I. Evidence-based Optometry (EBO).
   A. Definition of EBM: EBM “is the conscientious, explicit, & judicious use of current best evidence in making decisions about the care of individual patients.” The practice of EBM means integrating individual clinical expertise with the best available external clinical evidence from systematic research.” (Sackett et al. BMJ 1996;312:71-2)
   B. There is an increasing need for EBM partly due to the exponential increase in medical knowledge.
      1. More than 27 million citations available on PubMed
      2. More than 5,630 medical journals indexed for MEDLINE
      3. In FY2016 on average about 2380 new citations were indexed per day
      4. During the last year on the subject of “eye” in PubMed, there were ~60 new papers, ~1 new trial, ~1 new systematic review, ~1 new RCT, & ~5 new reviews published every day!
      5. We are drowning in information of variable quality.
         a. About 10% of published evidence is worth reading.
         b. About 1/3 of worthwhile evidence is eventually refuted or attenuated.
         c. About 1/2 of relevant evidence is not implemented.

II. 5 basic steps in practicing EBO.
   A. Construct well-built & answerable clinical questions.
   B. Locate the best evidence to answer these questions.
   C. Critically appraise your findings.
   D. Integrate your findings with clinical expertise & patient needs.
   E. Evaluate your performance of these steps & seek ways to improve.

III. Step 1 – Construct clinical questions: the PICO model – the anatomy of a good clinical question:
   A. P – Patient, Population, or Problem: Describe as accurately as possible the patient or group of patients of interest.
   B. I – Intervention, prognostic factor, or exposure: What is the main intervention, prognostic factor, or exposure you wish to consider?
   C. C – Comparison: What is the main alternative to compare with the intervention? This can include a placebo, or a different drug, or a different diagnostic test.
   D. O – Outcome: What can you hope to accomplish, improve, measure, or affect?
   E. Note: some add a T to PICO for the Time frame (e.g., what is an appropriate assessment period? Follow-up period?), & others add an S to PICO for Study design.
   F. Example: In patients with AMD, are vitamins versus a placebo effective in preventing progression?
   G. Note see Appendix 1: PICO Worksheet & Search Strategy.

IV. Step 2 – Locate the best evidence.
   A. Sources of information.
      1. “Expert opinion”: accessibility & credibility vary; can have biased opinions; can be wrong.
      2. Textbooks: often best place to start an inquiry; represent an overview; quickly become outdated.
      3. Journals:
         a. Provide recent views on a given topic.
         b. The better journals select articles by peer review.
         c. Can have several drawbacks:
            1) may reflect a partisan point of view
            2) tend to magnify own data & to minimize significance of contradictory data
            3) too many journals
         d. Newest article may not be the most accurate.
      e. Types of journals/articles.
         1) Original research articles. Contain enough detail to judge validity of study results & their applicability to your patients
         2) Narrative review articles (caution against using these to keep up-to-date)
            a) Can be an efficient means of learning
            b) Authors can have biased opinions & their thinking can lag behind published evidence
         3) Systematic reviews.
            a) Pooling of data from several primary studies (e.g., meta-analysis with forest plots)
b) Highest level of evidence for therapeutic interventions is a meta-analysis and systematic review of good RCTs.
c) Look for these first.
d) One of best sources = Cochrane Collaboration; abstracts are catalogued on PubMed
e) **Advantages of systematic reviews:**
   i. High-quality systematic reviews and meta-analyses take great care to find all relevant studies, critically assess each study, synthesize the findings from individual studies in an unbiased manner, and present balanced important summary of findings with due consideration of any flaws in the evidence.
   ii. Systematic review and meta-analysis is a way of summarizing research evidence, which is generally the best form of evidence, and hence positioned at the top of the hierarchy of evidence.
   iii. Explicit methods limit bias in identifying and rejecting studies.
   iv. Conclusions are hence more reliable and accurate.
   v. Large amounts of information can be assimilated quickly by health care providers, researchers, and policymakers.
   vi. Delay between research discoveries and implementation of effective diagnostic and therapeutic strategies is reduced.
   vii. Results of different studies can be formally compared to establish generalizability of findings and consistency (lack of heterogeneity) of results.
   viii. Reasons for heterogeneity (inconsistency in results across studies) can be identified and new hypotheses generated about particular subgroups.
   ix. Quantitative systematic reviews (meta-analyses) increase the precision of the overall result

f) **Disadvantages of systematic reviews.**
   i. They are very time consuming.
   ii. It may not be easy to combine studies. For example, evaluation techniques may not be consistent across studies.
   iii. The reporting quality of systematic reviews varies, limiting readers’ ability to assess the strengths and weaknesses of those reviews.
   iv. There can be certain inherent flaws associated with them, such as the location and selection of studies, heterogeneity, loss of information on important outcomes, inappropriate subgroup analyses, conflict with new experimental data, and duplication of publication.

4. **Clinical guidelines:**
   a. Although these are quality improvement tools, carefully constructed, timely guidelines can be used to keep up-to-date. However, not all guidelines are up-to-date. Check the date the guidelines were posted and last reviewed.
   b. In an attempt to make clinicians’ actions more evidence-based, guidelines gather, evaluate, & synthesize evidence to address broader clinical areas. However, not all clinical guidelines are evidence-based; often there is insufficient evidence. Sometimes there is a conflict of interest.
   c. Sources: e.g., AOA, American Academy of Ophthalmology; National Guideline Clearinghouse.

5. **Consensus recommendations** (expert panels)

6. **“Trade Journals”**:
   a. Ex: Rev of Optometry; Rev of Ophthalmology
   b. Often provide practical information
   c. Quality varies widely
   d. Susceptible to bias.

7. **Literary review journals**
   a. Provide critical analyses of current literature

8. **Evidence-based journals**
   a. Have critical appraisals & cost-effective analyses
   b. Ex. Evidence-Based Medicine, International Journal of Evidence-Based Healthcare

9. **Websites.**

B. **Suggested order of search steps:**
   1. Determine the level of evidence that best answers the question.
b. There are levels of evidence. For example, levels of evidence for a therapeutic intervention (from highest to lowest levels):
   1) Systematic reviews of randomized controlled trials (RCTs), including meta-analyses
   2) Individual RCTs
   3) Systematic reviews of cohort studies
   4) Individual cohort studies and low-quality RCTs
   5) Systematic reviews of case-controlled studies
   6) Individual case-controlled studies
   7) Case series and poor quality cohort and case-controlled studies
   8) Expert opinion based on clinical experience
   9) Preclinical animal studies

2. **Select relevant databases to search.**
   a. Some of the most important are PubMed, the Cochrane Library (e.g., Cochrane Database of Systematic Reviews), and ACCESSSSS Federated Search
   b. See Appendix 2: Useful Databases When Searching for Evidence.

3. **Identify key concepts or keywords from your PICO question to search databases.**
   a. See Appendix 1: PICO Worksheet & Search Strategy.
   b. For PubMed searches:
      1) On the results screen, look at the far right column under "Search details."
      2) This shows you how PubMed interpreted the terms you used.
      3) It displays the actual search strategy & syntax used to run the search.

