

Information Resources for  
Clinical Research

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Introduction to the Principles & Practices of Clinical Research

(IPPCR), National Institutes of Health (NIH), 3/7/16

Johns Hopkins University (JHU)  
2001 Asthma Study

Healthy volunteer died after hexamethonium administration by inhalation

PI didn't find potential toxicity despite

"standard PubMed search" &

consulting "standard current editions of textbooks

of pharmacology & pulmonary medicine"

- JHU Report, 7/01: Report of Internal Investigation into the Death of a Volunteer      Research  
Subject, Johns Hopkins University, 7/01,  
[https://web.archive.org/web/20150311234613/http://www.hopkinsmedicine.org/press/2001/JULY/report\\_of\\_internal\\_investigation.htm](https://web.archive.org/web/20150311234613/http://www.hopkinsmedicine.org/press/2001/JULY/report_of_internal_investigation.htm)

- J Savulescu and M Spriggs, The Hexamethonium Asthma Study and the Death of a      Normal  
Volunteer in Research, J. Med. Ethics, 2002; 28;3-4, PMID 11834748,  
<http://jme.bmj.com/content/28/1/3.full>

JHU 2001 Asthma Study – results

JHU research oversight was improved

“requiring investigators to collaborate with a librarian and a pharmacist to strengthen literature searches... to help search appropriate databases for potential side effects.”

Hopkins Response to FDA Observations, JHMI Office of Communications and  
Public Affairs, 9/7/01,

<https://web.archive.org/web/20070903162020/http://www.hopkinsmedicine.org/press/2001/SEPTEMBER/010907A.htm>

Guidelines were established at JHU & elsewhere

Guidelines for Determining an Adequate and Comprehensive Literature Search of Drug and Device Safety for Use by Investigator and Institutional Review Boards, Institutional Review Board, Mount Sinai School of Medicine, 1/03,

[http://www.mssm.edu/static\\_files/Old%20Sites/www.mssm.edu/cmca/pdf/SearchGuidelines.pdf](http://www.mssm.edu/static_files/Old%20Sites/www.mssm.edu/cmca/pdf/SearchGuidelines.pdf)

## Lecture Objectives

Overview of clinical information resources, scope and capabilities, with links to more information:

introduction to information resources – characteristics &

questions to ask

PubMed, Embase & other databases, both free &

subscription-based

internet search engines & other information resources

search tips & issues to consider when conducting or search

requesting an information

Major focus

Searching for adverse effects & protocol development

applicable to many other topics in clinical research

relevant chapters in textbook, "Principles and Practice of Clinical Research" JI Gallin & FP Ognibene, eds., 3rd ed., Elsevier, 2012, <http://www.sciencedirect.com/science/book/9780123821676>

3 - Researching a Bioethical Question

10 - Unanticipated Risk in Clinical Research - describes 1990s fialuridine (FIAU) clinical trials at the NIH

- also see "Review of the Fialuridine (FIAU) Clinical Trials, FJ Manning & M Swartz, eds., Institute of Medicine, National Academy Press, 1995  
[http://www.nap.edu/openbook.php?record\\_id=4887](http://www.nap.edu/openbook.php?record_id=4887)

32 - Writing a Protocol

Information Resources: questions

Origin – lab data or journal article or database or reference/textbook

Content – scope/ subjects covered / comprehensiveness; exactly what's in a record, full text or titles/abstracts/keywords

Capabilities – search technology, interface & added features; wildcards, Boolean logic; thesaurus; cited references/similar items

Access – readily available or must be ordered; “free” vs. fee

Business Model – who pays? - affiliations/sponsorship/bias

Familiarity – sources you know how to search, and sources you've heard about

- Are there other important sources, changes, or updates?

