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Information Resources for Clinical Research:

A Brief Overview

July-Aug 2017, NIH Library, Bldg. 10 / Clinical Center

Josh Duberman, MLIS
Informationist / Research Librarian
jduberman@nih.gov

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

- 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

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 requesting an information search

Major focus

Searching for **adverse effects** & **protocol development;**
applicable to many other topics in clinical research

"Introduction to the Principles and Practice of Clinical Research", NIH Clinical Center course, http://www.cc.nih.gov/training/training/ippcr1.html

lecture, 3/7/16 http://videocast.nih.gov/launch.asp?19530

- 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 – 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
- 32 - Writing a Protocol

Information Resources: questions

- **Origin** – lab data or journal article or database or reference/textbook;

  - publication cycle of new research: idea (request funding)

    > preliminary findings (letters to the editor, submit patent application to be published in 18 months)

    > research report (conference literature)

    > publish research (peer-reviewed journals)

    > popularize research (newspapers, websites)

    > repackaged research (reviews, texts, guidelines)

- **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

Information Resources: more questions

- **Access** – readily available or must be ordered; "free" vs. fee

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

- **Familiarity** – sources you know how to search & sources you've heard about
  - Are there other important sources, changes, or updates?

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- New England Journal of Medicine (NEJM)

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PubMed

US National Library of Medicine (NLM) database – refers to >27 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; **NIH staff should click '*PubMed@NIH*' under 'Quick Links / Databases' 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

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Understand PubMed to get comprehensive results

- Search Aids available by clicking *'Help'* - online book
  http://www.ncbi.nlm.nih.gov/books/NBK3827/
  » *includes Quick Start & FAQs at lower left*
  » *'PubMed Tutorials'* - web-based & interactive
- Online training, tutorials, webinars, instruction materials -
  https://learn.nlm.nih.gov/rest/training-packets/T0042010P.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;
  phrase (string) searching: " " is only sometimes accurate

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PubMed comprises more than 27 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher web sites.

Using PubMed

- PubMed Quick Start Guide
- Full Text Articles
- PubMed FAQs
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- PubMed Mobile
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- Batch Citation Matcher
- Clinical Queries
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More Resources

- MeSH Database
- Journals in NCBI Databases
- Clinical Trials
- E-Utilities (API)
- LinkOut

Public access at www.pubmed.gov

Latest Literature

New articles from highly accessed journals

- Ann Pharmacother (1)
- Blood (1)
- Cancer Res (3)
- EMBO J (1)
- J Biol Chem (13)

Trending Articles

PubMed records with recent increases in activity

CRISPR-Cas encoding of a digital movie into the genomes of a population of living bacteria.
Nature. 2017.

The effects of moderate- versus high-load resistance training on muscle growth, body composition, and performance in collegiate women.
J Strength Cond Res. 2017.

PubMed Commons

Featured comments

Modeling absence epilepsy in rats? @DepaulisAntoine et al critique analysis; author D Barth replies. bit.ly/2ulYNqk
Jul 14

Bias in biobank analyses—@MarcusMunafo et al discuss potential impact of low response rates on association estimates bit.ly/2spEqrT

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

- **JHU Report, 7/01**

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

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J Med Ethics. 2002 Feb;28(1):3-4.

The hexamethonium asthma study and the death of a normal volunteer in research.

Savulescu J[1], Spriggs M.

Author information

Comment in

Two deaths and two lessons: is it time to review the structure and function of research ethics committees? [J Med Ethics. 2002]

PMID: 11834748 PMCID: PMC1733509

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Savulescu J[1], Spriggs M.

Author information

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Two deaths and two lessons: is it time to review the structure and function of research ethics committees? [J Med Ethics. 2002]

PMID: 11834748 PMCID: PMC1733509

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Publication type, MeSH terms, Substances

Publication type
Case Reports

MeSH terms
Administration, Inhalation
Asthma/drug therapy*
Baltimore
Controlled Clinical Trials as Topic
Ethics Committees, Research*
Fatal Outcome
Female
Ganglionic Blockers/administration & dosage
Ganglionic Blockers/adverse effects*
Hexamethonium/administration & dosage
Hexamethonium/adverse effects*
Human Experimentation*
Humans
Professional Misconduct*
Professional Staff Committees
United States
Universities

Substances
Ganglionic Blockers
Hexamethonium

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**
  - more recent articles refer to older articles

- *1966 and all that--when is a literature search done?,* F McLellan, *The Lancet*, August 25, 2001, v358 i9282 p646
  http://www.ncbi.nlm.nih.gov/pubmed/11530164

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1. Anti-Hu antibodies activate enteric and sensory neurons.
Li Q, Michel K, Annahazi A, Demir IE, Ceyhan GO, Zeller F, Komorowski L, Stöcker W, Beyak MJ, Grundy D, Farrugia G, De Giorgio R, Schemann M.
Sci Rep. 2016 Dec 1;6:38216. doi: 10.1038/srep38216.
PMID: 27905561 Free PMC Article
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2. HIF-1α Plays a Critical Role in the Gestational Sidestream Smoke-Induced Bronchopulmonary Dysplasia in Mice.
Singh SP, Chand HS, Gundavarapu S, Saeed AI, Langley RJ, Tesfaigzi Y, Mishra NC, Sopori ML.
PLoS One. 2015 Sep 11;10(9):e0137757. doi: 10.1371/journal.pone.0137757. eCollection 2015.
PMID: 26361040 Free PMC Article
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3. Regulation of Cigarette Smoke Induction of IL-8 in Macrophages by AMP-activated Protein Kinase Signaling.
Ko HK, Lee HF, Lin AH, Liu MH, Liu CI, Lee TS, Kou YR.
J Cell Physiol. 2015 Aug;230(8):1781-93. doi: 10.1002/jcp.24881.
PMID: 25503516
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4. [The role of the adreno-cholinergic interaction in the pulmonary hemodynamics changes following myocardial ischemia].
Evlakhov VI, Poiasov IZ.
Ross Fiziol Zh Im I M Sechenova. 2014 Jun;100(6):750-8. Russian.

