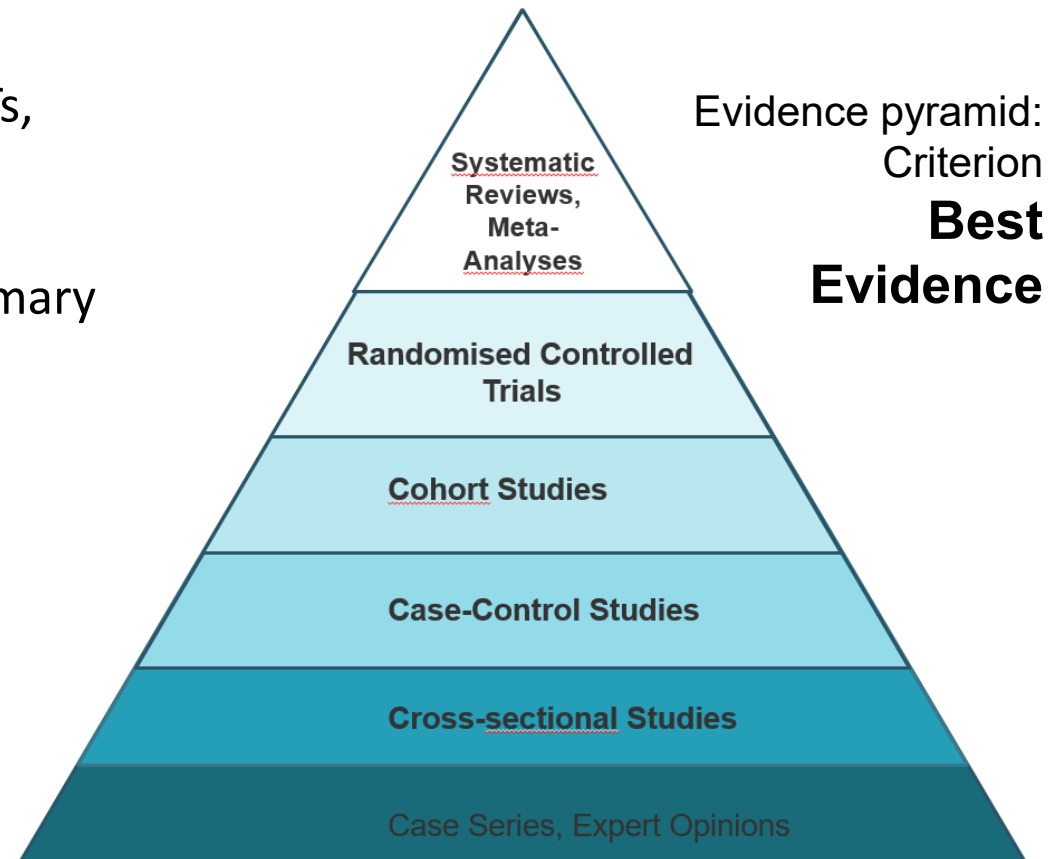
And if there are too many hits?

Filter by Best Evidence

Studies with appropriate methodological quality (RCTs, cohort studies) have higher evidence.
SR & MA are ranked highest, having systematically searched for, assessed, and statistically evaluated primary studies.



**The best
"filter" is the
human being!**



Validated methodological filters

State-of-the-art for SR searches



Cochrane Search Filter for RCTs:

<https://work.cochrane.org/pubmed> (PubMed)

UTHealth (School of Public Health, University of Texas)

https://libguides.sph.uth.tmc.edu/search_filters/pubmed_filters (PubMed)

SIGN (Healthcare Improvement Scotland)

<https://www.sign.ac.uk/what-we-do/methodology/search-filters/>
(Medline, Embase, CINAHL on the Ovid Platform)

ISSG Search Filters Resource (York)

<https://sites.google.com/a/york.ac.uk/issg-search-filters-resource/home>

Validated filters: Cochrane filters for RCTs

<https://work.cochrane.org/pubmed>

The Cochrane highly sensitive search strategies for identifying randomized trials in PubMed

Not all randomised controlled trials have been indexed as RCTs in MEDLINE. There is a validated filter in the Cochrane Handbook for both PubMed and Ovid interfaces¹.

Sensitivity-maximizing version (2008 revision); PubMed format

#1 randomized controlled trial [pt]
 #2 controlled clinical trial [pt]
 #3 randomized [tiab]
 #4 placebo [tiab]
 #5 drug therapy [sh]
 #6 randomly [tiab]
 #7 trial [tiab]
 #8 groups [tiab]
 #9 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8
 #10 animals [mh] NOT humans [mh]
 #11 #9 NOT #10

Direct link to
PubMed!

Direct link to PubMed with **sensitivity-maximizing version** (2008 revision)

Related Resources

The Cochrane highly sensitive search strategies for identifying randomized trials in PubMed

Link to PubMed with sensitivity-maximizing version (2008 revision)

Link to PubMed with sensitivity- and precision-maximizing version (2008 revision)

Cochrane's validated filter searches not only in MeSH (= [mh]), but also within other fields:

[pt] = publication types

[tiab] = titles/abstracts

[sh] = subheadings

Note:

#10 and #11 additionally show how animal studies are excluded in a state-of-the-art search.

Source: Lefebvre C, Glanville J. et al. Chapter 4: Searching for and selecting studies [last updated September 2024]. In: Higgins JPT et al. (editors). Cochrane Handbook for Systematic Reviews of Interventions. Version 6.5. Cochrane, 2024. Available from <https://training.cochrane.org/handbook/>

Why validated methodological filters?

Example

Helmets for preventing head and facial injuries in bicyclists		
Sets 1-3 are the MeSH terms & text words [words found in the TITLE or ABSTRACT of a record] for the population (i.e bicyclists). They are combined using OR	<ol style="list-style-type: none"> 1. bicycl* or cycling or cyclist*.ab,ti 2. exp Bicycling/ 3. 1 or 2 	Population (P)
Sets 4-6 are the MeSH terms & text words [words found in the TITLE or ABSTRACT of a record] for the intervention (i.e helmets). They are combined using OR	<ol style="list-style-type: none"> 4. helmet* .ab,ti 5. exp Head Protective Devices/ 6. 4 or 5 	Intervention (I)

Source: Cochrane Training Guide Appendix 6. Example of the structure of a search strategy for a Cochrane Review

Comparison

Search	Journals	Books	Multimedia	My Workspace	Mo
▼ Search History (8)					
<input type="checkbox"/>	# ▲	Searches			
<input type="checkbox"/>	1	(bicycl* or cycling or cyclist*).ab,ti,kw.			
<input type="checkbox"/>	2	exp Bicycling/			
<input type="checkbox"/>	3	1 or 2			
<input type="checkbox"/>	4	helmet*.ab,ti,kw.			
<input type="checkbox"/>	5	exp Head Protective Devices/			
<input type="checkbox"/>	6	4 or 5			
<input type="checkbox"/>	7	3 and 6			
<input type="checkbox"/>	8	limit 7 to randomized controlled trial			