## PubMed

US National Library of Medicine (NLM) database – refers to >25.8 M articles from 5,600 biomedical journals in 39 languages

medicine, nursing, dentistry, veterinary medicine, allied health & pre-clinical sciences

currently includes references from 1940s - present, with some older items

free access online – [www.pubmed.gov](http://www.pubmed.gov); NIH staff should click

‘PubMed@NIH’ under ‘Quick Links’ at the NIH Library site <http://nihlibrary.nih.gov> to access full text of subscribed journals

bibliographic database with author-provided abstracts

added indexing terms - MeSH (Medical Subject Headings) thesaurus

links to other resources

## PubMed - Searching

Understand PubMed to get comprehensive results

Search Aids available by clicking 'Help' - online book

includes Quick Start & FAQs at lower left

'PubMed Tutorials' - web-based & interactive

Online training, tutorials, webinars, instruction materials -  
<http://www.nlm.nih.gov/bsd/disted/pubmed.html>

MeSH – added subject headings often change over time

My NCBI – save searches, get updates while trial is in progress

Filters - not always obvious; 'clinical trial' filters don't include all observational studies

Advanced Search: Search Builder – combine search results;

Details - shows what was searched;

Sometimes use " " for phrase (string) searching

PubMed searching – cont'd

JHU internal investigation found different PubMed results depending on the terms searched

Terms searched		# Results	# Useful
hexamethonium inhalation lung injury =>		0 hits	--
hexamethonium inhalation =>		42 hits	0
hexamethonium lung =>		not reported	3
hexamethonium lung toxicity =>		4 hits	0
hexamethonium lung hypersensitivity =>		16 hits	3
hexamethonium lung fibrosis =>		3 hits	2

possibly due in part to limited coverage of older material & MeSH term changes over time - see  
Hexamethonium entry <http://www.ncbi.nlm.nih.gov/mesh/68018738>

## Basic Searching Tips

How Search Works – typically every word in record is indexed & the index is searched; success depends on:

File content or scope

Individual record content (bibliographic info, abstract if it's available, indexing/keywords)

Problem of categories & group names - thesauri, classification schemes

Transparency/reproducibility of search algorithms & processes

Additional search terms automatically added – plurals, synonyms, etc.

Build concept-based searches - first broad, then narrow

use synonyms & group similar concepts together, and

take controlled vocabulary terms into account - for example:

(ganglionic blockers OR hexamethonium) AND lung

PubMed record - default format

PubMed record - expanded

## PubMed - Older Information

PubMed now covers back to mid-1940s with some earlier coverage; older information is available in print sources – 3 examples:

“Lung Changes During Hexamethonium Therapy for Hypertension”, British Heart J., 1954 – key article but

- ‘toxicity’ or ‘adverse effects’ not in PubMed record

‘hexamethonium lung’ occurs in titles of 2 articles from 1956 & 1962

- indexing included ‘toxicity’ or ‘adverse effects’

Cited reference searching could provide additional access  
refer to older articles

- more recent articles

1966 and all that--when is a literature search done?, F McLellan, The Lancet,  
2001, v358 i9282 p646

August 25,

<http://www.ncbi.nlm.nih.gov/pubmed/11530164>

## More Information Sources

Comprehensive searches usually require multiple information sources

Different sources have areas of specialization but may overlap

Many sources are available from NIH Library – some must be searched by NIH Library staff who may request a CAN number

Examples of some information sources follow; see websites for tutorials & more information

different versions of these sources may be available with varying coverage and capabilities

many other sources may also be important for a given search

## Embase™

Covers pharmacological & biomedical literature, with >29M records from > 8,500 journals, 40 languages

key clinical medicine subscription database, European based

NIH-accessible file covers 1947 – present (Resources >article databases >A-Z list >Embase )

[www.embase.com](http://www.embase.com)

Includes all of Medline (not PubMed), as well as additional material, but with different index terms (Emtree), often more specific than MeSH <http://www.elsevier.com/online-tools/embase/about/emtree>

Useful coverage of drug side effects/interactions, toxicology, biotechnology, medical devices, health policy/management, public/occupational/environmental health, conferences, & alternative/complementary medicine

