



# **Evidence Based Medicine in Clinical Practice**

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# Learning Objectives

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- **What is EBM? – Definition**
- **Why is EBM becoming important?**
- **Introduction to EBM – 5 steps of EBM**
- **Advantages and Limitations of EBM**
- **EBM Resources**



# **Clinician Goal in Medicine**

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- **Provide the best care...**
- **Provide patients the best information to guide health care decisions...**
- **Improve health outcomes...**
  
- **...based on the “truth” – separating medical knowledge from folklore**



# EBM: Original “Official” Definition

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**The explicit, conscientious, and  
judicious use of the current best  
evidence in making decisions  
about the care of individual  
patients (and populations)**

*Evidence-Based Medicine Working Group  
Sackett et al circa 1996*



## **“Evidence Based Medicine”?**

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- **“EBM aims to provide clinicians and patients with choices about the most effective care based upon best available research evidence”**



# Evidence-based medicine

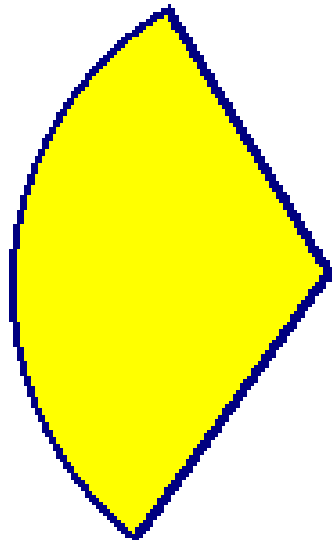
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**The practice of EBM is the integration of**

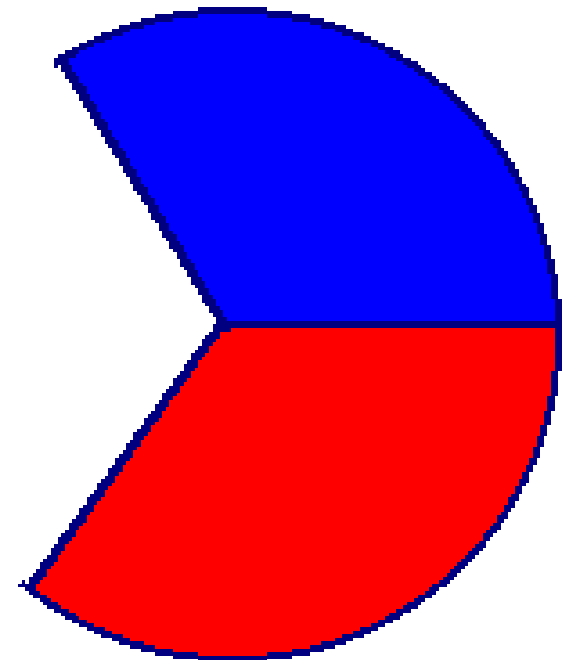
- **individual clinical expertise**  
with the
- **best available external clinical evidence**  
from systematic research.  
and
- **patient's values and expectations**



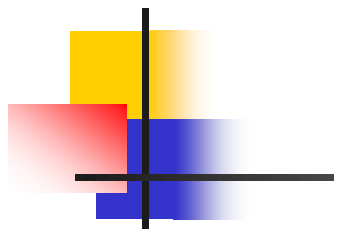
**Evidence from  
Research**



**Patient Circumstances**



**Preferences, Values, and Rights**







# Individual Clinical Expertise

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- **Clinical skills and clinical judgement**
- **Vital for determining whether the evidence (or guideline) applies to the individual patient at all and, if so, how**



# Best Research Evidence

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- **Comprehensive** – evidence only known to be best if all the available evidence is known
- **Valid** – critical appraisal determines potential for bias
- **Systematic** – selection and evaluation of evidence by protocol reduces author bias, investigator bias
- **Current** – every day new evidence could be best
- **Synthesized** – one study vs. the whole picture