4. **Look for secondary sources.** These are filtered & synthesized sources that are collections of the best available evidence to support practice.
   b. PubMed using the "Article types" option on the homepage. (free) For example, go to the "Article Types" on the left sidebar and click on "Customize." Scroll down to find the highest levels of evidence (e.g., "Meta-Analysis" > "Systematic Reviews" > "Randomized Controlled Trial"). Put a check mark by each, and then click on "Show" at the bottom. Under "Article types," click on "Meta-Analysis," and evaluate the papers. If there are no relevant meta-analyses, then click on "Systematic Reviews" under article types, and evaluate the papers. If there are no relevant systematic reviews, then click on "Randomized Controlled Trial," evaluate the papers, etc.
      1) The Cochrane Database of Systematic Reviews (CDSR) is the leading resource for systematic reviews in health care.
      2) The Database of Abstracts of Reviews of Effects (DARE) is the only database to contain abstracts of systematic reviews that have been quality-assessed. Each abstract includes a summary of the review together with a critical commentary about the overall quality. DARE complements the CDSR by quality-assessing and summarizing reviews that have not yet been carried out by The Cochrane Collaboration. DARE was produced by the Centre for Reviews and Dissemination at the University of York, UK, until April 2015. The Cochrane Library will host the archived versions from April 2015 onwards, until further notification
   e. TRIP Database – to search multiple EBM sources: [https://www.tripdatabase.com/](https://www.tripdatabase.com/) (free)
   h. Note: for more information & databases, see Appendix 2: Useful Databases When Searching for Evidence.

5. **Look for primary sources.**
   a. PubMed Clinical Queries: "Clinical Study Categories." Uses methodological filters for etiology, diagnosis, therapy, prognosis, clinical prediction guidelines. You can also choose a broad or narrow scope for your search.
   b. PubMed main page
   c. See Appendix 2.
V. Step 3 – Critically appraise the evidence. This involves systematically and carefully examining the research to judge its trustworthiness, value, and relevance.

A. Excellent sources of information on how to critically appraise evidence:

B. Use checklists covering results, validity, and relevance. For example:
   1. For systematic reviews, consider the following:
      a. The Oxford Centre for Evidence-based Medicine (OCEBM) Systematic Review Critical Appraisal Sheet
      b. The Preferred Reporting Items for Systematic Reviews & Meta-Analyses (PRISMA) Statement. This includes a 27-item checklist and a four-phase flow diagram illustrating the flow of information through the different phases of a systematic review.
      c. AMSTAR (Assessment of Multiple Systematic Reviews) Checklist. AMSTAR is a measurement tool created to assess the methodological quality of systematic reviews
   2. For randomized, controlled trials (RCTs) consider:
      a. The OCEBM RCT Critical Appraisal Sheet.
      b. The CONSORT (Consolidated Standards of Reporting Trials) 2010 statement. This is an evidence-based, minimum set of recommendations for reporting RCTs (a 25-item checklist and a flow diagram, along with some brief descriptive text).
      c. Grading of Recommendations Assessment, Development and Evaluation (GRADE). The GRADE approach is a system for grading the quality of evidence and the strength of recommendations that can be applied across a wide range of interventions and contexts. It grades the strength of each important outcome and looks at important considerations around study design and study quality. In addition, it takes into account values and preferences and considers the trade-offs between harms and benefits.
      d. The Cochrane Risk of Bias tool is available in Chapter 8 of the Cochrane Handbook for Systematic Reviews of Interventions.

C. Check for bias (e.g., selection bias, performance bias, detection bias, attrition bias, & reporting bias). Consider using the Cochrane Collaboration's tool for assessing risk of bias. For example, did the study use randomization, a control group, and blinding?

D. Beware of subgroup analyses. Subgroup analysis should be pre-specified and should be considered exploratory for informing future research and not conclusive to guide clinical practice.

E. Do not assume that statistical significance is the same as clinical significance.

F. The p-value problem.

1. The statistical community has been deeply concerned about issues of reproducibility and replicability of scientific conclusions.
2. While the p-value can be a useful statistical measure, it is commonly misused and misinterpreted. This has led to some scientific journals discouraging the use of p-values, and some scientists and statisticians recommending their abandonment.
3. The issue is significant enough that the American Statistical Association (ASA) published a formal statement clarifying several widely agreed upon principles underlying the proper use and interpretation of the p-value. The issues affect not only research, but research funding, scientific education, journal practices, career advancement, public policy, journalism, and law.
4. Researchers should always report effect sizes and confidence intervals. These convey what a P value does not: the magnitude and relative importance of an effect.
5. One proposal is to lower P-value thresholds from the current 0.05 to 0.005 for the social and biomedical sciences.
6. Selected references:

G. Consider using Point-of-Care Information Summary Resources. These are web-based compendiums designed to provide health professionals with comprehensive evidence condensed into easily digestible formats. See Appendix 3. Examples include:
1. **DynaMed Plus** (fee-based subscription; a free trial is available). This is a clinical support/reference tool that contains evidence-based clinical review summaries for use primarily at the point-of-care. It provides evidence boiled down to actionable steps, added to more than a thousand topics. ([http://www.dynamed.com/home/](http://www.dynamed.com/home/))

2. **UpToDate** (fee-based subscription). UpToDate is a clinical reference designed to provide quick and easy access to clinical information. It is comprised of thousands of original topic reviews written by a recognized faculty of experts who each address a specific clinical issue and provide detailed recommendations. Each topic review is peer reviewed, referenced, and offers CME credit. ([http://www.uptodate.com/index](http://www.uptodate.com/index))

3. **eMedicine**: [http://emedicine.medscape.com/](http://emedicine.medscape.com/) (free). This is an online, peer-reviewed medical reference. It gives you access to information on diseases, including background, differential diagnosis, work-up, treatment, medications, and follow-up. The authors include faculty and physicians from medical schools and medical societies. The content undergoes multiple levels of physician peer review. It covers topics in medicine and surgery, including ophthalmology.

VI. **Step 4 – Integrate findings with clinical expertise & patient needs.**

VII. **Step 5 – Evaluate performance & seek ways to improve.**

- A. Am I asking well-formulated clinical questions?
- B. Am I searching at all? Do I know the best sources of current external evidence?
- C. Am I critically appraising the external evidence?
- D. Am I integrating my critical appraisal into my practice?

VIII. **Evaluation of Web-based health information.**


B. **Finding and Evaluating Online Resources** ([https://nccih.nih.gov/health/webresources](https://nccih.nih.gov/health/webresources)) from the National Center for Complementary and Integrative Health (NCCIH).

C. **Try using “Evaluating Resources” by the University of California Berkeley Library at http://guides.lib.berkeley.edu/evaluating-resources. Also consider “Evaluating Information” by the Johns Hopkins Sheridan Libraries at http://guides.library.jhu.edu/c.php?g=202581&p=1334997.**

D. One major difficulty is to efficiently identify valid information, not only for yourself, but also for your patients. Fortunately, there a number of resources available online. These include:

1. **URAC Web Site Accreditation** ([http://www.urac.org/](http://www.urac.org/)). URAC is a private, nonprofit health site accreditation organization that offers a seal indicating that a site adheres to more than 50 standards for reliability, quality, privacy, and accountability.

2. **Quality labels.** A quality label is a symbol or logo displayed on a site’s Webpage. It represents a commitment by a provider to adhere to a code of conduct. The label provider may check the site for compliance and users can report misuse of the label.
   a. **Health On the Net** Foundation ([http://www.hon.ch/](http://www.hon.ch/)) produces the best known quality label (HON). Look for the HON Code icon at the bottom of the main Website page. Click on it to see if the site is in compliance.