<http://help.elsevier.com/app/answers/list/p/9754/c/8266>

<http://help.elsevier.com/app/answers/list/p/9754/c/9540>

<http://help.elsevier.com/app/answers/list/p/9754/c/9547>

- Getting Started
- Help & Video Guides
- Webinars



## Cited References & Ranking

Web of Science® – subscription-based, includes multidisciplinary indexes; >12,000 journals from 1900 – present; complete citation counts for all records; many lack abstracts/indexing

- recorded training [http://wokinfo.com/training\\_support/training/web-of-science/](http://wokinfo.com/training_support/training/web-of-science/)

Scopus® - subscription-based, covers scientific, technical, medical, humanities & social science literature; >18,500 journals from 1823 – present; many records include abstracts; complete citation counts for indexed articles from 1996 – present;

- Useful conference coverage & affiliations/institutions

- 'Help' at upper right, <http://help.scopus.com> and  
<http://help.elsevier.com/app/answers/list/p/8150/c/0>

Both are useful in obtaining citation rankings of authors' publications

Clinical Decision Resources – subscription-based

Micromedex® - summaries & detailed monographs for world-wide marketed drugs; names, actions, indications, dosing, toxicology, drug interactions, comparisons, product lookup & adverse effects;

- 'Help' in upper right corner – links to Training, Search Tips, Results, Tools, etc.

- “had lung toxicity as the first side effect of hexamethonium” (JHU Report, 7/01)

mine for comparative drug information, i.e. hypoglycemic data for anti-diabetes drugs as compared with Metformin

Lexicomp / AHFS - clinical decision support tools and databases including detailed drug monographs from AHFS (American Hospital Formulary System from ASHP, the American Society of Health-System Pharmacists)

- see <http://www.wolterskluwer CDI.com/lexicomp-online/>

- User Guide at <http://online.lexi.com/lco/help/lco-ug.pdf>

Up To Date - clinical decision support system for point-of-care; etiology, diagnosis & treatment questions; peer-reviewed text includes drug and evidenced-based information; currency varies; references have links to NIH full-text subscriptions

- 'Help' at upper right, with links to FAQ, Demos, User Manual, & Quick Start

<http://www.uptodate.com/home/help>

Evidence-Based Information:  
Secondary Sources

Cochrane Library [www.cochrane.org](http://www.cochrane.org) - Regularly updated subscription-based collection for practitioners, patients & policy makers; includes:

Systematic reviews of interventions; extensive abstracts in PubMed; search for: "Cochrane Database Syst Rev"[TA]

Evaluations of effectiveness of health care interventions

Clinical trial reports (published/unpublished)

NIH staff have access via NIH Library

Free in some countries

Guidelines.gov [www.guidelines.gov](http://www.guidelines.gov) - Frequently updated evidence-based guideline clearinghouse from the Agency for Healthcare Research & Quality (AHRQ), HHS

Extensive filtering

Ability to compare several guidelines side-by-side

## Clinical Trial Information

clinicaltrials.gov www.clinicaltrials.gov  
not limited to NIH-funded research

- registry maintained by NIH;

## International Clinical Trials Registry Platform (ICTRP)

- approx. 20 registries, maintained by World Health Organization,  
<http://www.who.int/ictcp/en/>

Cochrane Library – published & unpublished clinical trial reports

Pharmaprojects (formerly Pipeline) – subscription based drugs-in-development database; detailed drug profiles including therapy, mechanism, biological targets, development history & clinical trial information  
FAQ <http://nih-pipeline.citeline.com/CpHelp.aspx> ; Quick Start  
<https://nih-pipeline.citeline.com/Documents/Quick%20Start.pdf>

## Clinical Trial Information - Caveats

Despite policies, many trials are not properly registered

Mann E, et al, Compliance with trial registration in 5 core journals of clinical geriatrics, *Age Ageing* 2014; PMID 24982096  
<http://www.ncbi.nlm.nih.gov/pubmed/24982096>

