

Searching for the right evidence: how to answer your clinical questions using the 6S hierarchy

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Asking and answering clinical questions during daily practice can be challenging and time consuming. Knowing the resources available to answer a specific clinical question can lead to a more efficient and effective search strategy and thus, to a more applicable answer based on the levels of evidence available. This primer reviews how to search for the right evidence using a specified hierarchy and provides examples of pre-appraised resources with corresponding websites to help with your search.

Introduction

The readers of our journal most likely have busy clinical, administrative and/or teaching roles. As such, time is of the essence when thinking about answering clinical questions that arise in patient care. DiCenso and colleagues recently published a hierarchy of pre-appraised evidence called the 6S model.¹ This model denotes in a pyramidal fashion the six levels of evidence available in clinical decision making. It starts with the largest resource available at the base of the pyramid with individual original studies. It then moves upward through synopses of studies, syntheses, synopses of syntheses, summaries and ends with the most specific form of evidence at the apex, with the "systems" layer. This article is a primer on how to use the 6S model when searching for and assessing the highest quality of evidence. The text and Table provide a summary view of clinical questions associated with each stage of the hierarchy, the strengths and weaknesses for each level of evidence, and a comprehensive list of pre-appraised resources with corresponding websites.

Studies (base of the pyramid)

Clinical question

I want to find the latest treatment for my patient's illness and want to use an evidence-based approach (ask, acquire, appraise and apply). Where should I look for this information?

Answer

In this case, searching the primary literature for single articles would be best.

Sample resources

PubMed; Clinical Queries; international literature searches through EMBASE; topics of nursing, biomedicine, health sciences librarianship, alternative/complementary medicine and consumer health through CINAHL; PsycINFO (see table 1 for corresponding websites of all sample resources in this article).

Strengths

The most updated studies are readily available both online and in print. Many of these resources provide

alerts when new articles in a topic of interest are published.

Weaknesses

When using original studies, you need to understand how to use the search engines to find the study you are interested in and then subsequently interpret and apply the study on your own without an expert opinion. This can be tedious and time consuming.

Synopses of studies (above studies)

Clinical question

I want to find the latest treatment for my patient's illness but: (1) do not have the time to read the study thoroughly, and/or (2) do not feel that I have the expertise to interpret the information in the article. Where should I look for this information?

Answer

Using resources that summarise single studies would be the best place to look. Some of these resources include appraisal and application of the literature.

Sample resources

ACPJournalWise; Evidence-Based Medicine; McMaster PLUS Database; Journal Watch.

Strengths

The studies chosen for synthesis are usually of higher quality, summarised for the reader and have commentary to help interpret the findings in the appropriate clinical context.

Weaknesses

Not every study has a synopsis, and thus the list of studies with a summary is not extensive.

Syntheses (step above synopses of studies)

Clinical question

I know there is a lot of literature about my clinical question but is there a resource I can use that integrates all of this information and provides recommendations given the data?

Answer

Systematic reviews with or without meta-analyses are ideally suited for this type of questioning.

Sample resources

PubMed; The Cochrane Library; DynaMed; Database of Abstracts of Reviews of Effects (DARE); The Campbell Library; Agency for Healthcare Research and Quality (AHRQ).



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Table 1 Clinical questions and available resources associated with the 6S model of evidence