3. **Most reliable sites are sponsored by government agencies or reputable medical institutions.**
   Examples include:
   d. The Department of Health and Human Services’ free site, **Healthfinder**, has content that has been carefully screened ([http://www.healthfinder.gov](http://www.healthfinder.gov)). It offers tips for physical activity, eating healthy, and more.
   e. **Mayo Clinic** ([http://www.mayoclinic.org/](http://www.mayoclinic.org/))

4. **Some of the sites that are accredited include:**
   a. **WebMD** ([http://www.webmd.com](http://www.webmd.com))
   b. **Drugs.com** ([https://www.drugs.com/](https://www.drugs.com/))

E. **Examples.**

- 1. Is eMedicine a good source?
- 2. Is Wikipedia a good source?

IX. **Ophthalmic example #1:** Can vitamins/supplements slow the progression of AMD?

X. **Ophthalmic example #2:** Can vitamins/supplements prevent AMD?

XI. **Ophthalmic example #3:** Is “pencil push-ups” a credible therapy for convergence insufficiency?
XII. Paper to reflect on: Ioannidis JP. Why most published research findings are false. PLoS Med 2005;2(8):e124. Full text is free. Are the author’s conclusions reasonable? What is the relevance of this paper?

Examples of the corollaries in the paper:

A. A research finding is less likely to be true:
   1. When the studies are smaller.
   2. When effect sizes are smaller.
   3. Where there is greater flexibility in designs, definitions, outcomes, & analytical modes.
   4. When there is greater financial & other interests & prejudice.

B. Most “interesting” research is wrong, but clinicians are not skilled in appraisal.
   1. Flawed studies
      a. Hormone replacement therapy
      b. Beta-carotene and cancer
      c. MMR and autism
      d. Folate and CHD
   2. Data mining
      a. Genes for anything
      b. Suppression of outcomes
   3. Small early studies

XIII. Journals: develop a surveillance strategy

A. Prospectively identify & critically review newly published studies likely to affect your practice.
B. Endeavor to keep abreast of major developments in several relevant areas of clinical optometry/ophthalmology.
C. Choose a small number of core journals for regular browsing. Suggestions include:
D. Sign up for Table of Contents (TOC) alerts at the journals’ Websites (free) or sign up for many journals from one source like:
   1. Science Direct (http://www.sciencedirect.com/) – free service with registration. You can set up alerts to notify you of new articles related to a specific search, new volume issues of specific journals, book-series, and handbooks, or new articles or publications related to a specific topic
   2. JournalTOCs (http://www.journaltocs.hw.ac.uk/) – free service with registration. This is the largest, free collection of scholarly journal Tables of Contents (TOCs): 29,389 journals including 11,860 selected Open Access journals and 11,306 Hybrid journals from 2,825 publishers. It alerts you when new issues of your Followed journals are published.

XIV. Take home.

A. Learn to recognize the quality of evidence.
B. Learn to question what you read and hear.
C. Use PubMed (especially “Clinical Queries” and “Article Types” filters)
D. Sign up for TOC alerts
E. Make it a habit to spend 10 minutes each day reviewing important systematic reviews or evidence-based summaries of relevance to your practice.

XV. Some Selected Useful Evidence-based Medicine Books

- Gosall NK, Gosall GS. The doctor’s guide to critical appraisal. 3rd ed. PasTest Ltd. 2012.

XVI. Some Selected Useful Evidence-based Medicine Websites

- University of Rochester Medical Center, Nesbit EBM Guide (http://www.urmc.rochester.edu/hslt/miner/digital_library/evidence_based_resources.cfm). This site has a compilation of EBM resources and tools.
- The Cochrane Collaboration (http://www.cochrane.org/index.htm). This site gives you access to systematic reviews for questions of therapy, clinical trials registry, abstracts of effectiveness, health technology assessment and economic evaluation.
- Open Clinical: Knowledge Management for Medical Care – Evidence-Based Medicine (http://www.openclinical.org/ebm.html).
- NIH Consensus Development Program (http://consensus.nih.gov/).
- Core Library for Evidence Based Practice, Sheffield University (http://www.shef.ac.uk/scharr/ir/core.html).
- Netting the Evidence: A ScHARR (Sheffield University School of Health and Related Research) Introduction to Evidence Based Practice on the Internet (http://www.shef.ac.uk/scharr/ir/netting/). This site has a comprehensive list of Internet resources for EBM.
- Introduction to Evidence-Based Practice Tutorial from Duke University Medical Center Library and the Health Sciences Library at the University of North Carolina at Chapel Hill (http://guides.mclibrary.duke.edu/ebmtutorial).
- Trip Database – Clinical Search Engine (http://www.tripdatabase.com/).
- PubMed (http://www.ncbi.nlm.nih.gov/sites/entrez?tool=nyumlib). This site gives you access to over 20 million citations for biomedical articles from MEDLINE and life science journals. Some citations include links to free, full-text articles. The site has embedded filters allowing you to find systematic reviews, meta-analyses, etc. quickly.
- Finding Information on the Internet: A Tutorial – UC Berkeley Library (http://www.lib.berkeley.edu/TeachingLib/Guides/Internet/FindInfo.html). This is a great site! For example, it has a comparison table of recommended search engines, a table comparing some of the best human-selected collections of web pages (i.e., subject directories), and a section on the “invisible web” – what it is, how to find it, and its inherent ambiguity. There is also a section on evaluating web pages.
- Internet Tutorials – Your Basic Guide to the Internet (http://www.internettutorials.net/). This site has articles on search tools and search techniques.
- Evaluating Web Content (University Libraries – University at Albany SUNY) (http://library.albany.edu/usered/eval/evalweb/).
Appendix 1: PICO Worksheet & Search Strategy

1. Define your question using PICO: (Your question should be used to help establish your search strategy.)

P → Patient/Problem → ________________________________
I → Intervention → ________________________________
C → Comparison → ________________________________
O → Outcome → ________________________________

Write out your question: _________________________________________________________________

2. Scenario/Need:
□ Therapy/Prevention
□ Diagnosis
□ Etiology
□ Prognosis
□ Other Clinical

3. Type of study: (keep in mind the evidence hierarchy)

□ Meta-analysis
□ Systematic Review
□ Randomized Controlled Trial
□ Cohort Study
□ Case Control Study
□ Cross Section Study
□ Case Series or Case Report
□ Editorials, Letters, Opinions
□ Animal Research/In vitro Research
□ Clinical Practice Guidelines
□ Electronic Textbooks
□ Qualitative Research

4. Use Boolean operators to combine your terms: use AND to narrow your search; use OR to broaden your search

5. List the main topics/concepts and alternative terms (synonyms) from your PICO that can be used for your search: (use controlled vocabulary (e.g., MeSH) if possible).