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[Effect of euphylline and **hexamethonium** on the [Sov Med. 1969]
Fibrous healing of old iatrogenic pulmonary eden [J Pathol Bacteriol. 1962]
Hexamethonium lung; report of a case associa [J Obstet Gynaecol Br Emp. 1956]
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Search details
(("ganglionic blockers" [Pharmacological Action] OR "ganglionic blockers"[MeSH Terms] OR ("ganglionic"[All Fields] AND "blockers"[All
Search
See more...

Search Details

Query Translation:

```
(("ganglionic blockers"[Pharmacological Action] OR "ganglionic
blockers"[MeSH Terms] OR ("ganglionic"[All Fields] AND
"blockers"[All Fields]) OR "ganglionic blockers"[All Fields])
OR ("hexamethonium"[MeSH Terms] OR "hexamethonium"[All
Fields])) AND ("lung"[MeSH Terms] OR "lung"[All Fields])
```

Search URL

Result:

303

Translations:

ganglionic blockers	"ganglionic blockers"[Pharmacological Action] OR "ganglionic blockers"[MeSH Terms] OR ("ganglionic"[All Fields] AND "blockers"[All Fields]) OR "ganglionic blockers"[All Fields]
hexamethonium	"hexamethonium"[MeSH Terms] OR "hexamethonium"[All Fields]
lung	"lung"[MeSH Terms] OR "lung"[All Fields]

Database:

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User query:

(ganglionic blockers OR hexamethonium) AND lung

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1. Sub-chronic lead exposure produces β_1-adrenoceptor downregulation decreasing arterial pressure reactivity in rats.
   Toscano CM, Simões MR, Alonso MJ, Salaices M, Vassallo DV, Fioresi M.
   Life Sci. 2017 Jul 1;180:93-101. doi: 10.1016/j.lfs.2017.05.009. Epub 2017 May 9.
   PMID: 28499935
   Similar articles

2. Neutrophil Recruitment and Articular Hyperalgesia in Antigen-Induced Arthritis are Modulated by the Cholinergic Anti-Inflammatory Pathway.
   Kanashiro A, Talbot J, Peres RS, Pinto LG, Bassi GS, Cunha TM, Cunha FQ.
   Basic Clin Pharmacol Toxicol. 2016 Nov;119(5):453-457. doi: 10.1111/bcpt.12611. Epub 2016 May 20.
   PMID: 27098245
   Similar articles

3. The effect of nicotine on the expressions of the α7 nicotinic receptor gene and Bax and Bcl-2 proteins in the mammary gland epithelial-7 breast cancer cell line and its relationship to drug resistance.
   Aali N, Motalleb G.
   Cell Mol Biol Lett. 2015 Dec;20(5):948-64. doi: 10.1515/cmble-2015-0056.
   PMID: 26812869
   Similar articles

4. Role of Efferent Sympathoadrenal **Effects** in Cooling-Induced Hemodynamic Perturbations in Rats: An Investigation by Spectrum Analysis.
   Liu YP, Lin YH, Lin CC, Lin YC, Chen YC, Lee PL, Tung CS.
   Chin J Physiol. 2015 Oct 31;58(5):312-21. doi: 10.4077/CJP.2015.BAD317.
   PMID: 26387655
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Use of C1300 neuroblastoma cells to evaluate the protectiv [J Pharm Sci. 1995]

Antagonization of tetramisole **toxicity** by **hexamethonium**. [Chemioterapia. 1987]

Prophylactic action of **hexamethonium**, trimethaphar [Fundam Appl Toxicol. 1986]

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```
("hexamethonium"[MeSH Terms]
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Fields]) AND (("toxicity"
[Subheading] OR "toxicity"[All
Fields]) OR ("adverse effects"
```

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Query Translation:

```
("hexamethonium"[MeSH Terms] OR "hexamethonium"[All Fields])
AND (("toxicity"[Subheading] OR "toxicity"[All Fields]) OR
("adverse effects"[Subheading] OR ("adverse"[All Fields] AND
"effects"[All Fields]) OR "adverse effects"[All Fields]) OR
("poisoning"[Subheading] OR "poisoning"[All Fields] OR
"poisoning"[MeSH Terms]))
```

Search URL

Result:

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Translations:

hexamethonium	"hexamethonium"[MeSH Terms] OR "hexamethonium"[All Fields]
toxicity	"toxicity"[Subheading] OR "toxicity"[All Fields]
adverse effects	"adverse effects"[Subheading] OR ("adverse"[All Fields] AND "effects"[All Fields]) OR "adverse effects"[All Fields]
poisoning	"poisoning"[Subheading] OR "poisoning"[All Fields] OR "poisoning"[MeSH Terms]

Database:

PubMed

User query:

hexamethonium AND (toxicity OR adverse effects OR poisoning)

PubMed Advanced Search Builder

YouTube Tutorial

((hexamethonium AND (toxicity OR adverse effects OR poisoning))) AND ((ganglionic blockers OR hexamethonium) AND lung)

Edit Clear

Builder

	All Fields	hexamethonium AND (toxicity OR adverse effects OR poisonii	Show index list
AND	All Fields	(ganglionic blockers OR hexamethonium) AND lung	Show index list
AND	All Fields		Show index list

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History

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Search	Add to builder	Query	Items found	Time
#6	Add	Search **hexamethonium AND (toxicity OR adverse effects OR poisoning)** Sort by: **PublicationDate**	365	00:23:02
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#3	Add	Search **all [sb]** Sort by: **PublicationDate**	27403291	23:58:38
#2	Add	Search **11834748[uid]**	1	23:09:18

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1. Regulation of Cigarette Smoke Induction of IL-8 in Macrophages by AMP-activated Protein Kinase Signaling.
   Ko HK, Lee HF, Lin AH, Liu MH, Liu CI, Lee TS, Kou YR.
   J Cell Physiol. 2015 Aug;230(8):1781-93. doi: 10.1002/jcp.24881.
   PMID: 25503516
   Similar articles

2. Role of TRPV1 and P2X receptors in the activation of **lung** vagal C-fiber afferents by inhaled cigarette smoke in rats.
   Weng WH, Hsu CC, Chiang LL, Lin YJ, Lin YS, Su CL.
   Mol Med Rep. 2013 Apr;7(4):1300-4. doi: 10.3892/mmr.2013.1300. Epub 2013 Jan 30.
   PMID: 23443231
   Similar articles

3. Silencing of periostin inhibits nicotine-mediated tumor cell growth and epithelial-mesenchymal transition in **lung** cancer cells.
   Wu SQ, Lv YE, Lin BH, Luo LM, Lv SL, Bi AH, Jia YS.
   Mol Med Rep. 2013 Mar;7(3):875-80. doi: 10.3892/mmr.2013.1267. Epub 2013 Jan 9.
   PMID: 23314871
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9. Airway irritation and cough evoked by inhaled cigarette smoke: role of neuronal nicotinic acetylcholine receptors.
Lee LY, Burki NK, Gerhardstein DC, Gu Q, Kou YR, Xu J.
Pulm Pharmacol Ther. 2007;20(4):355-64. Epub 2006 Oct 18.
PMID: 17137814
Similar articles

10. Nicotine and angiogenesis: a new paradigm for tobacco-related diseases.
Cooke JP, Bitterman H.
Ann Med. 2004;36(1):33-40. Review.
PMID: 15000345
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11. 1966 and all that-when is a literature search done?
McLellan F.
Lancet. 2001 Aug 25;358(9282):646. No abstract available.
PMID: 11530164
Similar articles

12. Human subjects. Volunteer's death prompts review.
Marshall E.
Science. 2001 Jun 22;292(5525):2226-7. No abstract available.
PMID: 11423623
Similar articles

13. Parasympathetic component of 5-hydroxytryptamine-induced pulmonary dysfunctions in healthy calves.
Linden AS, Desmecht DJ, Amory H, Lekeux PM.
Am J Vet Res. 1996 Jun;57(6):896-901.
PMID: 8725820
Similar articles

24. Drug-induced **lung** disease.
Davies PD.
Br J Dis Chest. 1969 Apr;63(2):59-70. Review. No abstract available.
PMID: 4388934
Similar articles

25. Reactivity of the bronchial tree to different stimuli.
de Vries K, Booy-Nord H, Lende R vd, van Lookeren CampagneJG, Orie NG.
Bronches. 1968 Nov-Dec;18(6):439-52. No abstract available.
PMID: 4394341
Similar articles

26. Fibrous healing of old iatrogenic pulmonary edema (**"hexamethonium lung"**).
HEARD BE.
J Pathol Bacteriol. 1962 Jan;83:159-64. No abstract available.
PMID: 13995765
Similar articles

27. Bronchospasm associated with the use of a combination of succinylcholine and mylaxen to produce muscular relaxation.
SELVIN B, HOWLAND WS.
Anesth Analg. 1959 Sep-Oct;38:332-4. No abstract available.
PMID: 14444777
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28. **Hexamethonium lung**: report of a case associated with pregnancy.
COCKERSOLE FJ, PARK WW.
J Obstet Gynaecol Br Emp. 1956 Oct;63(5):728-34. No abstract available.
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COCKERSOLE FJ, PARK WW.

PMID: 13367924

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MeSH terms, Substances

MeSH terms

Hexamethonium*
Hexamethonium Compounds/adverse effects*
Pregnancy
Pulmonary Fibrosis/etiology*

Substances

Hexamethonium Compounds
Hexamethonium

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COCKERSOLE FJ, PARK WW.

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MeSH Terms

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Br Heart J. 1954 Jan;16(1):101-8.

Lung changes during hexamethonium therapy for hypertension.

DONIACH I, MORRISON B, STEINER RE.

PMID: 13126364 PMCID: PMC503873

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MeSH terms, Substances

MeSH terms

Cardiovascular Agents*
Hexamethonium*
Hypertension/therapy*
Lung*
Muscle Relaxants, Central/therapeutic use*

Substances

Cardiovascular Agents
Muscle Relaxants, Central
Hexamethonium

Similar articles

Pulmonary complications during treatment with h [Can Med Assoc J. 195

[Hexamethonium therapy of arterial hypertension]. [Arq Bras Cardiol. 195

[Hexamethonium bromide in hypertensio therapy]. [Nord Med. 195

[Hexamethonium therapy of essential hypertension]. [Ugeskr Laeger. 195

[Hexamethonium in therapy of arterial hypertension]. [Rev Paul Med. 195

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 >33 M records from > 8,500 journals in 40 languages

- key clinical medicine subscription database, European based
- NIH-accessible file www.embase.com covers 1947 – present