Level of evidence	Clinical question	Resource*	Resource website	Resource description
Studies	I want to find the latest treatment for my patient's illness and want to use an evidence-based approach (ask, acquire, appraise and apply). Where should I look for this information?	PubMed	http://www.pubmed.gov	Database of life sciences and biomedical literature covering medicine, nursing, pharmacy, dentistry, veterinary medicine and healthcare from 1950 to present. Comprises more than 21 million citations for biomedical literature from MEDLINE, life science journals and online books
		Clinical Queries	http://www.ncbi.nlm.nih.gov/corehtml/query/static/clinical.shtml	Searches are limited to specific clinical research areas
		EMBASE	http://www.embase.com	Database covering international biomedical literature from 1947 to present and includes drug-related and clinical literature, comprehensive indexing of adverse drug reactions, systematic reviews and the development and use of medical devices
		CINAHL	http://www.ebscohost.com/academic/cinahl-plus-with-full-text	Database including topics of nursing, biomedicine, health sciences librarianship, alternative/complementary medicine and consumer health
		PsycINFO	http://www.apa.org/pubs/databases/psycinfo/index.aspx	Abstracting and indexing database with more than three million records devoted to peer-reviewed literature in the behavioural sciences and mental health
Synopses of studies	I want to find the latest treatment for my patient's illness but: (1) do not have the time to read the study thoroughly or (2) do not feel that I have the expertise to interpret the information in the article. Where should I look for this information?	Evidence-based medicine	http://ebm.bmj.com	Systematically searches international medical journals applying strict criteria for the validity of research. Experts critically appraise the validity of the most clinically relevant articles and summarise them including commentary on their clinical applicability
		ACPJournalWise	http://journalwise.acponline.org	Screens over 120 journals for recently published articles in the medical disciplines of the reader's choice
		McMaster PLUS Database	http://plus.mcmaster.ca/McMasterPLUSDB/Default.aspx?Page=1	Critically appraises articles and then rates their relevance and newsworthiness through the McMaster Online Rating of Evidence (MORE) system
		Journal Watch	http://www.jwatch.org	Distills research and practice guidelines into focused clinical summaries in topics of medical news, drug information and public health alerts
Syntheses	I know there is a lot of literature about my clinical question but is there a resource I can use that integrates all of this information and provides recommendations given the data?	PubMed	http://www.pubmed.gov	See Studies section above for description

Continued

Table 1 Continued

Level of evidence	Clinical question	Resource*	Resource website	Resource description
		The Cochrane Library	http://www.thecochranelibrary.com	Database of over 5000 systematic reviews of primary research in human healthcare and health policy
		The Campbell Library	http://www.campbellcollaboration.org/library.php	Prepares, maintains and disseminates systematic reviews in education, crime and justice and social welfare
		DynaMed	http://dynamed.ebscohost.com	Reviews articles on a daily basis and integrates new evidence with existing evidence for an overall conclusion. Contains clinically organised summaries for more than 3200 topics
		DARE	http://www.crd.york.ac.uk/CRDWeb	Databases of systematic reviews, economic evaluations, health technology assessments, summaries of Cochrane and Campbell reviews
		AHRQ	http://www.ahrq.gov/clinic	Supports efforts in decision-making in many venues including US Preventive Services Task Force (that makes recommendations about clinical preventive services) and evidence-based practice centres (that develop evidence reports and technology assessments on topics relevant to clinical and other healthcare organisation and delivery issues)
Synopses of syntheses	I know there is a lot of literature about my question but I do not want to read through an entire systematic review to determine the evidence. Where should I look for this information?	ACPJournalWise	http://journalwise.acponline.org	See Studies section above for description
		Evidence-Based Medicine	http://ebm.bmj.com	See Synopses of studies section above for description
		DARE	http://www.crd.york.ac.uk/CRDWeb	See Syntheses section above for description
		Journal Watch	http://www.jwatch.org	See Synopses of studies section above for description
		Evidence-Based Mental Health	http://ebmh.bmj.com	Assesses the clinical relevance of mental health studies from international medical journals and presents key details of selected studies using an abstract with an expert commentary on clinical application
		Evidence-Based Nursing	http://ebn.bmj.com	Assesses the clinical relevance and rigour of select nursing studies and provides key findings and implications for clinical practice
		Bandolier	http://www.medicine.ox.ac.uk/bandolier/index.html	Searches the literature presents results as simple bullet points of those things that worked and those that did not. Information comes

Continued

Table 1 Continued

Level of evidence	Clinical question	Resource*	Resource website	Resource description
				from systematic reviews, meta-analyses, randomised trials and from high quality observational studies
Summaries	I just want to apply the evidence for my patients when the topic arises. Where can I go to find the clinical bottom line?	AHRQ	http://www.ahrq.gov/clinic	See Syntheses section above for description
		National Guidelines Clearinghouse	http://www.guidelines.gov	Contains detailed information on clinical practice guidelines
		Clinical Evidence	http://www.clinicalevidence.com	Database of systematic overviews assessing the benefits and harms of treatments
		PIER	pier.acponline.org	A decision-support tool designed for point-of-care use by internists. Provides recommendations for treatment and the evidence used to formulate the recommendations for internal medicine topics
		AHRQ	http://www.ahrq.gov/clinic	See Synopses of studies above for description
		UpToDate	http://www.uptodate.com	Clinical knowledge database that synthesises the most recent medical information into evidence-based medicine recommendations
		GIDEON	http://www.gideononline.com	Online infectious diseases application providing up to date information on epidemiology, treatment and microbiology infectious diseases
		Skinsight	http://www.skindsight.com/search.htm	Reviews dermatologic conditions and provides clinical information on what to look for in a patient, best tests and therapies
Systems	How can I keep up with the guidelines for each of my individual patients?	Not currently available for widespread use	–	–

*Some of the resources listed require subscriptions, and thus may not be accessible to all readers.