P ( _________________________________ OR      _________________________________ ) AND
I ( _________________________________ OR      _________________________________ ) AND
C ( _________________________________ OR      _________________________________ ) AND
O ( _________________________________ OR      _________________________________ ) AND

List any inclusion criteria/filters: e.g., gender age level, publication dates, language:

________________________________________________________________________________________

List irrelevant terms that you may want to exclude in your search (operator NOT):

________________________________________________________________________________________

6. List the databases you plan to search: (e.g., PubMed, Cochrane, TRIP database, ACCESSSSS Federated Search, National Guideline Clearinghouse, ClinicalTrials.gov, Health Services Technology Assessment Texts, TOXNET, Embase, UpToDate, DynaMedPlus, Clinical Key)

________________________________________________________________________________________

________________________________________________________________________________________

This form was adapted from Syrene A. Miller, PICO Worksheet & Strategy, National Center for Dental Hygiene Research
Appendix 2: Useful Databases When Searching for Evidence

PubMed (free)
- PubMed is developed and maintained by the National Center for Biotechnology Information (NCBI), at the U.S. National Library of Medicine (NLM), located at the National Institutes of Health (NIH).
- PubMed has more than 27 million references that include the MEDLINE database plus the following types of citations:
  o In-process citations, which provide records for articles before those records are indexed with MeSH or converted to out-of-scope status.
  o Citations to articles that are out-of-scope (e.g., covering plate tectonics or astrophysics) from certain MEDLINE journals, primarily general science and general chemistry journals, for which only the life sciences articles are indexed with MeSH.
  o "Ahead of Print" citations that precede the article's final publication in a MEDLINE indexed journal.
  o Citations that precede the date that a journal was selected for MEDLINE indexing (when supplied electronically by the publisher).
  o Pre-1966 citations that have not yet been updated with current MeSH and converted to MEDLINE status.
  o Citations to some additional life sciences journals that submit full text to PMC® (PubMed Central®) and receive a qualitative review by NLM. PMC is a free archive for full-text biomedical and life sciences journal articles. PMC serves as a digital counterpart to the NLM extensive print journal collection; it is a repository for journal literature deposited by participating publishers, as well as for author manuscripts that have been submitted in compliance with the NIH Public Access Policy and similar policies of other research funding agencies.
  o Citations to author manuscripts of articles published by NIH-funded researchers.
  o Citations for the majority of books available on the NCBI Bookshelf (a citation for the book and in some cases each chapter of the book).
- Simply enter your search topics - one or more terms - and click Search. PubMed can be searched using MeSH terms, author names, title words, text words or phrases, journal names, or any combination of these. Retrieved citations are displayed and their associated abstracts can be selected for viewing. A unique feature of PubMed is the ability to instantly find related articles for any citation (under "Similar Articles," +click on “See all” or “See reviews”).
- Using the search bar on the main page of PubMed results in unfiltered articles.
- However, once a search term has been entered a number of filters become available. One of the most useful is the “Article types” filter. Clicking on “Customize” under “Article types,” one can choose types like Meta-Analyses, Systematic Reviews, Randomized Controlled Trial, Observational Study, Case Reports, and many others. Once one or more have been chosen, click on “Show” at the bottom of the drop-down menu. Then one can click on one or more of the types to see which citations are of that study design.
- Other advanced search features and filters are also available. A special Clinical Queries page provides customized searches for studies based on etiology, diagnosis, prognosis, or treatment of a particular disease. Systematic reviews of a topic and medical genetics can also be searched here. Search results can be viewed or downloaded in various formats, including a format suitable for bibliographic management software.
- PubMed's LinkOut feature provides access to a wide variety of relevant web-accessible online resources, including full-text publications, biological databases, consumer health information, research tools, and more. More than 60 percent of PubMed records are linked to the full text on publishers' web sites or in PMC (PubMed Central). More than 90 percent of the records from the past 10 years are linked to full text. Users may have to register, or there may be a fee or subscription required to access the full text.

Cochrane Library – Cochrane Collaboration (fee-based subscription needed [although free abstracts of CDSR articles can be obtained for free from PubMed; full-text free to Salus students via Blackboard > Library Catalogs > Salus Total Search Article Databases])
- Cochrane Database of Systematic Reviews (CDSR)
  o CDSR is the leading resource for systematic reviews in health care. This database contains systematic reviews and meta-analyses of RCTs.
  o In meta-analyses, data are often combined statistically to increase the power of the findings of numerous studies, each too small to produce reliable results.
  o It contains full text articles, as well as protocols focusing on the effects of healthcare.
  o Cochrane reviews are considered to have the strongest level of evidence for intervention questions because they have the best study designs and are generally the most rigorous.
The CDSR includes Cochrane Reviews (the systematic reviews) and protocols for Cochrane Reviews as well as editorials. The CDSR also has occasional supplements. The CDSR is updated regularly as Cochrane Reviews are published ‘when ready’ and form monthly issues.

- The CDSR includes all Cochrane Reviews (and protocols) prepared by Cochrane Review Groups. Each Cochrane Review is a peer-reviewed systematic review that has been prepared and supervised by a Cochrane Review Group (editorial team), according to the Cochrane Handbook for Systematic Reviews of Interventions or Cochrane Handbook for Diagnostic Test Accuracy Reviews. One of the Review Groups is the Eyes and Vision Group.

- **Cochrane Central Register of Controlled Trials (CENTRAL)**
  - CENTRAL is a highly concentrated source of reports of randomised and quasi-randomised controlled trials. The majority of CENTRAL records are taken from bibliographic databases (mainly MEDLINE and Embase), but records are also derived from other published and unpublished sources. In addition to bibliographic details (author, source, year, etc.), CENTRAL records will often include an abstract (a summary of the article). They do not contain the full text of the article.
  - About three-fifths of the records in CENTRAL are taken from MEDLINE. Also, each Cochrane Review Group maintains and updates a collection of controlled trials relevant to its own area of interest; these are called ‘Specialized Registers’. Each Cochrane Review Group may also collect items that are not relevant to its own field of interest; these are known as ‘Handsearch Results.’
  - All Cochrane Review Groups’ Specialized Registers, the handsearch results register, relevant records retrieved from MEDLINE, and relevant records retrieved from EMBASE, are merged and published as CENTRAL.

- **Database of Abstracts of Reviews of Effects (DARE)** (when available, listed under “Full Text Links” in PubMed - free)
  - The Database of Abstracts of Reviews of Effects (DARE) is the only database to contain abstracts of systematic reviews that have been quality-assessed. Each abstract includes a summary of the review together with a critical commentary about the overall quality.
  - DARE is a key resource for busy decision-makers and can be used for answering questions about the effects of specific interventions, whether such questions arise from practice or when making policy. DARE covers a broad range of health related interventions and thousands of abstracts of reviews in fields as diverse as diagnostic tests, public health, health promotion, pharmacology, surgery, psychology, and the organization and delivery of health care.
  - DARE complements the CDSR by quality-assessing and summarizing reviews that have not yet been carried out by Cochrane.
  - DARE was produced by the Centre for Reviews and Dissemination at the University of York, UK, until April 2015. The Cochrane Library will host the archived versions from April 2015 onwards, until further notification.

- **Health Technology Assessment Database (HTA)**
  - The Health Technology Assessment (HTA) Database brings together details of completed and ongoing health technology assessments (studies of the medical, social, ethical, and economic implications of healthcare interventions) from around the world. The aim of the HTA Database is to improve the quality and cost-effectiveness of health care.
  - The HTA database is produced by the Centre for Reviews and Dissemination (CRD) at the University of York, UK, using information obtained from members of International Network of Agencies for Health Technology Assessment (INAHTA) and other health technology assessment organizations.

**TRIP Database**: Turning Research into Practice – (free).
- This website presents the TRIP Database. It provides links to hundreds of other medical databases on the web through a search engine. The TRIP Database is a clinical search tool designed to allow health professionals to rapidly identify the highest quality clinical evidence for clinical practice.
- Registered users (registration is free) benefit from extra features such as CPD, search history, and collaborative tools.
- In addition to Boolean searching you can also use brackets to enhance the search e.g. “(measles OR mumps) and pregnancy.”
- On the results page you can filter your results based on an evidence based medicine hierarchy e.g. evidence-based synopses, systematic reviews. Use the “Filter by” function on the left-hand side of the screen.
- The advanced search (link is to the right of the Search button) gives more flexibility around searching, you may want to try using that.
SUMSearch2 — (free).