Database filter
for RCTs



# ▲	Searches	Results
1	(bicycl* or cycling or cyclist*).ab,ti,kw.	75951
2	exp Bicycling/	10450
3	1 or 2	78717
4	helmet*.ab,ti,kw.	4936
5	exp Head Protective Devices/	3290
6	4 or 5	5862
7	3 and 6	1316
8	randomized controlled trial.pt.	498497
9	controlled clinical trial.pt.	99301
10	randomized.ab.	435394
11	placebo.ab.	203373
12	drug therapy.fs.	2120171
13	randomly.ab.	299943
14	trial.ab.	459230
15	groups.ab.	1852118
16	8 or 9 or 10 or 11 or 12 or 13 or 14 or 15	4383015
17	exp animals/ not humans.sh.	4685302
18	16 not 17	379184
19	7 and 18	213

Cochrane RCT
Study design Filter



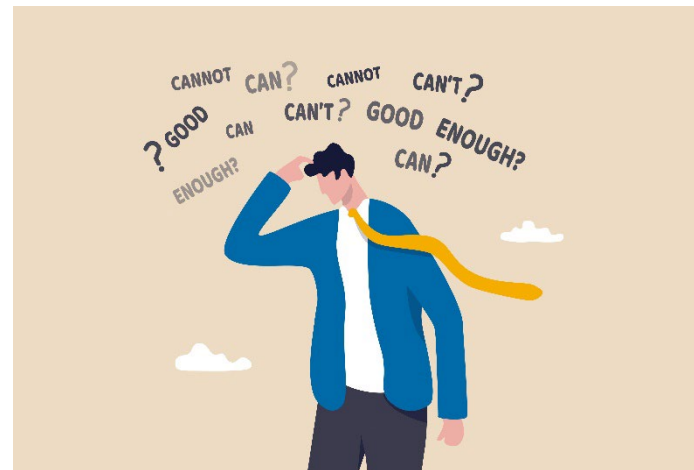
When is a search "good enough"?

Quality assurance with the PRESS Checklist

10
Quality control

A "state-of-the-art" literature search for a SR must meet the PRESS criteria:

Original PRESS Element
Translation of the research question
Boolean and proximity operators
Subject headings
Text word searching (free text)
Spelling, syntax, and line numbers
Limits and filters
Search strategy adaptations



PRESS Checklist: Peer Review of Electronic Search Strategies

TABLE 9: PRESS 2015 EVIDENCE-BASED CHECKLIST

Translation of the research question	<ul style="list-style-type: none"> Does the search strategy match the research question/PICO? Are the search concepts clear? Are there too many or too few PICO elements included? Are the search concepts too narrow or too broad? Does the search retrieve too many or too few records? (Please show number of hits per line.) Are unconventional or complex strategies explained?
Boolean and proximity operators (these vary based on search service)	<ul style="list-style-type: none"> Are Boolean or proximity operators used correctly? Is the use of nesting with brackets appropriate and effective for the search? If NOT is used, is this likely to result in any unintended exclusions? Could precision be improved by using proximity operators (e.g., adjacent, near, within) or phrase-searching instead of AND? Is the width of proximity operators suitable (e.g., might adj5 pick up more variants than adj2)?
Subject headings (database-specific)	<ul style="list-style-type: none"> Are the subject headings relevant? Are any relevant subject headings missing; e.g., previous index terms? Are any subject headings too broad or too narrow? Are subject headings exploded where necessary and vice versa? Are major headings ("starring" or restrict to focus) used? If so, is there adequate justification? Are subheadings missing? Are subheadings attached to subject headings? (Floating subheadings may be preferred.) Are floating subheadings relevant and used appropriately? Are both subject headings and terms in free text (see below) used for each concept?

69

Checking the search strategy

PubMed

((("Diabetes Mellitus, Type 1"[Mesh]) OR (type 1 diabet*[Title/Abstract] OR type I diabet*[Title/Abstract] OR diabetes mellitus type 1[Title/Abstract] OR diabetes mellitus type I[Title/Abstract] OR T1D[Title/Abstract] OR T1DM[Title/Abstract] OR insulin-dependent diabet*[Title/Abstract] OR juvenile-onset diabet*[Title/Abstract] OR sudden-onset diabet*[Title/Abstract] OR IDDM[Title/Abstract] OR autoimmune diabet*[Title/Abstract] OR brittle diabet*[Title/Abstract] OR ketosis-prone diabet*[Title/Abstract])) AND ((("Adolescent"[Mesh] OR "Child"[Mesh] OR "Infant"[Mesh]) OR (child*[Title/Abstract] OR infan*[Title/Abstract] OR adolescen*[Title/Abstract] OR newborn*[Title/Abstract] OR preschool*[Title/Abstract] OR pre-school*[Title/Abstract] OR teen*[Title/Abstract] OR pediatric*[Title/Abstract] OR paediatric*[Title/Abstract])) AND ("Insulin Infusion Systems"[Mesh]) OR (insulin pump*[Title/Abstract] OR insulin infus*[Title/Abstract] OR insulin deliver*[Title/Abstract] OR CSII[Title/Abstract])) AND ((randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tiab] OR clinical trials as topic[mesh:noexp] OR randomly[tiab] OR trial[ti] NOT (animals[mh] NOT humans [mh]))))

Disease

AND

Population

AND

Therapy

AND

Study type

NOT

Animal studies

Quality control: Key papers as test set

Have all key papers been identified?

History and Search Details					Download	Delete
Search	Actions	Details	Query	Results	Time	
#10	...	>	Search: #8 AND #9	1	13:41:21	
#9	...	>	Search: Ware J 2022 209	1	13:41:05	
#8	...	>	Search: (((("Diabetes Mellitus, Type 1"[Mesh]) OR (type 1 diabet*[Title/Abstract] OR type I diabet*[Title/Abstract] OR diabetes mellitus type 1[Title/Abstract] OR diabetes mellitus type I[Title/Abstract] OR T1D[Title/Abstract] OR T1DM[Title/Abstract] OR insulin-dependent diabet*[Title/Abstract] OR juvenile-onset diabet*[Title/Abstract] OR sudden-onset diabet*[Title/Abstract] OR IDDM[Title/Abstract] OR autoimmune diabet*[Title/Abstract] OR brittle diabet*[Title/Abstract] OR ketosis-prone diabet*[Title/Abstract])) AND ((("Adolescent"[Mesh] OR "Child"[Mesh] OR "Infant"[Mesh]) OR (child*[Title/Abstract] OR infan*[Title/Abstract] OR adolescen*[Title/Abstract] OR newborn*[Title/Abstract] OR preschool*[Title/Abstract] OR pre-school*[Title/Abstract] OR teen*[Title/Abstract] OR pediatric*[Title/Abstract] OR paediatric*[Title/Abstract])) AND ((("Insulin Infusion Systems"[Mesh]) OR (insulin pump*[Title/Abstract] OR insulin infus*[Title/Abstract] OR insulin deliver*[Title/Abstract] OR CSII[Title/Abstract])) AND ((randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tiab] OR clinical trials as topic[mesh:noexp] OR randomly[tiab] OR trial[ti] NOT (animals[mh] NOT humans [mh])))))	574	13:40:09	

#10: If the **intersection of the hits from the search strategy and the key paper** results in **1**, the key paper was found with the search strategy.