  (Resources >article databases >A-Z list >Embase)
- Includes **all** of Medline (not PubMed), and additional material, using Emtree index terms, often more specific than MeSH - see http://supportcontent.elsevier.com/Support%20Hub/Embase/Files%20&%20Attachements/5415-Embase%20E103%20-%20Searching%20with%20Emtree%20-%20March%202015.pdf
- coverage of **drug side effects/interactions, toxicology**, biotechnology, medical devices, health policy/management, public/occupational/environmental health, **conferences**, & alternative/complementary medicine
- Getting Started http://help.elsevier.com/app/answers/list/p/9754/c/8266
  Webinars http://help.elsevier.com/app/answers/list/p/9754/c/9547,10040

Embase™ vs. PubMed

- "Lung Changes During Hexamethonium Therapy for Hypertension", British Heart J, 1954

  PubMed – doesn't include abstract, *'toxicity'* or *'adverse effects'*

  Embase – includes abstract, ***'dyspnea'*** & ***'edema'*** (& British spellings), but not '*toxicity*' or '*adverse effects*'

- "Hexamethonium lung; report of a case associated with pregnancy", J Obstet Gynaecol Br Emp, 1956

  PubMed – no abstract, but good MeSH indexing terms

  Hexamethonium Compounds/*adverse effects

  *Embase – includes '**edema**'* & abstract, but not *'adverse effects'* : *"…a woman of 37, treated with hexamethonium compounds…died after the birth of a live infant…Treatment with hexamethonium drugs… from the 17th week. Severe, ultimately fatal, respiratory disease developed during the 35th week…"*

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Quick Search

Quick | PICO | PV Wizard | Advanced | Drug | Disease | Device | Article | Authors

Quick search — Search for: e.g. 'heart attack' AND stress

AND — Journal name — e.g. american heart

AND — Author name — e.g. watson j

AND — Author's first name — e.g. Mary Jane

+ Add search field

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Records added to Embase: 1-1-2016 to 31-12-2016

Evidence Based Medicine
- Cochrane Review
- Controlled Clinical Trial
- Systematic Review
- Randomized Controlled Trial
- Meta Analysis

Embase®

Search

Pico Search

Quick PICO PV Wizard Advanced Drug Disease Device Article Authors

At top right:

Default search strategy

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Find best term

Emtree

- anatomical concepts
- biological functions
- biomedical disciplines, science and art
- chemical, physical and mathematical phenomena
- chemicals and drugs
- diseases
- geographic names
- groups by age and sex
- health care concepts
- named groups of persons
- organisms
- procedures, parameters and devices
- society and environment
- types of article or study

Note: Filling any search line is optional

Population

Intervention

e.g. insulin

Comparison

e.g. placebo

Outcome

e.g. risk

Study design (or miscellaneous)

e.g. randomized controlled trial

Population

diabetes

diabetes mellitus	824,620
diabetes use: diabetes mellitus	824,620
diabetes adult onset use: non insulin dependent diabetes mellitus	198,679
diabetes mellitus maturity onset use: non insulin dependent diabetes mellitus	198,679
diabetes mellitus non insulin dependent use: non insulin dependent diabetes mellitus	198,679
diabetes mellitus type 2 use: non insulin dependent diabetes mellitus	198,679
diabetes mellitus type ii use: non insulin dependent diabetes mellitus	198,679
diabetes type 2 use: non insulin dependent diabetes mellitus	198,679
diabetes type ii use: non insulin dependent diabetes mellitus	198,679
diabetes complication use: diabetic complication	120,621

+ Use 'diabetes' as a free term

Find best term

diabetes

- diabetes mellitus
  824,620 records found
- diabetes
  Use preferred term 'diabetes mellitus'
  824,620 records found
- diabetes adult onset
  Use preferred term 'non insulin dependent diabet...
  198,679 records found
- diabetes mellitus maturity onset
  Use preferred term 'non insulin dependent diabet...
  198,679 records found
- diabetes mellitus non insulin dependent
  Use preferred term 'non insulin dependent diabet...
  198,679 records found
- diabetes mellitus type 2
  Use preferred term 'non insulin dependent diabet...
  198,679 records found
- diabetes mellitus type ii
  Use preferred term 'non insulin dependent diabet...
  198,679 records found

Note: Filling any search line is optional

Population

Intervention

e.g. insulin

Comparison

e.g. placebo

Outcome

e.g. risk

Study design (or miscellaneous)

e.g. randomized controlled trial

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PV Wizard - Drug Name

NIH Library
Office of Research Services
Serving the NIH Community

Quick PICO PV Wizard Advanced Drug Disease Device Article Authors

EMA's MLM searches >

Drug name — Alternative drug names — Adverse drug reactions — Special situations — Human limit

Drug name

e.g. Paracetamol

Clear field

Subheadings

- [x] Adverse drug reaction
- [x] Drug toxicity
- [x] Drug interaction
- [ ] Drug combination
- [ ] Drug comparison
- [ ] Drug therapy

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Search Browse Results My tools Register Login

Session Results / Record 1 of 1 Full record

Add All to Clipboard Prin

Record 1 Similar records | Add to Clipboard | Email Record

Back to results

Lung changes during hexamethonium therapy for hypertension

Donlach I., Morrison B., Steiner R.E.

British Heart Journal 1954 16:1 (101-108)

Go to publisher for the full text NIH Library Go

Abstract

In a series of 54 cases of severe hypertension treated with parenteral hexamethonium bromide, (C6), 3 cases developed dyspnoea and patchy shadowing in the lung fields. Two of these patients died and at autopsy it was found that the lung lesions consisted of organized fibrinous pulmonary oedema. The changes in fact were those of 'carnification'. The oedema was attributed to mild attacks of left ventricular failure modified by the effect of C6 in lowering the blood pressure; and the treatment by prolonging life allowed the process of carnification to develop. The change. were not regarded as being directly attributable to Cf, and were not considered to be a contraindication to the use of this drug.

Drug Terms

hexamethonium %, hexamethonium bromide %

Disease Terms