- Highlights: SUMSearch simultaneously searches for original studies, systematic reviews, and practice guidelines from multiple sources. Searches for studies are revised up to 6 times as needed, while guidelines and systematic reviews may be revised once each. Results from PubMed, the Database of Abstracts of Reviews of Effectiveness (DARE), and the US National Guidelines Clearinghouse (NGC) are merged and sorted. As SUMSearch executes live searches of external websites in response to your query, SUMSearch is always up-to-date.
- It groups results by category: original studies, systematic reviews, and guidelines. Entries from the blog ClinDx are displayed, along with the New England Journal of Medicine’s Image Challenge, CME cases, and Physician’s First Watch medical news. Recent articles from ACP Journal Club are also displayed.
- Changes from the prior version: 1) faster; 2) search strategies are validated; 3) automated summaries are provided as well as bibliometric markers of article quality; 4) Guidelines from PubMed and National Guidelines Clearinghouse are merged into one list sorted by year of publication, 5) systematic reviews from DARE and PubMed are merged into one list and sorted by year of publication.

ACCESSSSS Federated Search (free with registration)

- ACCESSSSS is designed to find the best evidence-based answer to your clinical questions by simultaneously searching the leading evidence-driven medical publications and high quality clinical literature
- ACCESSSSS provides a single search engine that taps several evidence-based resources among a library’s licensed online medical texts and joins those searches with content from McMaster Premium Literature Services (MacPLUS), arranged according to a hierarchy of relevance to clinical practice.
- Recommendation: look at “hits” at the top of the pyramid (Summaries) first, as they are most likely to provide clinically useful information. If you want systematic reviews or original studies, start at the highest appropriate layer (Synopses of Syntheses and Synopses of Studies respectively) for the highest quality evidence.

National Guideline Clearinghouse (free)

- AHRQ’s National Guideline Clearinghouse is a public resource for summaries of evidence-based clinical practice guidelines
- It includes a collection of guidelines from the U. S. federal government (Agency for Healthcare Research and Quality (AHRQ)) and professional medical societies.

NICE Evidence Services – Evidence Search (free)

- Part of the National Institute for Health and Care Excellence (NICE), this is an online library of evidence of effectiveness and uncertainty. While NICE Evidence Services are designed primarily for professionals and practitioners, patients and the wider public are also able to search most of the content. You can search via keywords (e.g., macular degeneration) and a selection of other search functions (e.g., medicines/commissioning), you can read about evidence using the guidance and knowledge summaries.
- Evidence search provides access to selected and authoritative evidence in health, social care and public health.
  - combines evidence on health, drugs and technologies, public health, social care, and healthcare management and commissioning in one place
  - brings together high quality consolidated and synthesized evidence from hundreds of trusted sources.
  - includes guidance, systematic reviews, evidence summaries and patient information.
  - freely available, without needing to log in.
  - content is refreshed regularly and up-to-date.
  - full text of the search results can be freely obtained in most cases.
  - offers filters to manage search results, allowing access to relevant information more quickly.

Sources include: British National Formulary, Clinical Knowledge Summaries, SIGN, the Cochrane Library and Royal Colleges, Social Care Online and GOV.UK

NICE (National Institute for Health and Clinical Excellence) (free) – collection of guidelines from the U.K.

- Collection of guidelines from the UK.
- Browse guidance by area: Conditions and diseases, Health protection, Lifestyle and wellbeing, Population groups, Service delivery, organization and staffing, Setting.
MedlinePlus (free)

- MedlinePlus is the National Institutes of Health's Web site for patients and their families and friends. Produced by the National Library of Medicine, the world's largest medical library, it brings you information about diseases, conditions, and wellness issues in language you can understand. MedlinePlus offers reliable, up-to-date health information, anytime, anywhere, for free.
- You can use MedlinePlus to learn about the latest treatments, look up information on a drug or supplement, find out the meanings of words, or view medical videos or illustrations. You can also get links to the latest medical research on your topic or find out about clinical trials on a disease or condition.
- Health professionals and consumers alike can depend on it for information that is authoritative and up-to-date. MedlinePlus has extensive information from the National Institutes of Health and other trusted sources on over 1000 diseases and conditions. There are directories, a medical encyclopedia and a medical dictionary, health information in Spanish, extensive information on prescription and nonprescription drugs, health information from the media, and links to thousands of clinical trials. MedlinePlus is updated daily.
- It includes:
  o Over 1000 health topic pages in English (many of these are also available in Spanish)
  o Information from over 1,000 organizations
  o Over 35,000 links to authoritative health information

ClinicalTrials.gov (free)

- ClinicalTrials.gov is a registry and results database of publicly and privately supported clinical studies of human participants conducted around the world.
- ClinicalTrials.gov is a Web-based resource that provides patients, their family members, health care professionals, researchers, and the public with easy access to information on publicly and privately supported clinical studies on a wide range of diseases and conditions.
- The Web site is maintained by the National Library of Medicine (NLM) at the National Institutes of Health (NIH).
- Information on ClinicalTrials.gov is provided and updated by the sponsor or principal investigator of the clinical study. Studies are generally submitted to the Web site (i.e., registered) when they begin, and the information on the site is updated throughout the study. In some cases, results of the study are submitted after the study ends.
- ClinicalTrials.gov does not contain information about all the clinical studies conducted in the United States because not all studies are required by law to be registered (e.g., observational studies and trials that do not study a drug, biologic, or device).
- Each ClinicalTrials.gov record presents summary information about a study protocol and includes the following:
  o Disease or condition
  o Intervention (for example, the medical product, behavior, or procedure being studied)
  o Title, description, and design of the study
  o Requirements for participation (eligibility criteria)
  o Locations where the study is being conducted
  o Contact information for the study locations
  o Links to relevant information on other health Web sites, such as NLM's MedlinePlus® for patient health information and PubMed® for citations and abstracts of scholarly articles in the field of medicine
  o Note: some records also include information on the results of the study.

TOXNET: Toxicology Data Network (free)

- TOXNET® (TOXicology Data NETwork) is a group of databases covering chemicals and drugs, diseases and the environment, environmental health, occupational safety and health, poisoning, risk assessment and regulations, and toxicology. It is managed by the Toxicology and Environmental Health Information Program (TEHIP) in the Division of Specialized Information Services (SIS) of the National Library of Medicine (NLM). A mobile version of TOXNET is available.
- Use TOXNET to find:
  o Specific chemicals, mixtures, and products
  o Chemical nomenclature
  o Chemicals that may be associated with a disease, condition or symptom
  o Chemicals associated with consumer products, occupations, hobbies, and more
  o Special toxic effects of chemicals in humans and/or animals
  o Citations from the scientific literature
- TOXNET provides links to PubMed®, NLM's free web interface to the world's biomedical literature, and to additional sources of toxicological information.
Health Services Technology Assessment Texts - HSTAT (free)

- HSTAT is a free, electronic resource that provides access to the full-text of documents useful in health care decision making. HSTAT’s audience includes health care providers, health service researchers, policy makers, payers, consumers and the information professionals who serve these groups.