# Patients' Values & Expectations

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- **Have always played a central role in determining whether and which interventions take place**
- **We're getting better at quantifying and integrating them**



# What EBM is not:

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- EBM is not cook-book medicine
  - evidence needs extrapolation to my patient's unique biology and values
- EBM is not cost-cutting medicine
  - when efficacy for my patient is paramount, costs may rise, not fall



# The Problems:

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- **We need evidence (about the accuracy of diagnostic tests, the power of prognostic markers, the comparative efficacy and safety of interventions, etc.) about 5 times for every in-patient (and twice for every 3 out-patients).**
- **We get less than a third of it**



# Performance deteriorates, too

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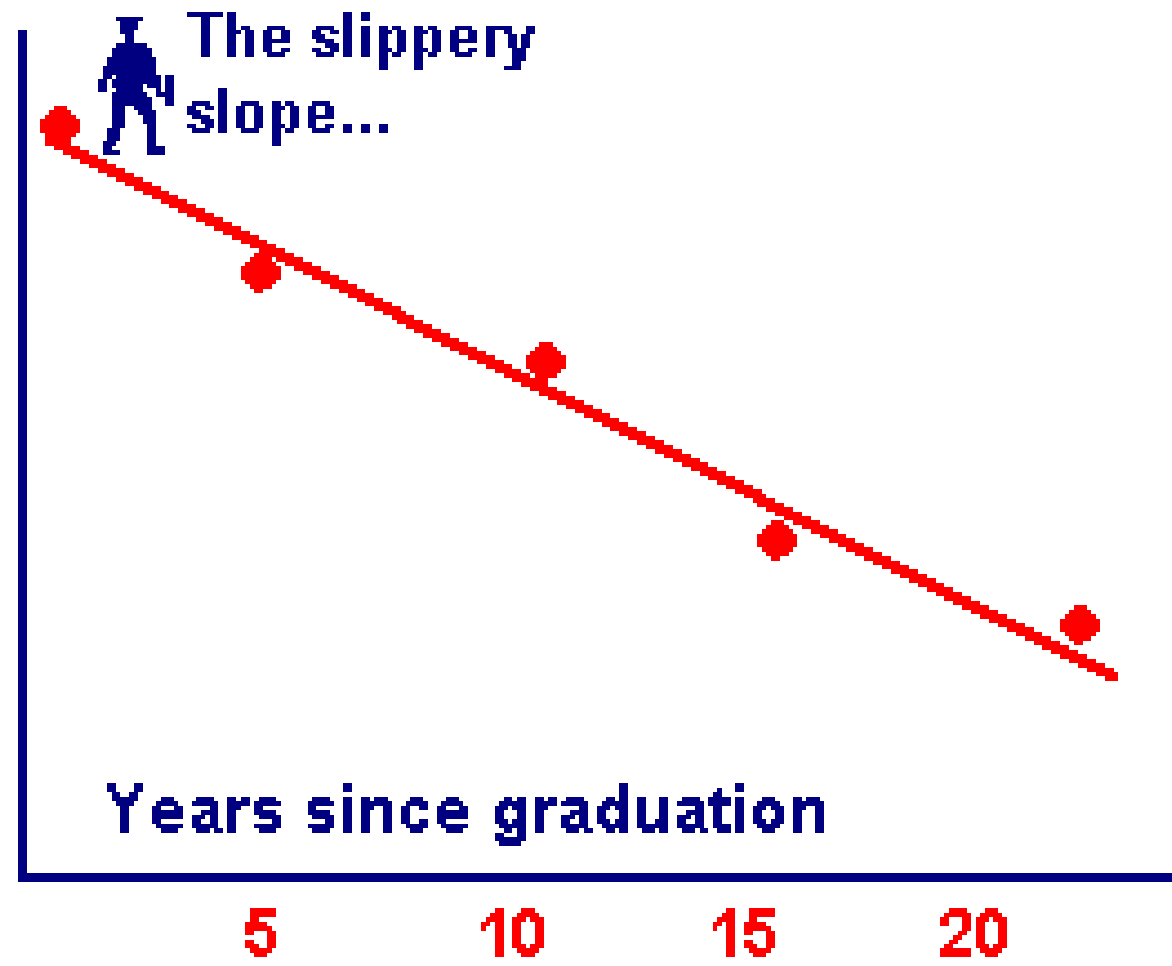
**Determinants of the clinical decision to treat some, but not other, hypertensives**