Hakala A, et al, Accessibility of trial reports for drugs stalling in development, *BMJ* 2015; PMID 25752879  
<http://www.ncbi.nlm.nih.gov/pubmed/25752879>

Weber WE, et al, Trial Registration 10 years on, *BMJ* 2015; PMID 26149708  
<http://www.ncbi.nlm.nih.gov/pubmed/26149708>

Take-away: read critically; data & insights can come from both old and new resources

Prasad V, et al, A decade of reversal: an analysis of 146 contradicted medical practices, *Mayo Clin Proc* 2013; PMID 23871230  
<http://www.ncbi.nlm.nih.gov/pubmed/23871230>

[clinicaltrials.gov](https://clinicaltrials.gov)

## Other Resources

TOXNET - <http://toxnet.nlm.nih.gov> - cluster of databases covering toxicology, hazardous chemicals, environmental health & related areas from NLM – for more info see <http://www.nlm.nih.gov/pubs/factsheets/toxnetfs.html>

Texts & References – either in print or online:

NCBI Bookshelf – free online books, available by clicking the arrow next to the PubMed search window to search ‘Books’-

<http://www.ncbi.nlm.nih.gov/books>

Hexamethonium toxicity wasn’t mentioned in the last 4

editions of Goodman & Gillman, or in the current edition of Fishman’s Pulmonary Medicine – but was included in a previous edition of Fishman’s text (JHU Report, 7/01)

## Specialized sources

MedWatch - regulatory information – post-marketing surveillance from pharmaceutical companies, required by FDA [www.fda.gov/medwatch/index.html](http://www.fda.gov/medwatch/index.html)

RePORTER - NIH-funded research grants [projectreporter.nih.gov/reporter.cfm](http://projectreporter.nih.gov/reporter.cfm)

PsycINFO – subscription-based psychological, social, behavioral and health science citations and abstracts; access from NIH Library (Resources >article databases >A-Z list >PsycINFO ) ; see 'Help' at upper right

Compendex® & Inspec® - two subscription-based engineering databases, searchable by NIH Library staff; useful for medical device information

- Scopus covers much of the content of Compendex, but lacks the extensive subject-specific indexing

SciFinder – chemistry information subscription database from Chemical Abstracts; menu-based end-user access; STN staff can request access from NIH Library

## More About Full Text Searching

QUOSA Information Manager – retrieve many full text articles with one click; manage & organize the collection, & search the full text easily; NIH Library staff and many institutes have subscriptions

Many NIH Library journals & Science Direct (Elsevier journals) permit full-text searching

PubMed Central (PMC) – free digital biomedical/life sciences journal literature archive from NIH, 3.8 M full text articles (>14% of PubMed) ; <http://www.ncbi.nlm.nih.gov/pmc/> ; includes BioMed Central, Public Library of Science & public access to NIH-funded research

Directory of Open Access Journals – many are full text searchable <http://www.doaj.org/>

MedlinePlus – consumer health information from NLM  
<http://www.nlm.nih.gov/medlineplus/>

## Internet Search Engines

Google, Google Scholar, Bing & others – access increasing amounts of information, some in full text

JHU PI found first evidence of hexamethonium pulmonary

toxicity on the internet

Google and Yahoo found a hexamethonium toxicity site, but other (JHU Report, 7/01)

search engines didn't

Currently, about one in every 20 Google searches is for a

health-related term

- search most effectively using advanced search features
- change preferences to see more, with less work
  - use different search engines to take advantage of different coverage, search capabilities, & ranking algorithms

Google & other web resources

Why is the information provided?

What is the business model - who pays?

Incentives for accuracy and completeness?