National Information Center on Health Services Research and Health Care Technology (NICHSR) – U.S. National Library of Medicine (free)

- HSR Information Central is not an index of all health services resources on the Web. Rather, it contains selective links representing a sample of available information. Items are selected for their quality, authority of authorship, uniqueness, and appropriateness.
- The overall goals of the NICHSR are: to make the results of health services research, including practice guidelines and technology assessments, readily available to health practitioners, health care administrators, health policy makers, payers, and the information professionals who serve these groups; to improve access to data and information needed by the creators of health services research; and to contribute to the information infrastructure needed to foster patient record systems that can produce useful health services research data as a by-product of providing health care.

DailyMed – National Library of Medicine, NIH (free)

- DailyMed provides trustworthy information about marketed drugs in the United States. DailyMed is the official provider of FDA label information (package inserts). This Web site provides a standard, comprehensive, up-to-date, look-up and download resource of medication content and labeling found in medication package inserts.
- The National Library of Medicine (NLM) provides this as a public service and does not accept advertisements. The drug labeling information on this Web site is the most recent submitted to the Food and Drug Administration (FDA) and currently in use; it may include, for example, strengthened warnings undergoing FDA review or minor editorial changes. These labels have been reformatted to make them easier to read.

World Health Organization (WHO) Global Index Medicus (free)

- The Global Index Medicus (GIM) provides worldwide access to biomedical and public health literature produced by and within low- and middle-income countries. The main objective is to increase the visibility and usability of this important set of resources.
- The material is collated and aggregated by WHO Regional Office Libraries (i.e., Africa [AFRO], Americas [AMRO/PAHO], Eastern Mediterranean [EMRO], Europe [EURO], South-East Asia [SEARO], and Western Pacific [WPRO]) on a central search platform allowing retrieval of bibliographical and full text information.

Embase – Elsevier (fee-based subscription)

- Embase is a highly versatile, multipurpose and up-to-date biomedical database. It covers the most important international biomedical literature from 1947 to the present day. It has a more European emphasis than PubMed and includes more non-English language biomedical journals than PubMed.
- Over 32 million records, including all the content available in MEDLINE
- Over 8,500 indexed peer-reviewed journals, including over 2,900 not available in MEDLINE
- Over 1.5 million records added annually, with on average more than 6,000 records each working day
- Over 2.3 million conference abstracts indexed from more than 7,000 conferences dating from 2009
- In-press publications
- Dedicated query forms for drug, disease and medical device searches along with a PICO query form for systematic reviews

ScienceDirect – Elsevier (fee-based subscription)

- This is a platform of peer-reviewed scholarly literature. It includes millions of articles from over 3,800 journals and more than 35,000 book titles.
• Thousands of Elsevier journals, articles and book chapters are available on ScienceDirect as open access.
• Books on ScienceDirect cover 24 subject collections across disciplines such as biochemistry, genetics and molecular biology, chemistry, clinical medicine, engineering and veterinary medicine.

**Web of Science** - Clarivate Analytics (fee-based subscription needed)
• This is an online scientific citation indexing service that provides a comprehensive citation search. It includes information from more than 18,000 journals with 1.3 billion cited references going back to 1900, over 180,000 conference proceedings, and over 80,000 books
• The **Web of Science Core Collection** was originally produced by the Institute for Scientific Information (ISI), now maintained by Clarivate Analytics (previously the Intellectual Property and Science business of Thomson Reuters). It gives access to multiple databases that reference cross-disciplinary research, which allows for in-depth exploration of specialized sub-fields within an academic or scientific discipline.
• Web of Science is a comprehensive research platform. Journal articles, patents, websites, conference proceedings, Open Access material—all can be accessed through one interface, using a variety of powerful search and analysis tools. Web of Science Core Collection is a painstakingly selected, actively curated database of the journals that researchers themselves have judged to be the most important and useful in their fields.
• It combines the following citation databases:
  - Science Citation Index Expanded. Over 8,850 major journals across 150 disciplines from 1900 to the present. This database allows a researcher to identify which later articles have cited a particular article published earlier or the articles of any particular author, and to determine which articles have been cited most frequently.
  - Social Sciences Citation Index. Over 3,200 journals across 55 social science disciplines, as well as selected items from 3,500 of the world’s leading scientific and technical journals from 1900 to the present.
  - Arts & Humanities Citation IndexFully. Indexes over 1,700 arts and humanities journals, as well as selected items from over 250 scientific and social sciences journals from 1975 to the present.
  - Emerging Sources Citation Index. Covering over 5,000 journals, EXCI captures scientific, social science, and humanities trends and developments beyond the high-impact literature.
  - Book Citation Index. Indexes over 80,000 editorially selected books with 10,000 new books added each year from 2005 to the present.
  - Conference Proceeding Citation Index. This multidisciplinary index is the fastest way to gain access to cutting edge, impactful research derived from over 180,000 conference proceedings from 1990 to the present

**Faculty of 1000 (F1000)** - Faculty of 1000 Ltd. (fee-based subscription; 30-day free trial available)
• F1000Prime provides researchers with a personalized literature service of article recommendations from our Faculty of 8,000 leading researchers in biology and medicine. It publishes article recommendations of the best papers in biology and medicine, providing expert commentary on the top articles across 4,000+ journals.
• F1000Workspace offers scientists a comprehensive suite of software and services to write and collaborate on papers, annotate and share references and articles, as well as easily discover and save relevant new articles.
• F1000Research is an Open Science publishing platform for life scientists, offering fast publication and transparent refereeing, avoiding editorial bias and ensuring the inclusion of all source data.

**Cumulative Index to Nursing and Allied Health Literature (CINAHL)** – EBSCO Health (fee-based subscription; a free trial is available)
• CINAHL provides indexing for more than 3,100 journals from the fields of nursing and allied health. The database contains more than 3.7 million records dating back to 1981. Offering complete coverage of English-language nursing journals and publications from the National League for Nursing and the American Nurses' Association, CINAHL covers nursing, biomedicine, health sciences librarianship, alternative/complementary medicine, consumer health and 17 allied health disciplines.
• In addition, this database offers access to health care books, nursing dissertations, selected conference proceedings, standards of practice, educational software, audiovisuals and book chapters. Searchable cited references for more than 1,300 journals are also included. Full-text material includes more than 70 journals plus legal cases, clinical innovations, critical paths, drug records, research instruments and clinical trials.

A related product is **CINAHL Complete** – (fee-based subscription; a free trial is available)
• Users get fast and easy full-text access to top journals, evidence-based care sheets, quick lessons and more.
• This product indexes more than 5,400 journals (full-text from about 1,450 journals). There are more than 5.5 million records dating back to 1937.
PsycINFO – American Psychological Association (APA) (fee-based subscription)
- This database is the world's largest resource devoted to peer-reviewed literature in behavioral science and mental health. It is produced by the American Psychological Association and distributed on the association's APA PsycNET and through third-party vendors.
- This database contains more than 4 million records centered on psychology and the behavioral and social sciences. The records are from peer-reviewed journals, books, and dissertations. Upwards of 4,000 indexed records are added each week.
- Over 2,500 scholarly journals are indexed. There are more than 90 million cited references in over 1.8 million journal articles, books, and book chapters.
- Earliest records are from the 17th and 18th centuries, with extensive coverage from the 1800s to the present.
- It provides professional coverage beyond psychology to include related disciplines such as medicine, law, social work, neuroscience, business, nursing, forensics, engineering, and more.
- Extensive pre-release quality assurance and post-release record monitoring ensures highly relevant and accurate results.