dyspnea %, edema %, heart left ventricle failure %, **hypertension** %, lung edema %, lung injury %

Other Terms

autopsy %, blood pressure %, lung %, **lung development** %, patient %, **therapy** %

Embase®

Search Browse Results My tools Register Login

Session Results / Record 2 of 3 Full record

Add All to Clipboard Prin

Record 2 Similar records | Add to Clipboard | Email Record

Back to results Previous Ne

Hexamethonium lung. Report of a case associated with pregnancy

Wallace Park W., Cockersole F.J.

Journal of obstetrics and gynaecology of the British Empire 1956 63:5 (728-734)

NIH Library Go

Abstract

The case is reported of a woman of 37, treated with hexamethonium compounds for severe hypertension during her 8th pregnancy. She died after the birth of a live infant, in the 36th week. Treatment with hexamethonium drugs had been continuous, in increasing dosage, from the 17th week. Severe, ultimately fatal, respiratory disease developed during the 35th week. Necropsy showed nephrosclerosis, hypertrophy of the left ventricle, and a state of 'solid oedema' and widespread fine fibrosis throughout both lungs. Microscopically the condition was one of non-infected, fibrinous, pulmonary oedema with organization and areas of fibrosis. The possible mechanism of development of the lesion is discussed.

Drug Terms

BCG vaccine %, **hexamethonium** %

Disease Terms

edema %, fibrosis %, hypertension %, hypertrophy %, lung edema %, nephrosclerosis %, respiratory tract disease %

Other Terms

autopsy %, female %, heart left ventricle %, infant %, **lung** %, **pregnancy** %, solid %

Cited References & Ranking

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

- reference guide http://wokinfo.com/media/pdf/qrc/webofscience_qrc_en.pdf
- recorded training http://wokinfo.com/training_support/training/web-of-science/

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- Useful conference coverage & affiliations/institutions
- 'Help' at upper right, https://www.elsevier.com/solutions/scopus 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.wolterskluwercdi.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.cochranelibrary.com - 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 - 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

AHRQ's National Guideline Clearinghouse is a public resource for summaries of evidence-based clinical practice guidelines.

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Guideline Syntheses

Comparisons of areas of agreement and disagreement among selected guidelines addressing similar topics. View All >

Expert Commentaries

Expert insight on guidelines and other relevant issues. View All >

Browse All Clinical Specialties Browse by Organization

Clinical Trial Information

clinicaltrials.gov www.clinicaltrials.gov

- registry maintained by NIH; not limited to NIH-funded research

International Clinical Trials Registry Platform (ICTRP)

- approx. 20 registries, maintained by World Health Organization, http://www.who.int/ictrp/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

A service of the U.S. National Institutes of Health

Saved Studies (0)

Give us feedback

Find Studies | About Studies | Submit Studies | Resources | About Site

ClinicalTrials.gov is a registry and results database of publicly and privately supported clinical studies of human participants conducted around the world.

Search (all fields optional)

Condition / Disease: e.g. breast cancer

Other Terms: e.g., NCT number, drug name, investigator name

Country:

Find a study to participate in | Search all studies

Advanced Search

Help | Studies by Topic | Studies on Map | Glossary

The database currently lists 249,644 studies with locations in all 50 States and in 201 countries.

Recruiting Study Locations

Non-U.S. only (57%)

U.S. only (38%)

Both U.S. and non-U.S. (5%)

43,529 recruiting studies (July 17, 2017)

More Information

For Patients and Families

For Researchers

For Study Record Managers

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)

TOXNET SEARCH RESULTS | BROWSE TOXNET | ADVANCED SEARCH

hexamethonium | ALL DATABASES | Search

Search Term: singular/plural | Records with: all of the words | ☑ Include Synonyms and CAS Numbers in Search

TOXNET databases use unique formats. Only one record from each of the selected resources appears below. Click on "More Results" to see all records retrieved for your search.

Search Details | History | My List

TOP RESULTS	DATABASE	ADD TO MY LIST
1. Prophylactic Action Of Hexamethonium, Trimethaphan, And Mecamylamine Against Diisopropyl Fluorophosphate Poisoning In Mice Chiou GCY ; Chang WTS ; Aimoto T Fundamental and Applied Toxicology, Vol. 6, No. 1, pages 35-43, 25 references, 19861986 [NIOSH]	TOXLINE More Results (2,210)	Select Record
2. Excitatory action of lead on rat sympathetic preganglionic neurons in vitro and in vivo. Lai CC; Lin HH; Chen CW; Chen SH; Chiu TH Life Sci. 2002, Jul 19; 71(9):1035-45. [Life sciences] [PubMed] PubMed Citation	DART More Results (52)	Select Record
3. NICOTINE TARTRATE 65-31-6	HSDB More Results (24)	Select Record
4. Hexamethonium 60-26-4	ChemIDplus More Results (9)	Select Record
5. Hexamethonium 60-26-4	CTD More Results (5)	Select Record

NCBI Resources How To Sign in to NCBI

PubMed.gov
US National Library of Medicine
National Institutes of Health

PubMed Search

Help

- All
- All Databases
- Assembly
- Biocollections
- BioProject
- BioSample
- BioSystems
- Books
- ClinVar
- Clone
- Conserved Domains
- dbGaP
- dbVar
- EST
- Gene
- Genome
- GEO DataSets
- GEO Profiles
- GSS
- GTR

PubMed

PubMed comprises more than 27 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher web sites.

Using PubMed

- PubMed Quick Start Guide
- Full Text Articles
- PubMed FAQs
- PubMed Tutorials
- New and Noteworthy

PubMed Tools

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- Single Citation Matcher
- Batch Citation Matcher
- Clinical Queries
- Topic-Specific Queries

More Resources

- MeSH Database
- Journals in NCBI Databases
- Clinical Trials
- E-Utilities (API)
- LinkOut

You are here: NCBI > Literature > PubMed

GETTING STARTED

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- NCBI Handbook
- Training & Tutorials

RESOURCES

- Chemicals & Bioassays
- Data & Software