Search Engine Optimization industry - examples discussed in

D. Segal, Search Optimization and Its Dirty Little

Secrets, NYT 2/12/11 <http://nyti.ms/optimiz>

Promising technology - increasingly powerful capabilities

Cautions include possible

inconsistent results,

lack of search documentation

lack of confidentiality

## Google & Google Scholar

Google [www.google.com](http://www.google.com) - Advanced [http://www.google.com/advanced\\_search?hl=en](http://www.google.com/advanced_search?hl=en) & <http://www.google.com/support/websearch/bin/answer.py?hl=en&answer=136861> ; Preferences <http://www.google.co.in/preferences?hl=en> > 'Never show Instant results' ; > change 'Results per page' from 10 to 100

Google Scholar <http://scholar.google.com/> - fulltext journal articles, books, patents, & dissertations; Advanced - click arrow at far right of search results; Help - <http://scholar.google.com/intl/en/scholar/help.html>

Preferences [http://scholar.google.com/scholar\\_preferences](http://scholar.google.com/scholar_preferences) > change 'Number of Results' from 10 to 20; possibly also check 'Show links to import citations into EndNote';

> Library Links> Search for 'NIH' > check box 'NIH Library - Full-Text Plus!' > save;  
also search 'worldcat', check box 'Open WorldCat – Library Search'

Advanced Search Operators: "Phrase Search" within double quotes; exclude: '-' minus sign immediately before excluded word (no spaces) ; 'site:' URL must include word immediately following colon; 'filetype:ppt' or 'filetype:pdf'

Note: To search within a web page, type <Ctrl> F

Learn about Internet Searching

“Web Search: Thinking Beyond Google” NIH Library class – handout  
<http://nihlibrary.nih.gov/ResearchTools/Pages/WebSearching.aspx>

“Google and Bing for Researchers”, Daniel Russell of Google and Duane Forrester of Bing/Microsoft, NIH lecture, 2/6/13, <http://videocast.nih.gov/launch.asp?17791>

“How to solve impossible problems: Daniel Russell’s awesome Google search techniques”, John Tedesco, 6-21-12, <http://www.johntedesco.net/blog/2012/06/21/how-to-solve-impossible-problems-daniel-russells-awesome-google-search-techniques>

Become a Google Power Searcher – free online courses from Google, may require free gmail account, <http://www.powersearchingwithgoogle.com/>

Bing, Exalead & DuckDuckGo

Bing [www.bing.com](http://www.bing.com) ; > Preferences <http://www.bing.com/account> or > Gear symbol at upper right > 'Settings' > 'Results' > change from 'Auto' to 50 > 'Save';

Help <http://onlinehelp.microsoft.com/en-US/bing/ff808535.aspx>;

Advanced <http://onlinehelp.microsoft.com/en-us/bing/ff808438.aspx>

Exalead [www.exalead.com/search/](http://www.exalead.com/search/) - allows true proximity searching, truncation, & phonetic searching;  
Information > Click 'Help' at bottom left for FAQ

Advanced > 'advanced search' > menu of options;

Preferences (upper right) or [www.exalead.com/account/preferences/](http://www.exalead.com/account/preferences/) > change 'Results per page' from '10' to '100' > 'Save my preferences';

DuckDuckGo <https://duckduckgo.com> - preserves privacy; doesn't track users questions or personalize search results

## Bioinformatics Resources

NCBI resource list - > 'Resources' above PubMed search window > 'All Resources' > list  
<http://www.ncbi.nlm.nih.gov/guide/all/> Search NCBI databases > click down arrow next  
to 'PubMed' > Search 'All Databases'

NCBI YouTube channel - tutorials <http://www.youtube.com/ncbinlm>

NIH Library Bioinformatics - from NIH Library home page: > 'Services' >  
'Bioinformatics Program' <http://nihlibrary.nih.gov/Services/Bioinformatics/Pages/default.aspx>

> 'Services' > 'Bioinformatics Program' > 'Online Tutorials'  
<http://nihlibrary.nih.gov/Services/Bioinformatics/Pages/Biotutorials.aspx>