If 0, then find out why and **optimize search strategy**.

#9: Key Paper to Review

Ware, Julia et al. "Randomized Trial of Closed-Loop Control in Very Young Children with Type 1 Diabetes." *The New England journal of medicine* vol. 386.3 (2022): 209-219.
doi:10.1056/NEJMoa2111673.

#8: Final search strategy

Evidence from other databases

Translate" search strategy syntax

11
Translation
database syntax

Databases use different
field codes, truncation
characters etc.

Example field codes:

PubMed **[tiab]**

Ovid Medline **.ab,ti.**

Cochrane **:ab,ti**

Attention: Thesaurus

Terms must also be

translated!

Fields	PubMed	EBSCO	OvidSP Medline/PsycInfo	Cochrane
Title/ abstract	[tiab]	TI () OR AB ()	(.ab,ti.	():ab,ti
Meaningful text	[tw]	TX ()	(.mp. (.tw,kf,ot.)	():ab,ti,kw
Including subheadings	"		"	"
Keyword	"Mesh term"[mesh]	DE cinahl heading	exp term/	[mh "mesh term"] ¹
No explode	"Mesh term"[mesh:noexp]	DE cinahl heading+	term/	[mh ^"mesh term"]
with subheading	"Mesh term"/sh[mesh]		exp term/sh	[mh "mesh term"/SH,SH]
just subheading	[sh]	MW	.xs. (exp) of .fs. (noexp)	[mh /SH]
synonyms	-		-	-
Proximity (n terms)	-	Nn - Wn ²	ADJn	NEAR/n - NEXT/n
Phrases	MeSH with "double quotes", free text without quotes	No quotes needed	No quotes needed	"double quotes"
Phrase truncation	No quote*	No quote*	No quote*	"use quote*"
Truncation	End	End/ mid ³	End/ mid	End/ mid
endless	*	*	*	*
0 or 1 character		#	?	
1 character		?	#	?
Filters				
Limit humans	NOT (animals[mesh] NOT humans[mesh])	NOT (MH animals+ NOT MH humans)	NOT (animals NOT humans).sh.	(Not necessary)
Added since	yyyy/mm/dd:3000 [mhda]	EM yyyy(mm)(dd)-	limit 1 to rd=yyyymmdd- yyyymmdd	AND ("yyyy, Issue m" OR "yyyy Issue m+1" etc...) ⁴
Publication date		S1	limit 1 to yr=yyyy-yyy	
Recordset-numbers	#1	Cinahl headings	1 ⁵	#1
Thesaurus	MeSH		MeSH / own thesaurus	MeSH

Translation PubMed to Cochrane Library

More than one possible solution

Cochrane Library (advanced search)

((("type 1 diabetes" OR "type I diabetes " OR "diabetes mellitus type 1" OR "diabetes mellitus type I" OR T1D OR T1DM OR "insulin-dependent diabetes" OR "juvenile-onset diabetes" OR "sudden-onset diabetes" OR IDDM OR "autoimmune diabetes" OR "brittle diabetes" OR "ketosis-prone diabetes"):ti,ab)
AND
((child* OR infan* OR adolescen* OR newborn* OR preschool* OR pre-school* OR teen* OR pediatric* OR paediatric*):ti,ab)
AND
(("insulin pump" OR "insulin pumps" OR "insulin infusion" OR "insulin delivery" OR CSII):ti,ab)

Cochrane Library (expert search)

(((((diabet*) NEAR/3 ("type 1" OR "type 1" OR "type I" OR insulin-dependent OR juvenile* OR sudden-onset OR early-onset OR autoimmune* OR auto-immune OR brittle* OR ketosis-prone OR ketoacid* OR keto-acidotic OR keto-acidosis)) OR T1D OR T1DM OR IDDM OR "dm 1"):ab,ti) AND ((child* OR infan* OR adolescen* OR newborn* OR preschool* OR pre NEXT school* OR teen* OR pediatric* OR paediatric*):ab,ti) AND (((insulin NEAR/3 (infus* OR pump* OR deliver*)) OR CSII):ab,ti,kw)

→ Use proximity operators

→ Expand search fields

Translation PubMed in ClinicalTrials.gov

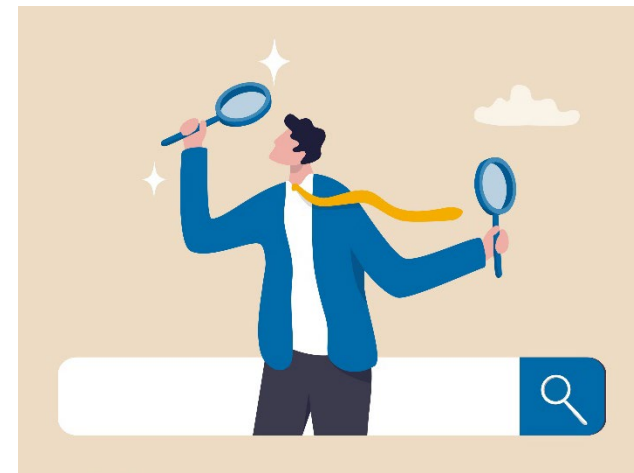
Simplify search string for trial registries

PubMed

(("Diabetes Mellitus, Type 1"[Mesh]) OR (type 1 diabet*[Title/Abstract] OR type I diabet*[Title/Abstract] OR diabetes mellitus type 1[Title/Abstract] OR diabetes mellitus type I[Title/Abstract] OR T1D[Title/Abstract] OR T1DM[Title/Abstract] OR insulin-dependent diabet*[Title/Abstract] OR juvenile-onset diabet*[Title/Abstract] OR sudden-onset diabet*[Title/Abstract] OR IDDM[Title/Abstract] OR autoimmune diabet*[Title/Abstract] OR brittle diabet*[Title/Abstract] OR ketosis-prone diabet*[Title/Abstract])) AND (("Adolescent"[Mesh] OR "Child"[Mesh] OR "Infant"[Mesh]) OR (child*[Title/Abstract] OR infan*[Title/Abstract] OR adolescen*[Title/Abstract] OR newborn*[Title/Abstract] OR preschool*[Title/Abstract] OR pre-school*[Title/Abstract] OR teen*[Title/Abstract] OR pediatric*[Title/Abstract] OR paediatric*[Title/Abstract])) AND (("Insulin Infusion Systems"[Mesh]) OR (insulin pump*[Title/Abstract] OR insulin infus*[Title/Abstract] OR insulin deliver*[Title/Abstract] OR CSII[Title/Abstract]))) AND ((randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tiab] OR clinical trials as topic[mesh:noexp] OR randomly[tiab] OR trial[ti] NOT (animals[mh] NOT humans [mh])))