- DNA & RNA
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FEATURED

- Genetic Testing Registry
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NCBI INFORMATION

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- NCBI News & Blog
- NCBI FTP Site

Bookshelf

Bookshelf provides free online access to books and documents in life science and healthcare. Search, read, and discover.

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New & Updated

The Effectiveness and Harms of Spinal Manipulative Therapy for the Treatment of Acute Neck and Lower Back Pain: A Systematic Review [Internet].
Shekelle PG, Paige NM, Miake-Lye IM, et al.
Washington (DC): Department of Veterans Affairs (US); 2017 Apr.

Integrating Clinical Research into Epidemic Response: The Ebola Experience.
National Academies of Sciences, Engineering, and Medicine; Health and

Featured Titles

Exploring Shared Value in Global Health and Safety: Workshop Summary.
Forum on Public-Private Partnerships for Global Health and Safety; Board on Global Health; Health and Medicine Division; National Academies of Sciences, Engineering, and Medicine.
Washington (DC): National Academies Press (US); 2016 Sep 26.

Guideline: Infant Feeding in Areas of Zika Virus Transmission.
Geneva: World Health Organization; 2016

More Information

- NLM Literature Archive
- Open Access Subset
- Librarians

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

Journals - **ScienceDirec**t (Elsevier journals), **IEEE Xplore** (engineering journals/conference proceedings), **Google Scholar** ; also many individual NIH Library journals

PubMed Central (PMC) – http://www.ncbi.nlm.nih.gov/pmc/ - free digital biomedical/life sciences journal literature archive from NIH; 4.4 M full text articles (>16% of PubMed) ; includes BioMed Central, Public Library of Science, & public access to NIH-funded research

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

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

PMC

PubMed Central® (PMC) is a free full-text archive of biomedical and life sciences journal literature at the U.S. National Institutes of Health's National Library of Medicine (NIH/NLM).

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Other Resources

- PMC International
- Text Mining Collections
- Developer Resources
- NLM LitArch
- PMC Citation Search
- PMC Accessibility

4.4 MILLION Articles

are archived in PMC.

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Public Access

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- How Papers Get Into PMC
- NIH Manuscript Submission System
- My Bibliography
- PMCID/PMID/NIHMSID Converter

Specialized sources

MedWatch - regulatory information – post-marketing surveillance from pharmaceutical companies, required by FDA www.fda.gov/medwatch/index.html

RePORTER - NIH-funded research grants 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 its extensive subject-specific indexing

IEEE Xplore – full text journal articles, conference proceedings, transactions and standards covering engineering, software, hardware, math, & data analysis subjects

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

NIH Research Portfolio Online Reporting Tools (RePORT)

NIH RePORTER

Version: 7.18.0

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Fiscal Year (FY): Current FY is 2017 — Active Projects — SELECT

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Use '%' for wildcard in PI names

Enter several PI/Project Leader names OR PI Profile IDs

Organization: — LOOKUP

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Organization Type: — SELECT

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What's New

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 search engines didn't** (JHU Report, 7/01)
- **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 Patents

NIH Library
Office of Research Services
Serving the NIH Community

Google www.google.com - Advanced 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, theses & 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 > change 'Number of Results' from 10 to 20; possibly also check 'Show links to import citations into EndNote';
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Google Patents http://www.google.com/patents – US, EP & WIPO patents and applications, with pdf images; help http://www.google.com/googlepatents/help.html ; field searching http://www.google.com/advanced_patent_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

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"Web Search: Thinking Beyond Google" NIH Library class – handout
https://nihlibrary.nih.gov/resources/subject-guides/web-search-thinking-beyond-google

"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/

John Tedesco

Investigative Reporter for the San Antonio Express-News

How to solve impossible problems: Daniel Russell's awesome Google search techniques

Daniel Russell stood in front of a crowd of investigative journalists in Boston last week and showed us this picture of a random skyscraper in an unknown city:

Russell posed a riddle:

What's the phone number of the office where this picture was snapped?

Bing, DuckDuckGo, Startpage, & Internet Archive

Bing www.bing.com ; > **Preferences** http://www.bing.com/account or > hamburger button at upper right > 'Settings' >'Results' > change from 'Auto' to 50> 'Save';

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

Advanced http://help.bing.microsoft.com/#apex/18/en-US/10001/-1
http://help.bing.microsoft.com/#apex/18/en-US/10002/-1

DuckDuckGo https://duckduckgo.com - preserves privacy; doesn't track users questions or personalize search results; other privacy-oriented search engines are:

Startpage www.startpage.com – Google results with privacy protection

Ixquick www.ixquick.eu – meta-search engine results with privacy protection

Internet Archive - https://archive.org/ - includes the **Wayback Machine** web page archive (>302 B web pages), digitized books, music, photos, films, video, maps, U.S. national TV news, audio books, old time radio shows, software, images from NASA and museums, and a free lending library ; for more information, see https://archive.org/about/