> 'Services' > 'Bioinformatics Program' > 'Classroom Training' -  
information about the NIH Library's Bioinformatics classes

## Bioinformatics & Data/Text Mining

Networks of data and information mined for the discovery of disease mechanisms and new therapeutics  
- NIH lectures:

The Emerging Network of Data for Understanding the Interactions of

Genes and Drugs, Russ Altman, NIH, 10/12/11,  
<http://videocast.nih.gov/launch.asp?16900>

Genomic Networks in Development and Cancer: Resolving Biomarkers and Therapeutic Targets from a  
Cloud of Data, Kevin White, NIH, 2/14/12, <http://videocast.nih.gov/launch.asp?17107>

Translational Bioinformatics: Transforming 300 Billion Points of Data into Diagnostics, Therapeutics,  
and New Insights into Disease, Atul Butte, NIH, 6/20/12 <http://videocast.nih.gov/launch.asp?17321>

Precision Medicine Initiative – includes plans for a research cohort of > 1M volunteers who will  
share genetic data, biological samples and diet/lifestyle info

<http://www.nih.gov/precisionmedicine/>

## Data Management

Data Management – emerging subject in clinical research; NIH Library Data Services guide <http://nihlibrary.campusguides.com/dataservices/> includes: Introduction to Data management; Finding and Re-using Scientific Research Data; Research Data Description and Organization; Preservation, Retention, and Storage of Digital Data; and data visualization topics; examples of content include:

Data Life Cycle: Proposal planning & writing; Project start up; Data collection; Data analysis (possibly re-purpose data); Data sharing; End of project; Deposit data in data archive; Re-use data for data discovery – an iterative process, not linear

Pre-Project Data Management Plan - consider using open formats vs proprietary formats; data collection - consider collecting meta-data including synonyms and controlled vocabulary terms; many journals have requirements about depositing data in repositories, such as GEO or GenBank

HA Piwowar, RS Day, DB Fridsma, Sharing Detailed Research Data Is Associated with Increased Citation Rate, PLoS ONE, 2007; 2(3): e308, PMID 17375194, doi:10.1371/journal.pone.0000308  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1817752/>

## Bibliometrics

Bibliometrics – statistical analysis of written publications, books or articles; used to measure the impact of an author, or within a subject area or a portfolio; NIH Library Bibliometric Services described at <http://nihlibrary.campusguides.com/bibliometrics>

Impact factor of a journal – ratio between citations to articles in that journal and number of articles published in a particular year – searchable from Journal Citation Reports from Web of Science (ISI)

h-index - attempts to measure an author's productivity and impact, based on the author's most cited papers and the number of citations received; an author with an h-index of 20 has written at least 20 papers which have each been cited at least 20 times

- available from Scopus and Web of Science (both subscription-based), and

- Publish or Perish website <http://www.harzing.com/pop.htm> - free; uses Google Scholar and Microsoft Academic Search

More information <http://nihlibrary.campusguides.com/c.php?g=38330&p=244518>

Google Scholar Metrics <http://scholar.google.com/intl/en-US/scholar/metrics.html>

MyRI – “Measuring your Research Impact” - Open Access toolkit for bibliographic training and awareness <http://myri.conul.ie/>

Scholarometer <http://scholarometer.indiana.edu/> - social tool to facilitate citation analysis

## Systematic Reviews

Systematic review - review of a clearly formulated question that uses systematic and explicit methods

- to identify, select, and critically appraise relevant research, and
- to collect and analyze data from the included studies;
- statistical methods or meta-analysis may or may not be used

NIH Library information for Systematic Reviews – includes gold standards, organizations, literature sources, scoring guides, documenting your work, protocols and protocol registries, and resources  
<http://nihlibrary.campusguides.com/systematicreviews>

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

- 27 item checklist, information flow diagram and Statement, links at  
<http://www.prisma-statement.org/>