Scopus – Elsevier (fee-based subscription)
- Scopus is the largest abstract and citation database of peer-reviewed literature: scientific journals, books, and conference proceedings.
- There are over 69 million items indexed on Scopus. Approximately 3 million new records are added each year. These include more than 22,700 peer-reviewed journals, 562 book serials (accounting for 34,000 individual book volumes), around 145,000 non-serial books, close to 8 million conference papers from nearly 100,000 worldwide events, and over 28 million patents.

International prospective register of systematic reviews (PROSPERO) - (free)
- PROSPERO is an international database of prospectively registered systematic reviews in health and social care, welfare, public health, education, crime, justice, and international development, where there is a health related outcome. Key features from the review protocol are recorded and maintained as a permanent record.
- Systematic review protocols on PROSPERO can include any type of any study design. Reviews of reviews and reviews of methodological issues that contain at least one outcome of direct patient or clinical relevance are also accepted.
- PROSPERO aims to provide a comprehensive listing of systematic reviews registered at inception to help avoid duplication and reduce opportunity for reporting bias by enabling comparison of completed review with what was planned in the protocol.
- PROSPERO is an open public access and user-friendly registry with no charges for registering a study protocol.
- PROSPERO is produced by Centre for Reviews and Dissemination (CRD) and funded by the National Institute for Health Research (NIHR).

Google Scholar (free)
- Despite its vast coverage of the scholarly literature, Google Scholar is not sufficient to be used on its own as a single database to support SR searching. The reason for this is not low precision in GS searching, which is comparable to traditional databases. More problematic is GS' low recall capabilities which are related to the viewable 1000 search results only policy of the search engine.
- It searches many sources: articles, theses, books, abstracts and court opinions, from academic publishers, professional societies, online repositories, universities and other web sites.
- Google Scholar aims to rank documents the way researchers do, weighing the full text of each document, where it was published, who it was written by, as well as how often and how recently it has been cited in other scholarly literature.
- Google Scholar selects references matching text words, based on algorithms. These algorithms change over time, often unexpectedly. Also the syntax that can be used changes from time to time; for example, the tilde (~), searching for synonyms, was recently discontinued. Repeatability with consistent results is impossible. The number of hits reported cannot be trusted as an accurate measurement.

Epistemonikos (free)
- Epistemonikos is a collaborative, multilingual database of research evidence and knowledge translation products.
- It was developed and is maintained by systematically searching electronic databases and other sources for relevant systematic reviews and broad syntheses of reviews.
Epistemonikos is not a comprehensive database of health research. It only includes primary studies that have been included in a systematic review.

It can easily be searched by typing terms into the search box and clicking on the “Search Epistemonikos” button. Articles will appear at the top based on an algorithm developed by the Epistemonikos team. For instance, articles including all terms entered in the query will appear first, and those including some terms will appear later. As you move away from results at the top of the search results, you will find less pertinent articles. Additional articles can also be found by opening the abstract for relevant articles that are found and then clicking on one of the boxes on the right (“the dolmen”) showing evidence related to the article.

The Epistemonikos foundation is a not for profit organization based in Santiago, Chile, and the Epistemonikos database follows its policies.

**Johns Hopkins Antibiotic Guide** (fee-based subscription)

- The Johns Hopkins POC-IT ABX Guide is intended for use by any clinician or other health care provider who engages patients with infectious diseases. It delivers up-to-date, authoritative information on infectious diseases, drugs, and pathogens written by the experts at the Johns Hopkins University School of Medicine.
- POC-IT (Point Of Care – Information Technology) Guides—available on the web and mobile devices—are designed for real-time use at the bedside or in the exam room in both primary- and specialty-care clinical settings.
- Features:
  - Monthly updates
  - Hundreds of brand name and generic drug listings
  - Diagnosis, Pathogen, Management, and Vaccine Indices
  - Evidence-based recommendations
  - Expert comments and analysis
  - Tabular summary of available drug forms and costs
  - Adverse Reactions and Drug Interactions
  - Personalized favorites
  - Optimized interface for each device platform
  - Web access for one year

**Sanford Guide to Antimicrobial Therapy** (fee-based subscription)

- The Sanford Antimicrobial Therapy App includes treatment recommendations for all types of infections, updated monthly with the latest information. The app includes bug and drug information, spectra of activity, dosing tables, calculators, and more.
- The Sanford Guide Collection App provides access to Antimicrobial, HIV/AIDS, and Viral Hepatitis Therapy content, bundled into a single searchable database. Users may create customized bookmarks and notes within the app to provide fast access to frequently accessed material. Subscriptions include information on over 1,000 syndromes and anti-infective agents, in addition to pharmacology and dosing tables, spectra of activity, and useful calculators. Content may be installed on iOS, Android, and Windows 10 devices.
Appendix 3: Point-of-Care Information Summary Resources

These are web-based compendiums designed to provide health professionals with comprehensive evidence condensed into easily digestible formats.

**DynaMed Plus** (fee-based subscription; a free trial is available)
- This is a clinical support/reference tool that contains evidence-based clinical review summaries for use primarily at the point-of-care. It provides evidence boiled down to actionable steps, added to more than a 3,300 topics. Clinicians can easily see the levels of evidence and guidelines behind each recommendation.
- Updated daily, DynaMed editors monitor the content of over 500 medical journals. Each article is evaluated for clinical relevance and scientific validity. The new evidence is then integrated with existing content, and overall conclusions are changed as appropriate, representing a synthesis of the best available evidence. It has the fastest speed of updating of the most popular point-of-care information resources.
- The format is bulleted lists (as opposed to narrative).
- Dynamed Plus editors systematically monitor journals, journal review services, systematic review collections, guideline collections, drug information sources and other relevant sources.
- Micromedex provides Medication Management and Lab Recommendation resources, including dosage, therapeutic use, cautions, comparative efficacy, approved and off-label indications, pharmacokinetics, clinical applications, and interactions of medications. Interactions include drug-drug, drug-food, drug-alcohol, drug-tobacco, and drug-laboratory.
- Content from 23 specialties is included (although ophthalmology is not included).
- A mobile app is complementary with the subscription so one can access all of the content on an iPhone, iPad, or Android device. This provides the ability to email topics, bookmark favorites, and create and save notes.
- The search algorithm in DynaMed Plus is based on concept-based searching and includes intelligent auto-suggest, direct-to-section search results, exact match summary display, and quick access to relevant images and calculators.
- The DynaMed Plus evidence-based methodology applies the following strict protocols:
  - Identifying the evidence
  - Selecting the best available evidence
  - Critical appraisal
  - Objectively reporting the evidence
  - Synthesizing multiple evidence reports
  - Basing conclusions on the evidence
  - Updating daily
- There are three levels of grades/recommendations, but not all summaries have graded evidence.
- Patient-level information is available for some topics.