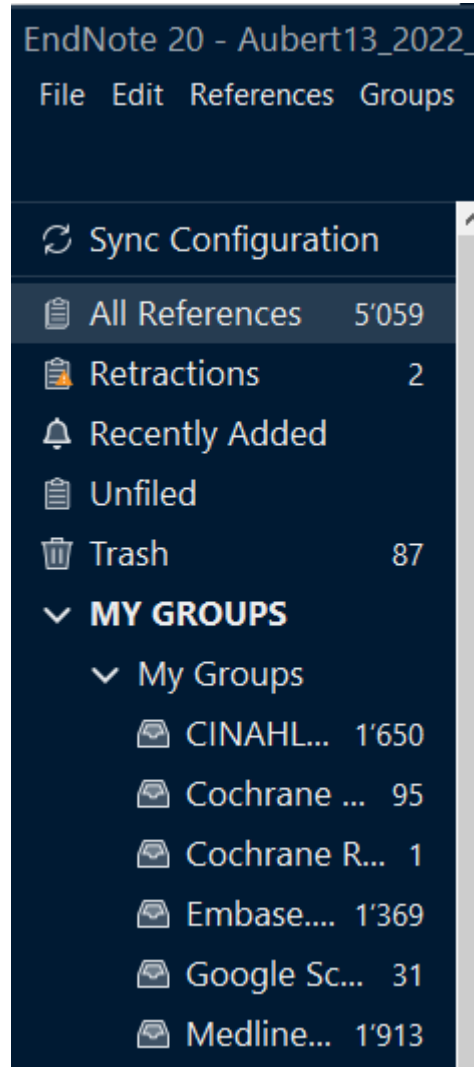
ClinicalTrials.gov

- *Condition or disease:*
Type 1 Diabetes OR Insulin-Dependent Diabetes Mellitus OR Juvenile-Onset Diabetes OR Sudden-Onset Diabetes OR Autoimmune Diabetes OR Brittle Diabetes OR Ketosis-Prone Diabetes OR IDDM OR T1D OR T1DM
- *Intervention:*
insulin infusion OR
insulin pump OR
insulin delivery
- *Age Filter:*
Child (birth - 17)



Export & deduplicate the search results

12
Export /
Deduplication



Export hits from all
databases to literature
management program and

remove duplicates



	Before deduplication	After deduplication
Embase.com	2968	1369
Medline (Ovid)	1919	1913
Cochrane Database of Systematic Reviews	3	1
Cochrane CENTRAL = trials	251	95
CINAHL (EBSCOhost)	3108	1650
Google Scholar	First 200	31
Total	8449	5059

3390 duplicated records have been removed

Duplicate check

Delete records found by multiple databases

Most literature management programs offer a duplicate check.
This is usually insufficient and requires a final manual check.



Alternative deduplication methods (more information in the [learning materials on ILIAS](#)):

- Bramer et al. 2016, Duplicate removal with the "**Bramer Method**" in EndNote.
Bramer WM, Giustini D, de Jonge GB, Holland L, Bekhuis T. [De-duplication of database search results for systematic reviews in EndNote](#). J Med Libr Assoc. 2016 Jul;104(3):240-3. doi: 10.3163/1536-5050.104.3.014. erratum in: J Med Libr Assoc. 2017 Jan;105(1):111.
- [Deduklick](#), a tool based on an algorithm developed at the University of Bern using AI (this tool is fee-based):
Borissov N, Haas Q, Minder B, Kopp-Heim D, von Gernler M, Janka H, Teodoro D, Amini P. [Reducing systematic review burden using Deduklick: a novel, automated, reliable, and explainable deduplication algorithm to foster medical research](#). Syst Rev. 2022 Aug 17;11(1):172. doi: 10.1186/s13643-022-02045-9.
- [TERA Deduplicator](#), part of the Evidence Review Accelerator Bond University, Australia (1 project free of costs)

Documentation of the search strategy

Saving the search in the databases

13
Documentation

Reproducibility

Set alerts to continuously receive new results for the search

Update the search before submitting the manuscript.
(after approx. 6 months)



Search: (((("Diabetes Mellitus, Type 1"[Mesh]) OR (type 1 diabet*[Title/Abstract] OR type I diabet*[Title/Abstract] OR diabetes mellitus type 1[Title/Abstract] OR diabetes mellitus type I[Title/Abstract] OR T1DM[Title/Abstract] OR insulin-dependent diabet*[Title/Abstract] OR juvenile-onset diabet*[Title/Abstract] OR sudden-onset diabet*[Title/Abstract] OR IDDM[Title/Abstract] OR autoimmune diabet*[Title/Abstract]))) AND (((("Adolescent"[Mesh]) OR "Child"[Mesh]) OR "Infant"[Mesh]) OR (child*[Title/Abstract] OR infan*[Title/Abstract] OR adolescen*[Title/Abstract] OR newborn*[Title/Abstract] OR preschool*[Title/Abstract] OR teen*[Title/Abstract] OR pediatric*[Title/Abstract] OR paediatric*[Title/Abstract]))) AND (("Insulin Infusion Systems"[Mesh]) OR (insulin pump*[Title/Abstract] OR insulin infus*[Title/Abstract]))) AND (randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tiab] OR drug therapy[sh] OR randomly[tiab] OR trial[tiab] OR groups[tiab] NOT (animals [mh] NOT humans [mh])))

Documentation Concepts Sheet

For your own documentation:

Explain your search strategy
to your supervisor

Understand your search
Strategy even after
months / years



<p>Concept 1:</p> <p>Type 1 Diabetes</p>	<p><i>Subject Heading [MeSH]</i></p> <p>"Diabetes Mellitus, Type 1"[Mesh]</p> <p>OR</p> <p><i>Textwords [Title/Abstract]</i></p> <p>type 1 diabet* OR type I diabet* OR diabetes mellitus type 1 OR diabetes mellitus type I OR T1D OR T1DM OR insulin-dependent diabet* OR juvenile-onset diabet* OR sudden-onset diabet* OR IDDM OR autoimmune diabet* OR brittle diabet* OR ketosis-prone diabet*</p>
<p>AND</p>	
<p>Concept 2:</p> <p>Children/Adolescents (age: up to 18 years)</p> <p><i>Please note: If you create a search for a systematic review, make sure to include even more terms, like: youth*, schoolchild*, girl*, boy* etc.</i></p>	<p><i>Subject Heading [MeSH]</i></p> <p>"Adolescent"[Mesh] OR "Child"[Mesh] OR "Infant"[Mesh]</p> <p>OR</p> <p><i>Textwords [Title/Abstract]</i></p> <p>child* OR infan* OR adolescen* OR newborn* OR preschool* OR teen* OR pediatric* OR paediatric*</p>
<p>AND</p>	
<p>Concept 3:</p> <p>Insulin pump</p> <p><i>continuous subcutaneous insulin infusion (CSII)</i></p>	<p><i>Subject Heading [MeSH]</i></p> <p>"Insulin Infusion Systems"[Mesh]</p> <p>OR</p> <p><i>Textwords [Title/Abstract]</i></p> <p>insulin pump* OR insulin infus* OR CSII</p>