Finding What Works in Health Care: Standards for Systematic Reviews, Institute of Medicine, National Academies Press, 2011

<http://www.ncbi.nlm.nih.gov/books/NBK209518/>

Search Strategy - one general model

Break query into essential concepts

Find synonyms/alternate terms for the concepts – use controlled vocabularies if available

Expand, then reduce retrieval – group together synonyms for each concept with 'OR' logic;  
then 'AND' the concept groups together

Use as many information resources as necessary

Search for information to find more information:

- Find key citations, possibly with Wikipedia (check the footnotes), Google, Bing, etc.;
- Search for these key citations in PubMed/ Embase/ etc. to find controlled vocabulary terms to expand your synonym lists
- Use these key citations in cited reference searching (Scopus/ Web of Science/ Google Scholar)

Repeat as necessary

Keep track of all searches and retrievals

Remove duplicate retrievals

## Search Strategy Tips

Ask the Right Questions, the right way – the PICO outline can help organize search concepts & terms:  
Patient/Population and/or Problem; Intervention; Comparison/Control; Outcome or Effects

- The Literature Searching Process Protocol for Researchers, Thames Valley  
Health Libraries Network, Mar. 2006,  
[http://www.ieph.org/hase/Downloads/Lit\\_Search\\_Protocol\\_Researchers.pdf](http://www.ieph.org/hase/Downloads/Lit_Search_Protocol_Researchers.pdf)

Remove Duplicates - use bibliographic/reference management utilities including EndNote (NIH-wide subscription); NIH Library Endnote classes

<http://nihlibrary.nih.gov/ResourceTraining/pages/TrainingDescription.aspx?rsID=27&View=Class>

- Reference management software compared; includes free options

[http://en.wikipedia.org/wiki/Comparison\\_of\\_reference\\_management\\_software](http://en.wikipedia.org/wiki/Comparison_of_reference_management_software)

Research Updates – set your searches to repeat automatically when the database is updated using MyNCBI in PubMed; check other databases for similar capabilities

## Search Quality Checks

You've identified and searched all relevant resources, and  
you understand their scope and coverage

You understand how each search engine works, what it searches, and what assumptions it makes  
plurals and/or alternate spellings automatically included?

search terms automatically "OR"ed with each other?

Google & web search engine results may be inconsistent – many assumptions & relevancy rankings  
aren't disclosed

Your results include known relevant articles

Different searchers/searches yield no new relevant results

## Search Quality Questions

Can you trust your search results?

When is a search complete?

These are difficult questions, best answered by

experience

following the guidelines & suggestions mentioned above

verifying your strategy & results

collaborating with a reference librarian, and, if applicable, a pharmacist as well

## Conducting Searches – resources

Guidelines for Determining an Adequate and Comprehensive Literature Search of Drug and Device Safety for Use by Investigator and Institutional Review Boards, Institutional Review Board, Mount Sinai School of Medicine, 1/03,

[http://www.mssm.edu/static\\_files/Old%20Sites/www.mssm.edu/cmca/pdf/SearchGuidelines.pdf](http://www.mssm.edu/static_files/Old%20Sites/www.mssm.edu/cmca/pdf/SearchGuidelines.pdf)

- includes overview, search log, summary & bibliography forms, lists of sources, & search technique suggestions

Literature Searching Guidelines Checklist for Researchers, J Glover & M Gentry, Yale

[http://doc.med.yale.edu/education/hic/Literature\\_Searching\\_Guidelines1.pdf](http://doc.med.yale.edu/education/hic/Literature_Searching_Guidelines1.pdf)

- very good checklist, includes many of the points discussed here

Final Notes & Acknowledgements

NIH Library email news - subscribe at

<http://nihlibrary.nih.gov/aboutus/announcements/pages/emailsignup.aspx>

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Please fill out the lecture evaluation – Thank You!!

Questions or comments: [jduberman@nih.gov](mailto:jduberman@nih.gov)