**UpToDate** Wolters Kluwer (fee-based subscription)
- UpToDate is a point-of-care clinical decision support system designed to provide quick and easy access to clinical information.
- Updated daily, the UpToDate editors monitor the content of over 460 medical journals. There are more than 11,000 original topic reviews written by a recognized faculty of experts who each address a specific clinical issue and provide detailed recommendations. Each topic review is peer reviewed, referenced, and offers CME credit.
- The format is narrative (as opposed to bulleted lists).
- There are two levels of grading, but not all summaries have graded evidence.
- It links to the LexiComp Drug database, including drug-to-drug, drug-to-herb, and herb-to-herb interactions information.
- There is a section on Practice Changing Updates that highlights specific new recommendations and/or updates that may change usual clinical practice.
- There is a graphics search engine that allows searching for more than 32,000 pictures, tables, diagrams, graphs, videos, illustrations, and algorithms.
- There are more than 1,500 corresponding patient information topics, plus more than 1,000 in universal Spanish. Clinicians can review this information with patients in the exam room, print out as handouts, or send via email.
- Content from 22 specialties is included (although ophthalmology is not included).
- UpToDate is in electronic format and is compatible with hand-held, mobile devices.
**BMJ Clinical Evidence** (Individual subscriptions to Clinical Evidence are no longer available; academic institutions can buy a site license; 14-day free trial available)

- This comprises a database of high-quality, rigorously developed systematic overviews assessing the benefits and harms of treatments, and a suite of EBM resources and training materials.
- It is a frequently updated compendium of evidence on the effects of common clinical interventions, published by the BMJ Publishing Group.
- It provides a concise account of the current state of knowledge, ignorance, and uncertainty about the prevention and treatment of a wide range of clinical conditions.
- It is not a textbook of medicine or a book of guidelines.

**eMedicine – Medscape (free)**

- eMedicine is an online, peer-reviewed medical reference that provides access to information on diseases, including background, differential diagnosis, work-up, treatment, medications, and follow-up. Consumer health content began in 2003.
- Contributors include physicians and faculty from medical schools and medical societies.
- Additional resources include clinical calculators, images, CME, decision rules, and drug information.

**EBM Guidelines** (fee-based subscription)

- This is an easy-to-use collection of clinical guidelines for primary and ambulatory care linked to the best available evidence. Continuously updated, EBM Guidelines follows the latest developments in clinical medicine and brings evidence into practice.
- EBM Guidelines is designed to provide you with the information that you need, using one search term, within one minute. Designed for use at the point of care, the guidelines are delivered in a format that makes it easy for a clinician to make a decision regarding treatment.
- Core clinical knowledge: nearly 1,000 concise primary care practice guidelines
- Trusted evidence: Over 3,000 quality graded evidence summaries, supporting the given recommendations
- Find the solution: Powerful software and indexing (including MeSH and UMLS) enabling quick and effective searching
- Watch the experts: An expanding collection of videos (currently over 60), showing clinical examinations and procedures, and ultrasonographic examinations
- See the problem: A searchable library of over 1,000 high-quality photographs and images including extensive collections of dermatological and eye images
- Hear the problem: Audio samples linked to articles, including descriptions of pulmonary diseases and heart murmurs in children
- Cochrane Inside: All Cochrane Systematic Reviews cited within EBM Guidelines are provided in full text
- Key calculations: Tools for the calculation of peak expiratory flow rate variation, body mass index and LDL cholesterol, amongst others

**Essential Evidence Plus – EE+** (fee-based subscription; a 30-day free trial is available)

- EE+ is an evidence-based clinical decision support system that includes information on 9,000 diagnoses. It gives you access to background, prevention, diagnosis, treatment, prognosis, special populations, guidelines, evidence, or resources.
- Each Essential Evidence Topic is integrated with evidence-based content such as decision support tools, diagnostic calculators, Cochrane Abstracts, POEMs (“Patient-Oriented Evidence that Matters”), evidence-based guidelines, and more.
- It includes over 13,000 topics, guidelines, abstracts, tools, images, and summaries covering the most common conditions, diseases, and procedures.
- Each topic has a “strength-of-evidence” rating for every recommendation and a “Bottom Line” summary that introduces each section.
- EE+ is available from any Internet connected device, including Smartphones.

**ClinicalKey** (fee-based subscription; 30-day free trial available)

- It contains a large collection of medical text and reference books, combined with full-text journal content and other useful content such as Procedures Consult and a large collection of medical videos and images that can be easily searched simultaneously.
- Ophthalmology is one of the Physician Specialty Content Packages ($649/year).
- Its use as a point-of-care product is somewhat limited by the fact that First Consult, which represents the major point-of-care content in ClinicalKey, is not that comparable to UpToDate.
- Topic Pages: Quick clinical answers and summaries from Conn’s Current Therapy, Goldman’s Cecil Medicine, Ferri’s Clinical Advisor and First Consult
- Full-Text Books: Elsevier’s world-renowned medical and surgical books, including Gray’s Anatomy, Goldman’s Cecil Medicine, Braunwald’s Heart Disease, Campbell’s Operative Orthopaedics and more
- Full-Text Journals: More than 600 top journals from Elsevier
- Medical and Surgical Videos: A continuously updated library of searchable video content
- Procedures Consult Videos and Articles: Step-by-step procedural videos and articles to teach techniques or simply help clinicians refresh their skills
- Images: A continuously updated library of searchable images from trusted books and journals
- Clinics: Full-text medical and surgical clinical review articles
- First Consult Monographs: Succinct, trusted clinical answers for clinicians at the point of care
- Drug Monographs: Continuously updated, with detailed information about hundreds of specific prescription drugs, over-the-counter products, nutritional supplements and herdals
- Practice Guidelines: Full-text practice guidelines from journals, links to full-text guidelines from professional and government agencies.
- Customizable Patient Education Handouts: Educational handouts that can incorporate institutional branding and special instructions, as well as the patient's preferred language and text size
- MEDLINE® Abstracts: Fully indexed, searchable abstracts retrieved daily from the National Library of Medicine
- Clinical Trials: Fully indexed, searchable clinical trials retrieved daily from the clinicaltrials.gov database

**BMJ Best Practice** (fee-based subscription; 7-day free trial available)

- BMJ Best Practice is an online decision-support tool for use at the point of care. In a single source, BMJ Best Practice brings together regularly updated research evidence and guidelines with peer-reviewed expert opinion.
- Distributed by ProQuest to medical schools, VA hospitals, and teaching hospitals in the United States and Canada, BMJ Best Practice gives clinicians and students fast and easy access to reliable, up-to-date information when making diagnosis and treatment decisions.
- Best Practice is a completely new concept for information delivered at the point of care. In a single source the latest research evidence is combined with guidelines and expert opinion – presented in a step-by-step approach – covering prevention, diagnosis, treatment and prognosis.
- Regularly updated, Best Practice provides a second opinion in an instant, without the need for checking multiple resources. Its unique patient-focused approach represents a major new advancement in information delivery at the point of care. In fact, Best Practice was rated among the three best point of care tools by an independent study published in the January 2016 issue of the Journal of Medical Information Research.

**Cochrane Clinical Answers** (fee-based subscription; 30-day free trial available)

- Cochrane Clinical Answers (CCAs) provide a readable, digestible, clinically focused entry point to rigorous research from Cochrane systematic reviews. They are designed to be actionable and to inform decision making at the point of care. Each Cochrane Clinical Answer contains a clinical question, a short answer, and an opportunity to “drill down” to the evidence from relevant Cochrane reviews. The evidence is displayed in a user-friendly format, mixing narrative, numbers and graphics. The target audience for Cochrane Clinical Answers is healthcare practitioners and professionals, and other informed health care decision-makers. Cochrane Clinical Answers have been developed by Cochrane Innovations Ltd. and Wiley Online Library.
- Get practical evidence for healthcare decision-making with Cochrane Clinical Answers, a new physician-focused resource from the Cochrane Library. Based on the high-quality evidence of Cochrane systematic reviews, this clinical support tool provides evidence-based answers when and where you need them most, making it easy to find authoritative answers to your clinical questions. Cochrane Clinical Answers focuses on important patient-centered outcomes, enabling you to apply the results of Cochrane reviews in practice.
- There is an “Eyes and Vision” section.