Reporting of the search strategies

The PRISMA Checklist Points #6 & #7

14
Reporting

Preferred Reporting Items for
Systematic Reviews and
Meta-Analyses (PRISMA)



PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item
TITLE		
Title	1	Identify the report as a systematic review.
ABSTRACT		
Abstract	2	See the PRISMA 2020 for Abstracts checklist.
INTRODUCTION		
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.
	9	Specify how many reviewers collected data from each report, whether from study investigators, and if applicable, details of automation tools used in the process.
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome of interest were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources, assumptions made about any missing or unclear information).

PRISMA 2020 Statement at
<http://www.prisma-statement.org/>

Note: ALL search strategies!

Section/topic	#	Checklist item	Location(s) Reported
INFORMATION SOURCES AND METHODS			
Database name	1	Name each individual database searched, stating the platform for each.	
Multi-database searching	2	If databases were searched simultaneously on a single platform, state the name of the platform, listing all of the databases searched.	
Study registries	3	List any study registries searched.	
Online resources and browsing	4	Describe any online or print source purposefully searched or browsed (e.g., tables of contents, print conference proceedings, web sites), and how this was done.	
Citation searching	5	Indicate whether cited references or citing references were examined, and describe any methods used for locating cited/citing references (e.g., browsing reference lists, using a citation index, setting up email alerts for references citing included studies).	
Contacts	6	Indicate whether additional studies or data were sought by contacting authors, experts, manufacturers, or others.	
Other methods	7	Describe any additional information sources or search methods used.	
SEARCH STRATEGIES			
Full search strategies	8	Include the search strategies for each database and information source, copied and pasted exactly as run.	
Limits and restrictions	9	Specify that no limits were used, or describe any limits or restrictions applied to a search (e.g., date or time period, language, study design) and provide justification for their use.	
Search filters	10	Indicate whether published search filters were used (as originally designed or modified), and if so, cite the filter(s) used.	
Prior work	11	Indicate when search strategies from other literature reviews were adapted or reused for a substantive part or all of the search, citing the previous review(s).	
Updates	12	Report the methods used to update the search(es) (e.g., rerunning searches, email alerts).	
Dates of searches	13	For each search strategy, provide the date when the last search occurred.	
PEER REVIEW			
Peer review	14	Describe any search peer review process.	
MANAGING RECORDS			
Total Records	15	Document the total number of records identified from each database and other information sources.	
Deduplication	16	Describe the processes and any software used to deduplicate records from multiple database searches and other information sources.	

PRISMA-S 2021 Extension



PRISMA 2020 Flow Diagram

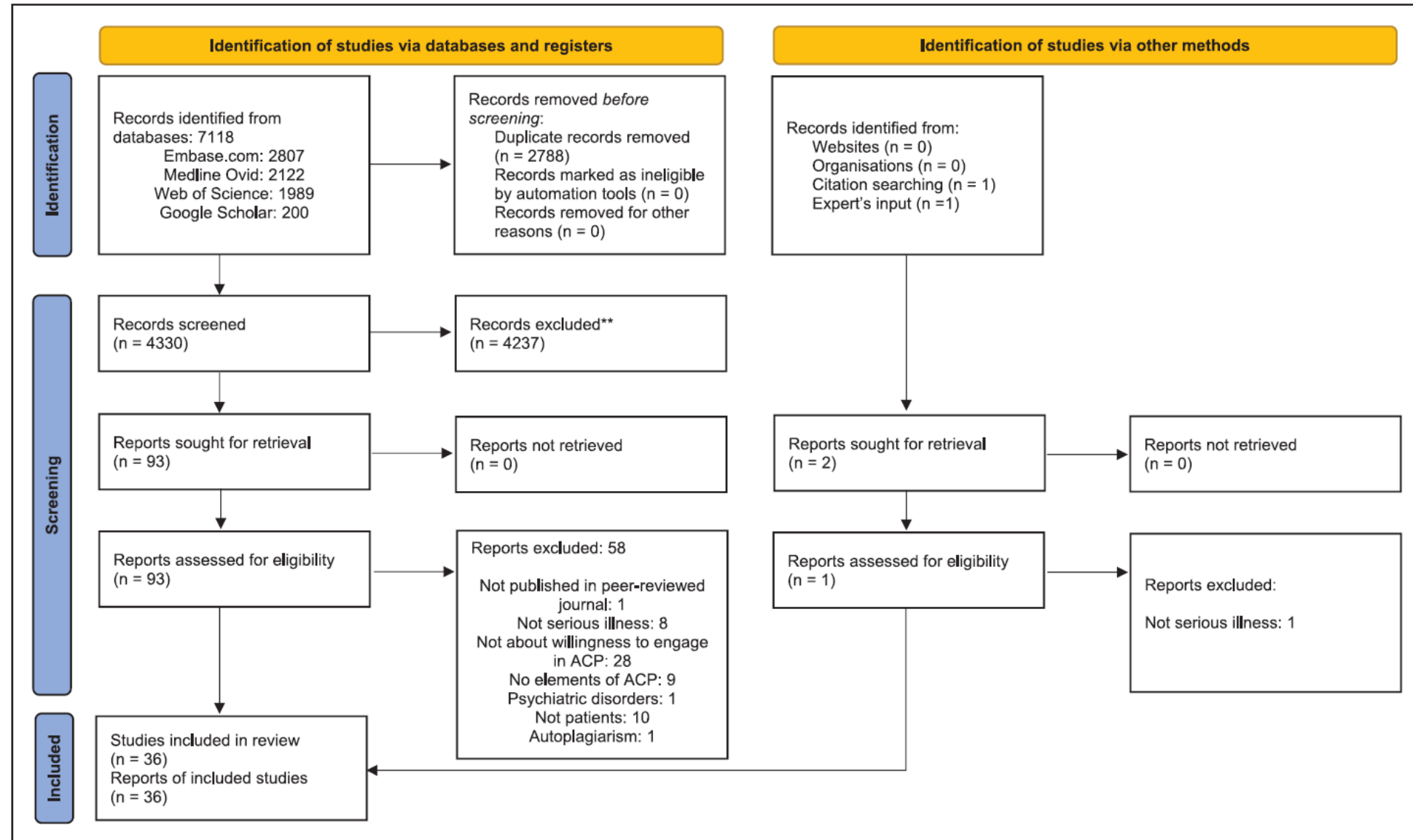
u^b

PRISMA 2020:

Page MJ, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021 Mar 29;372:n71. doi: [10.1136/bmj.n71](https://doi.org/10.1136/bmj.n71)

Example of the new version
(PRISMA 2020 Flow Diagram)
of:

Martina D, Geerse OP, Lin CP, et al. Asian patients' perspectives on advance care planning: a mixed-method systematic review and conceptual framework [published online ahead of print, 2021 Sep 6]. *Palliat Med*. 021;2692163211042530. doi:10.1177/02692163211042530



Reporting: Appendix in the paper

Appendix 1. Search strategies

Search terms and databases

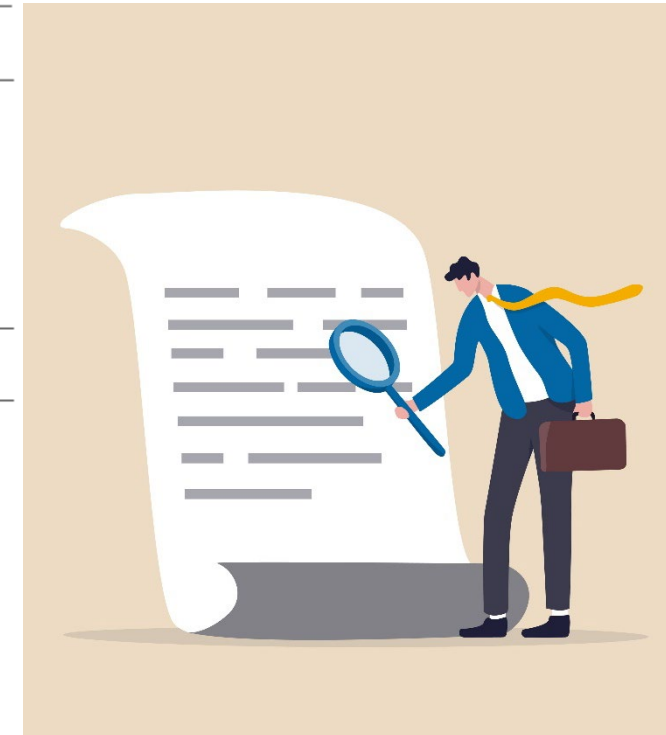
Unless otherwise stated, search terms are free text terms.

Abbreviations:

'\$': stands for any character; '?': substitutes one or no character; adj: adjacent (i.e. number of words within range of search term); exp: exploded MeSH; MeSH: medical subject heading (MEDLINE medical index term); pt: publication type; sh: MeSH; tw: text word.

The Cochrane Library

- #1 MeSH descriptor Diabetes mellitus, type 1 explode all trees
- #2 (IDDM in All Text or T1DM in All Text or T1D in All Text)
- #3 (("insulin* depend*" in All Text or "insulindepend*" in All Text) and not ("non insulin* depend*" in All Text or "non insulindepend*" in All Text))
- #4 ("typ? 1 diabet*" in All Text or "typ?1 diabet*" in All Text or "typ? l diabet*" in All Text or "typ?! diabet*" in All Text)
- #5 (child* in All Text near/2 diabet* in All Text)
- #6 (acidos* in All Text near/2 diabet* in All Text)
- #7 (labil* in All Text near/2 diabet* in All Text)
- #8 (britt* in All Text near/2 diabet* in All Text)
- #9 (keto* in All Text near/2 diabet* in All Text)
- #10 (juvenil* in All Text near/2 diabet* in All Text)
- #11 (autoimmun* in All Text near/2 diabet* in All Text)



Source: Fullerton B, Jeitler K, Seitz M, Horvath K, Berghold A, Siebenhofer A. Intensive glucose control vs. conventional glucose control for type 1 diabetes mellitus. [Cochrane Database Syst Rev. 2014 Feb 14;2014\(2\):CD009122.](#)



„Reading“ a complex search string

Forschungsfrage:

What are the risk factors for patients to fall during a hospitalization on a medical ward?

Limit to adult patients, no letters, editorials, etc.

PubMed (<https://pubmed.ncbi.nlm.nih.gov/>)

```
(Hospitals[Mesh] OR Hospitalization[Mesh:no exp] OR Inpatients[Mesh:no exp] OR "Patient Care"[Mesh:no exp] OR "Internal Medicine"[Mesh:no exp] OR (hospital*[tiab] OR inpatient*[tiab] OR in-patient[tiab] OR "non-ICU patient*" [tiab] OR "medical patient*" [tiab] OR "internal medicine"[tiab] OR "acute care setting*" [tiab] OR ward*[tiab])) AND ("Accidental Falls"[Majr:no exp] OR ("accidental fall*" [tiab] OR fall[tiab] OR falling*[tiab] OR falls[tiab] OR faller*[tiab] OR fallen[tiab] OR fell[tiab] OR near-fall[tiab] OR fall-related[tiab] OR slip*[tiab] OR trip[tiab] OR tripping[tiab] OR stumbl*[tiab] OR tumb*[tiab] OR collaps*[tiab])) AND (Risk[Mesh] OR Prevalence[Mesh:no exp] OR Incidence[Mesh:no exp] OR (risk*[tiab] OR threat*[tiab] OR predict*[tiab] OR implicat*[tiab] OR probabilit*[tiab] OR prevalenc*[tiab] OR incidence*[tiab] OR associat*[tiab])) NOT (("infant"[mesh] OR "child"[mesh] OR "adolescent"[mesh]) NOT ("adult"[mesh])) NOT ((paediatric*[ti] OR pediatric*[ti] OR child*[ti])) NOT (letter[pt] OR news[pt] OR comment[pt] OR editorial[pt] OR congress[pt])
```

„Reading“ a complex search string

Making block building visible

Forschungsfrage:

What are the **risk factors** for patients to **fall** during a **hospitalization on a medical ward**?


Limit to **adult patients, no letters, editorials, etc.**

PubMed (<https://pubmed.ncbi.nlm.nih.gov/>)

(Hospitals[Mesh] OR Hospitalization[Mesh:no exp] OR Inpatients[Mesh:no exp] OR "Patient Care"[Mesh:no exp] OR "Internal Medicine"[Mesh:no exp] OR (hospital*[tiab] OR inpatient*[tiab] OR in-patient[tiab] OR "non-ICU patient"*[tiab] OR "medical patient"*[tiab] OR "internal medicine"[tiab] OR "acute care setting"*[tiab] OR ward*[tiab])) AND ("Accidental Falls"[Majr:no exp] OR ("accidental fall"*[tiab] OR fall[tiab] OR falling*[tiab] OR falls[tiab] OR faller*[tiab] OR fallen[tiab] OR fell[tiab] OR near-fall[tiab] OR fall-related[tiab] OR slip*[tiab] OR trip[tiab] OR tripping[tiab] OR stumbl*[tiab] OR tumbl*[tiab] OR collaps*[tiab])) AND (Risk[Mesh] OR Prevalence[Mesh:no exp] OR Incidence[Mesh:no exp] OR (risk*[tiab] OR threat*[tiab] OR predict*[tiab] OR implicat*[tiab] OR probabilit*[tiab] OR prevalenc*[tiab] OR incidence*[tiab] OR associat*[tiab])) NOT (("infant"[mesh] OR "child"[mesh] OR "adolescent"[mesh]) NOT ("adult"[mesh])) NOT ((paediatric*[ti] OR pediatric*[ti] OR child*[ti])) NOT (letter[pt] OR news[pt] OR comment[pt] OR editorial[pt] OR congress[pt]))