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★ Once weekly thyroxine treatment as a strategy to treat non ...

www.ncbi.nlm.nih.gov › NCBI › Literature

... the diagnosis of **non-compliance**. Supervised once **weekly** oral ... of **levothyroxine**--Case ... **National Center for Biotechnology Information** ...

SYNTHROID (LEVOTHYROXINE SODIUM) TABLET [ABBVIE INC.]

dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=1E11AD30-1041-4520...

... poor **compliance**, ... **Non** Steroidal Anti-Inflammatory ... with gradual dose increments at 4-6 **week** intervals. The **levothyroxine** sodium dose is generally adjusted ...

★ Nonadherence to Medication in Hypothyroidism: A Case Report

www.ncbi.nlm.nih.gov › NCBI › Literature

The case reports suggest that a **weekly** total dose of **levothyroxine** ... Once **weekly** thyroxine treatment as a strategy to treat **non-compliance**. ... Simple **NCBI** Directory.

Management Strategies for Hypothyroidism in Noncompliant ...

academic.research.microsoft.com/Paper/10917098.aspx

... of 125 micrograms/day.The patient was very **non-compliant** with her daily oral ... given the **weekly** dose of **levothyroxine** 700 micrograms ...

Related searches

Non-Compliant **Diabetic Patient**

Non-Compliant **Behavior**

Non-Compliant **Synonyms**

Non-Compliant **Patient Letter Ten**

Non-Compliant **Students**

Non-Compliant **Balloon**

Find studies that used a 7 day levothyroxine dose for non-compliant patients

Google levothyroxine non compliant weekly ncbi

Web Shopping News Images Videos More Search tools

About 113,000 results (0.84 seconds)

★ Once **weekly** thyroxine treatment as a strategy to treat **non-complia**...
www.**ncbi**.nlm.nih.gov/pmc/.../PMC260013... National Center for Biotec...
by S Rangan - 2007 - Cited by 17 - Related articles
Once **weekly** thyroxine treatment as a strategy to treat **non-compliance** .... Mandel S J, Brent G A, Larsen P R. **Levothyroxine** therapy in patients with thyroid ...

★ Nonadherence to Medication in Hypothyroidism: A Case Report
www.ncbi.nlm.nih.gov › ... › v.12(3); 2010 National Center for Biotec...
by RC Kandukuri - 2010 - Related articles
We are sorry, but **NCBI** web applications do not support your browser, and may not .... Mr A was started on intravenous **levothyroxine**, quetiapine, and citalopram. .... Once **weekly** thyroxine treatment as a strategy to treat **non-compliance**.

[Hypothyroidism due to pseudo-malabsorption of **levothyroxine** ...
www.**ncbi**.nlm.nih.gov/pubmed/19941234 National Center for Biotec...
by K Müssig - 2009
Nov 25, 2009 - In some patients, hypothyroidism is refractory to oral **levothyroxine** ... In **non-compliant** patients, supervised once **weekly levothyroxine** ...

★ Treating primary hypothyroidism with **weekly** doses of **levothyroxine** ...
www.**ncbi**.nlm.nih.gov/pubmed/22790470 National Center for Biotec...
by A Bornschein - 2012 - Cited by 2 - Related articles
OBJECTIVE: **Compliance** to **levothyroxine** treatment in hypothyroidism is compromised by **daily** ... Fourteen females were assigned to **daily** or **weekly** doses of LT4. ... TSH remained unchanged and there were **no** hyperthyroidism symptoms or ...

Case report: increased **levothyroxine** requirement in a patient with ...
www.**ncbi**.nlm.nih.gov/pubmed/15251601 National Center for Biotec...

Bioinformatics Resources

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NCBI resource list - > '*Resources*' above PubMed search window > 'All Resources' > list https://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 Support'
https://nihlibrary.nih.gov/services/bioinformatics-support

> 'Services' > 'Bioinformatics Support' > 'Online Bioinformatics Tutorials'
https://nihlibrary.nih.gov/services/bioinformatics-support/online-bioinformatics-tutorials

> 'Services' > 'Bioinformatics Support' > 'Current Classes'
- information about the NIH Library's Bioinformatics classes

Keytruda - "FDA approves first cancer treatment for any solid tumor with a specific genetic feature", 5/23/17

https://www.fda.gov/newsevents/newsroom/pressannouncements/ucm560167.htm

NCBI Home
Resource List (A-Z)
All Resources
Chemicals & Bioassays
Data & Software
DNA & RNA
Domains & Structures
Genes & Expression
Genetics & Medicine
Genomes & Maps
Homology
Literature
Proteins
Sequence Analysis
Taxonomy
Training & Tutorials
Variation

All Resources

All | Databases | Downloads | Submissions | Tools | How To

Databases

Assembly
A database providing information on the structure of assembled genomes, assembly names and other meta-data, statistical reports, and links to genomic sequence data.

BioCollections
A curated set of metadata for culture collections, museums, herbaria and other natural history collections. The records display collection codes, information about the collections' home institutions, and links to relevant data at NCBI.

BioProject (formerly Genome Project)
A collection of genomics, functional genomics, and genetics studies and links to their resulting datasets. This resource describes project scope, material, and objectives and provides a mechanism to retrieve datasets that are often difficult to find due to inconsistent annotation, multiple independent submissions, and the varied nature of diverse data types which are often stored in different databases.

BioSample
The BioSample database contains descriptions of biological source materials used in experimental assays.

BioSystems
Database that groups biomedical literature, small molecules, and sequence data in terms of biological relationships.

Bookshelf
A collection of biomedical books that can be searched directly or from linked data in other NCBI databases. The collection includes biomedical textbooks, other scientific titles, genetic resources such as *GeneReviews*, and NCBI help manuals.

ClinVar
A resource to provide a public, tracked record of reported relationships between human variation and observed health status with supporting evidence. Related information in the NIH Genetic Testing Registry (GTR), MedGen, Gene, OMIM, PubMed and other sources is accessible through hyperlinks on the records.

ClincialTrials.gov
A registry and results database of publicly- and privately-supported clinical studies of human participants conducted around the world.