Strengths

Systematic reviews: (1) integrate existing information and thus provide increased power and precision or effect size; (2) establish whether findings are consistent and can be generalised; (3) assess consistency of relationships (direction and magnitude of the outcome) given the variability in study protocols; (4) explain data inconsistencies and conflicts and (5) can reduce random and systematic errors (bias) of single studies by using meta-analytic techniques to combine data.

Weaknesses

Systematic reviews: (1) can be very long and difficult to read; (2) do not control for sources of bias; (3) can result in bad statistical outcomes if poorly designed/analysed studies are combined (garbage-in and garbage-out); (4) can result in exaggerated outcomes if only published studies are used (ie, bias against negative or unpublished

results) and (5) can be misleading if conducted with an agenda-driven bias.

Synopses of syntheses (step above syntheses)

Clinical question

I know there is a lot of literature about my question but I do not want to read through an entire systematic review to determine the evidence. Where should I look for this information?

Answer

Use resources that provide a synopsis of syntheses.

Sample resources

ACPJournalWise; Evidence-Based Medicine; DARE; DynaMed; Journal Watch; Evidence-Based Mental Health; Evidence-Based Nursing; AHRQ; Bandolier.

Strengths

These synopses provide a summary of a systematic review with clinical implications and often review the methodological rigour of the studies included.

Weaknesses

These synopses may not be very current as it may take some time for a synopsis to be conducted and published.

Summaries (step above synopses of syntheses)**Clinical question**

I just want to apply the evidence for my patients when the topic arises. Where can I go to find the clinical bottom line?

Answer

Look for summaries that provide evidence-based decision clinical practice guidelines.

Sample resources

National Guidelines Clearinghouse; Clinical Evidence; ACP's Physicians' Information and Education Resource (PIER); UpToDate; AHRQ; Skinsight; GIDEON.

Strengths

These summaries often provide levels of evidence to help determine the strength of the evidence for a particular therapy, screening, etc.

Weaknesses

Summaries need to be updated often as evidence changes. Different practice guidelines may exist depending on the organisation that establishes the guidelines. Thus, it may be difficult to decide on the best practice given different guidelines.

Systems (top of pyramid)**Clinical question**

How can I keep up with the guidelines for each of my individual patients?

Answer

Electronic health records that have computerised decision support systems would be one way to keep up-to-date and evidence-based for each patient in real time.

Sample resources

These systems are evolving and not currently widespread. The most common example is seen in the US Veteran's Administration electronic medical record.

Strengths

A system would include a custom-fitted health plan for each patient based on their individual characteristics and health status.

Weaknesses

The system itself would need to be upgraded regularly as evidence-based medical decisions change. One potential draw-back is that a system may not be able to consider patient preferences in decision-making.

Conclusions

For readers with limited time, using search engines to help find the best available evidence may be appealing. Sites such as Google have a custom search link one can use <http://www.google.com/cse/home?cx=004326897958477606950%3Adjcbstrxkatm>. Google also has Google Scholar that can help with medical literature searches. Searchable databases include the TRIP database (<http://www.tripdatabase.com>), Evidence-Based Medicine Reviews (<http://www.ovid.com/site/catalog/DataBase/904.jsp>), the Centre for Reviews and Dissemination (<http://www.york.ac.uk/inst/crd/index.htm>) and SUMSearch 2 (<http://sumsearch.org>). Unfortunately, some of these search engines and the resources reviewed require a paid subscription.

While we all await the day for instant answers to our clinical questions, we currently must use the best evidence at the most specific level available when searching the medical literature. Developing a familiarity with one or two resources at each step of the hierarchy can only help improve our efficiency and effectiveness during our clinical inquiries.

Competing interests None.

Correction notice This article has been corrected since it was published Online First. The Introduction section has been added into the article.

Reference

1. DiCenso A, Bayley L, Haynes RB. Accessing pre-appraised evidence: fine-tuning the 5S model into a 6S model. *Evid Based Nurs* 2009;12:99–101.