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Pharmacy update

Management of insulin pump therapy in children with type 1 diabetes

Nadeem Abdullah¹, Claire Pesterfield¹, Daniela Elleri^{1, 2}, David B Dunger^{1, 2}

Correspondence to Professor David B Dunger, Department of Paediatrics, University of Cambridge, Cambridge CB20QQ, UK; dbd25@cam.ac.uk

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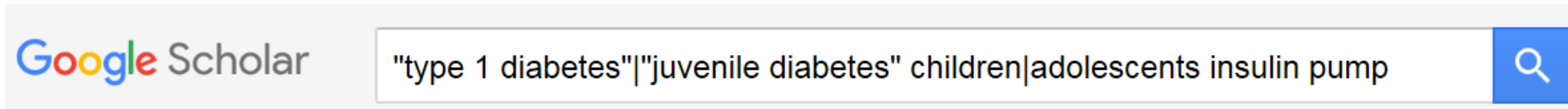
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Title	Date	Runtime	Format
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Google Scholar Search Tips



"Google Scholar: the ultimate guide"
(Paperpile)

Tips to improve your searching
(Wageningen University Library)





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3. Navigate to **My Library** via the hamburger menu at the top left of the page.  Google Scholar
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Google Scholar search

Authors:

Years: 0 - 0

Search

Publication name:

ISSN:

Search Direct

Title words:

Clear All

Keywords:

"insulin pump" "type 2 diabetes"|NIDDM "systematic review"|RCT|randomised

Revert

Maximum number of results:

200

Include:

☒ CITATION records

☒ Patents

New

Cites	Per year	Rank	Authors	Title
<input checked="" type="checkbox"/> h 267	26.70	1	Y Reznik, O Cohen...	Insulin pump treatment compared with multiple dai
<input checked="" type="checkbox"/> h 46	6.57	2	Z Landau, I Raz, J ...	The role of insulin pump therapy for type 2 diabetes
<input checked="" type="checkbox"/> h 78	9.75	3	R Aronson, Y Rezn...	Sustained efficacy of insulin pump therapy compare
<input checked="" type="checkbox"/> 28	2.80	4	R Aronson, O Coh...	OpT2mise: a randomized controlled trial to compare
<input checked="" type="checkbox"/> h 69	4.93	5	BW Bode	Insulin pump use in type 2 diabetes
<input checked="" type="checkbox"/> 22	2.75	6	J Morera, M Joube...	Sustained efficacy of insulin pump therapy in type 2
<input checked="" type="checkbox"/> 43	5.38	7	I Conget, J Castan...	The impact of insulin pump therapy on glycemic pr
<input checked="" type="checkbox"/> 0	0.00	8	AL Borel, S Lablan...	... Insulin Therapy for People With Type 2 Diabetes Tr
<input checked="" type="checkbox"/> h 61	5.55	9	Y Reznik, O Cohen	Insulin pump for type 2 diabetes: use and misuse of
<input checked="" type="checkbox"/> 27	4.50	10	DL Levitt, EK Span...	Insulin pump and continuous glucose monitor initia
<input checked="" type="checkbox"/> h 160	10.00	11	JC Pickup, E Renard	Long-acting insulin analogs versus insulin pump the
<input checked="" type="checkbox"/> h 54	18.00	12	G Freckmann, S B...	Insulin pump therapy for patients with type 2 diabet
<input checked="" type="checkbox"/> 44	7.33	13	RA Vigersky, S Hu...	... dose, and treatment satisfaction with insulin pum
<input checked="" type="checkbox"/> h 50	8.33	14	D Ehrmann, B Kulz...	Efficacy of an education program for people with di
<input checked="" type="checkbox"/> h 69	6.90	15	K Kumareswaran, ...	Feasibility of closed-loop insulin delivery in type 2 d

h-index: 46

g-index: 99

hI,norm: 29

hI,annual: 1.04

hA-index: 18

Papers with ACC >= 1,2,5,10,20: 90,83,54,31,17

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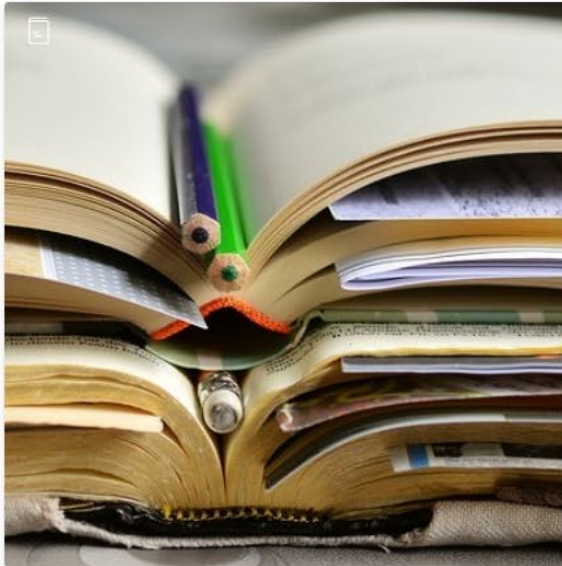
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Training Material & Templates on ILIAS

How to Build a Robust, Comprehensive Search of the Literature for Evidence Synthesis



1 | The Basics of Literature Searching (Theory)

Overview of all you need to know about systematic literature searching before you start out



2 | Guided Search Examples (Practical)

Building a search strategy step-by-step in Ovid Medline and PubMed (with lots of explanations)



3 | Templates, Tools & Checklists

Useful templates, tools, weblinks and checklists to build search strategies in multiple databases, remove duplicate content, an...



4 | Further training needed?