CloneDB (formerly Clone Registry)
A database that integrates information about clones and libraries, including sequence data, map positions and distributor information.

Computational Resources from NCBI's Structure Group
A centralized page providing access and links to resources developed by the Structure Group of the NCBI Computational Biology Branch (CBB). These resources cover databases and tools to help in the study of macromolecular structures, conserved domains and protein

Bioinformatics Support

- Current Classes
- Online Bioinformatics Tutorials
- Analysis Tools & Databases
- Reserve a High Performance Bioinformatics Workstation
- Bioinformatics Resources Registration
- Biosocial Networking
- Bioinformatics Consult
- Computational Molecular Biology Resources: Automated Discovery and Categorization
- Computational Molecular Biology: Curated List through

Bioinformatics Support Program

Dr. Medha Bhagwat, NIH Library Bioinformatics Support Program Coordinator, received the NIH Office of the Director Honor Award "in recognition of outstanding leadership in developing a nationally renowned library-based bioinformatics support program to facilitate NIH intramural scientific advances."

The NIH Library's Bioinformatics Support Program was developed to provide researchers with powerful tools to analyze and understand the biological significance of a variety of data. The program is conducted by an expert bioinformatics trainer, Dr. Medha Bhagwat.

Learn more about bioinformatics work at NIH in the August 2009 issue, page 10, of The NIH Catalyst and from the November 2010 issue,page 3, of The NIH Catalyst

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- Bioinformatics Consult
- Computational Molecular Biology Resources: Automated Discovery and Categorization
- Computational Molecular Biology: Curated List through 2009

Online Bioinformatics Tutorials

Online Tutorials

Bioinformatics Tutorial Series (BITS)

Coffee Break: Tutorials for NCBI Tools

Entrez Gene Tutorial

NCBI RefSeq group

NCBI YouTube

Online Lectures on Bioinformatics

UCSC Genome Bioinformatics

Licensed Resource Training

Videos, Training, Videos, Customer Stories, etc

Manuals for All Products

Research Medical Research Related App Notes, Papers, etc

CLC Developer Kit, Documentation, Blog

Training and Support

Video Library

Webinars

Bioinformatics & Data/Text Mining

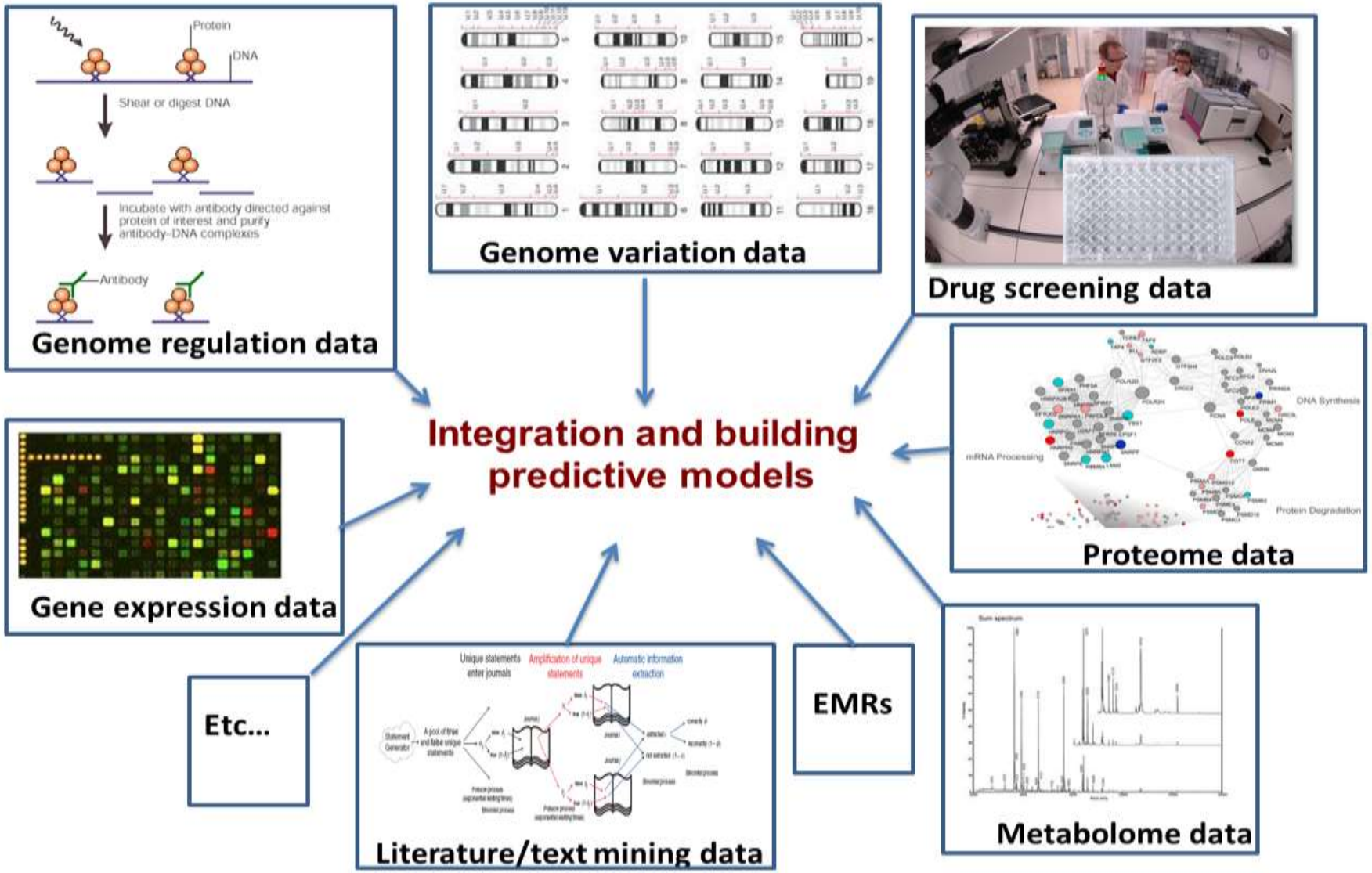
Networks of data and information mined for the discovery of disease mechanisms and new therapeutics - NIH lectures:

- 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

NIH Precision Medicine Initiative *'All of Us'* – 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/

Defining Networks, Mining Networks



from 'Genomic Networks in Development and Cancer', Kevin White, NIH Seminar, 2/14/12, http://videocast.nih.gov/launch.asp?17107

Data Management

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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

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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/

Selected Clinical Information Resources

Name	Free?	Subject	Notes
PubMed	Y	biomedicine	a standard of biomedical search; MeSH; My NCBI
Embase	$	biomedicine	larger than PubMed; international; conferences; Emtree
Web of Science	$	Science	cited reference searching; conferences
Scopus	$	Science	cited reference searching; conferences
Micromedex	$	drugs/toxicology	drug monographs; PosIndex - poison control centers
Lexicomp/AHFS	$	drugs/toxicology	detailed AHSP drug monographs
UpToDate	$	clinical medicine	point-of-care decision support system
Cochrane	Y / $	biomedicine	evidence-based medicine; clinical trials; reviews in PubMed
Guidelines.gov	Y	clinical medicine	evidence-based medicine
clinicaltrials.gov	Y	clinical trials	registered clinical trials
ICTRP	Y	clinical trials	registered clinical trials
Pharmaprojects	$	drug development	mine drug profiles for clinical trial information
ToxNet	Y	toxicology	databases of toxicological information
NCBI Bookshelf	Y	biomedicine	full text
MedWatch	Y	drugs	FDA safety alerts
RePORTER	Y	research grants	NIH-supported research
PsychINFO	$	psychology	psychological, social, behavioral information
Compendex	$	engineering	devices & instrumentation information
Inspec	$	engineering	devices & instrumentation information
PubMed Central	Y	biomedicine	full text
MedlinePlus	Y	medicine	consumer health information
Google Scholar	Y	science	full text articles & conference information
NCBI	Y	bioinformatics	sequences, genomics, etc.

Search Strategy - one general model

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1) **Break query into essential concepts**
2) **Find synonyms/alternate terms for the concepts – use controlled vocabularies if available**
3) **Expand, then reduce retrieval – group together synonyms for each concept with 'OR' logic; then 'AND' the concept groups together**
4) **Use as many information resources as necessary**
5) **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)
6) **Repeat as necessary**
7) **Keep track of all searches and retrievals**
8) **Remove duplicate retrievals**

Search Strategy Tips

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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

Remove Duplicates - use bibliographic/reference management utilities including EndNote (NIH-wide subscription); NIH Library Endnote classes https://nihlibrary.nih.gov/training/endnote and http://endnote.com/training

- Reference management software compared; includes free options 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

- 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://library.medicine.yale.edu/sites/default/files/services/crs/Literature_Searching_Guidelines1.pdf

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

Final Notes & Acknowledgements

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NIH Library email news - subscribe at

https://list.nih.gov/cgi-bin/wa.exe?SUBED1=NIHLIB-L&A=1

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Please fill out the lecture evaluation at

https://www.surveymonkey.com/r/jduberman **– Thank You!!**

Questions or comments: jduberman@nih.gov