Links to websites with recommended (advanced) training guides on systematic literature searching

- **Step-by-step instructions for a search in PubMed**
- **Step-by-step instructions for a search in Medline (via Ovid)**
- **Templates (Concepts Sheet, PRISMA Flow Chart, etc.)**

- Tools for translation into various database languages
- Glossary for systematic literature search
- Instructions for working with EndNote
- Web links to other training sites, incl. AI use

How to access Literature Search Services @Uni Bern

ISPM or BIHAM Affiliation:

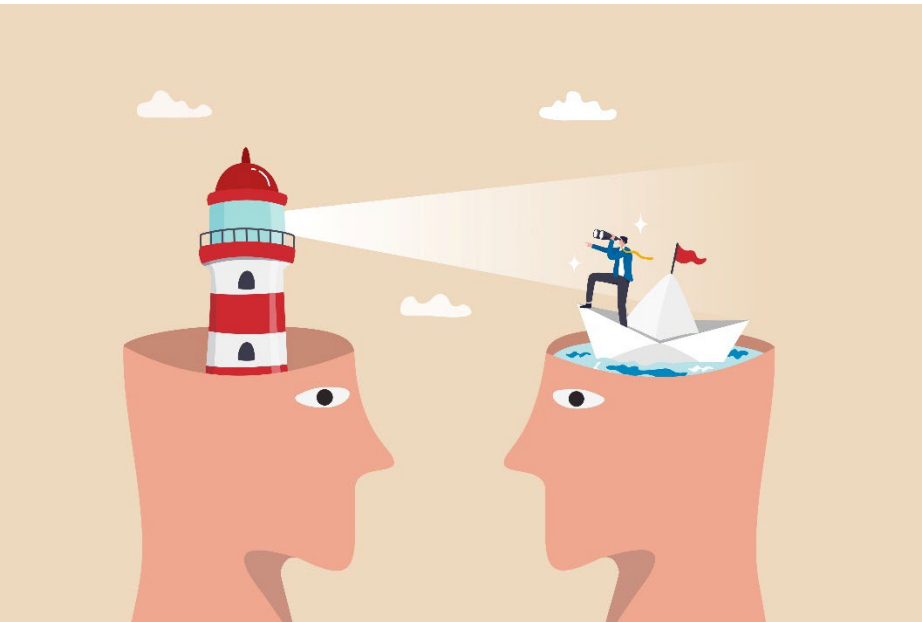
- Contact: biblio.ispm@unibe.ch
- Submit a Literature Search Request Form via the Intranet: [Link](#)

Other medical institutes & university hospital (Inselspital) researchers:

- Contact the Medical Library at support_med.ub@unibe.ch
- Submit your search request here: [Link](#)

SR Process Assistance

Interactive [LibGuide](#)
[Monash University Library](#)



Systematic Review: Home

Home
Getting started
Manuals, documentation & PRISMA
Develop question & key concepts
Look for existing reviews
Scoping searches & gold set
Identify search terms
Select databases & grey literature sources
Develop criteria & protocol
Run your search
Limits & filters
Review & test your search
Save & manage your search results
Database search translation
Screening process steps
Assess quality of your included studies

About systematic reviews

A systematic review is a type of literature review that demonstrates your awareness of existing primary research in your field. It is sometimes referred to as secondary research as it is research conducted on research.

Using this guide

Our guide is designed to help you:

- Understand the purpose of systematic reviews
- Follow a clear process to create your systematic review
- Adhere to relevant standards, guidelines or manuals
- Search for existing reviews
- Develop a research question and key concepts
- Select databases and grey literature sources

Get help

[Get help from a librarian](#) when you need support beyond what you can find in this guide. 15-minute bookings are available for students, educators, and researchers.

1 hour consultations are available to HDR students and Researchers only. For medical/biomedical systematic-style reviews, see [Request a consultation](#) for details on the review support service.

[Next: Getting started >>](#)

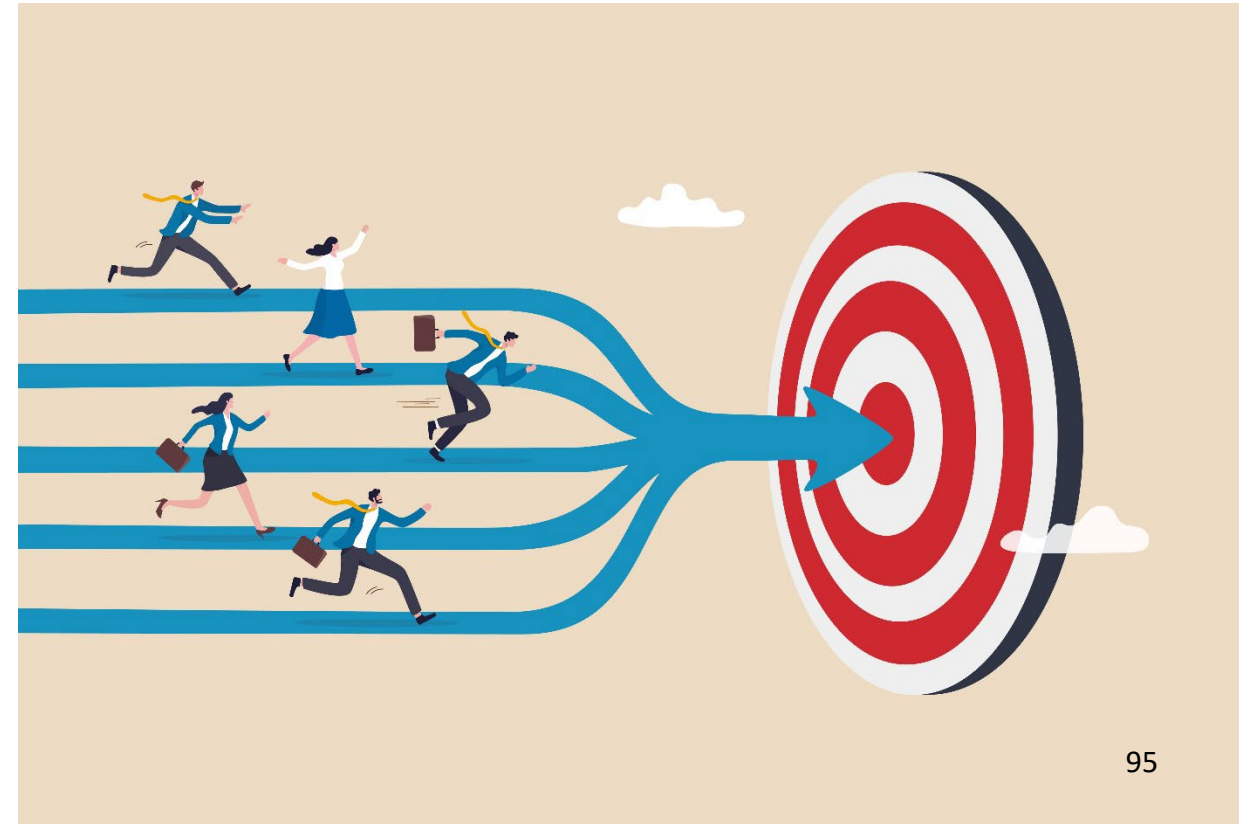
Literature search: how do you go about it?

Helpful video tutorials

Simple, easy to understand videos (English) about

[Starting a search](#) and [Tips & tricks](#)

(by the University of Reading Library)



Top 3 Take-Home Messages

1. Allow **enough time** for a state-of-the-art literature search.



2. ALWAYS take the **block building approach** (concepts sheet).



3. **Document** the search process on an **ongoing basis**.