- 1 Level of blood pressure.**
- 2 Patient's age.**
- 3 The physician's year of graduation from medical school.**
- 4 The amount of target-organ damage.**

Knowledge  
of best  
hypertension  
care

Shiri et al,  
CMAJ, 1993

$r = -.54$   
 $p < 0.001$





# Three solutions

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**Clinical performance can keep up to date:**

- 1 by learning how to practice evidence-based medicine ourselves.**
- 2 by seeking and applying evidence-based medical summaries generated by others.**
- 3 by applying evidence-based strategies for changing our clinical behaviour.**



# Why Is EBM So Important?



- **EBM is an essential skill needed for a physician's life-long learning (example of "self-directed learning") so that patient care can be delivered in the most appropriate manner**
- **EBM skills can be learned, practiced, and improved upon to enhance a physician's LLL habits**



# Ethical Framework for Decision-Making in Clinical Medicine

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- **First do no harm (Safety)**
- **Try and do good (Realistic)**
- **Justice/Equity (Benefit:cost for individual/popln)**
- **Patient autonomy**

**Result may be moral distress---**



# Why Is EBM Important?

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## **Inadequate traditional sources:**

- **Outdated (Textbooks)**
- **Frequently wrong (Expert opinions)**
- **Ineffective (Didactics/CME)**
- **Too overwhelming in volume and variable in validity (Medical Journals)**

# Why do we need EBM?

## Save LIVES!

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- **Encainide and flecainide for ventricular arrhythmia**
  - Well proven to decrease the number of premature ventricular beats – became widely used 1980's
  - BUT
  - Further studies showed significant **INCREASE** in **MORTALITY** – died from other cardiac complications and dysrhythmias ( a dangerous "DOE")
- **Thrombolytics for acute MI**
  - CLEAR evidence of benefit in the 1970's
  - Not widely recommended until 1988 – almost 13 yrs later
  - How many thousands of people died unnecessarily in the years in between?



# What is Driving EBM to the Forefront?

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- **More informed patients/families**
- **The internet – Not always accurate information**
- **Insurance companies**
- **Hospitals**
- **Accrediting bodies**
- **Medico-legal factors**
- **Research**
- **Medical education**



# Introducing EBM – 5 Steps

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- **“Frame” the patient care answerable question**
- **Search and find the best evidence**
- **Appraise critically the evidence**
- **Integrate the critical appraisal with expertise and patient’s unique values**
- **Evaluate the effectiveness and efficiency of steps 1-4**



# Framing the question - Tips

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- **P = Patient/Problem/Population:** Ask “how would I describe a group of patients similar to mine?” Balance precision with brevity
- **I = Intervention:** Ask “which main intervention am I considering?” (cause, prognostic factor, treatment, etc..)
- **C = Comparison/Control:** Ask “which is the main alternative to compare with the intervention?” again, be specific
- **O = Outcome:** Ask “what can I hope to accomplish?” or “what could this exposure really affect?” again, be specific.



# Best Research Evidence

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- **Where to find it?**
- **How to know that it is the BEST available evidence?**
- **Is it clinically relevant? Is it patient-centered?**
- **Hierarchy of evidence – 4 S**
  - **Studies**
  - **Systematic Reviews**
  - **Synopses**
  - **Systems – Guideline and pathways**



# Study Pyramid





# Quest for the Current Best Evidence

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## **CURRENT BEST Evidence**

Keep in mind that

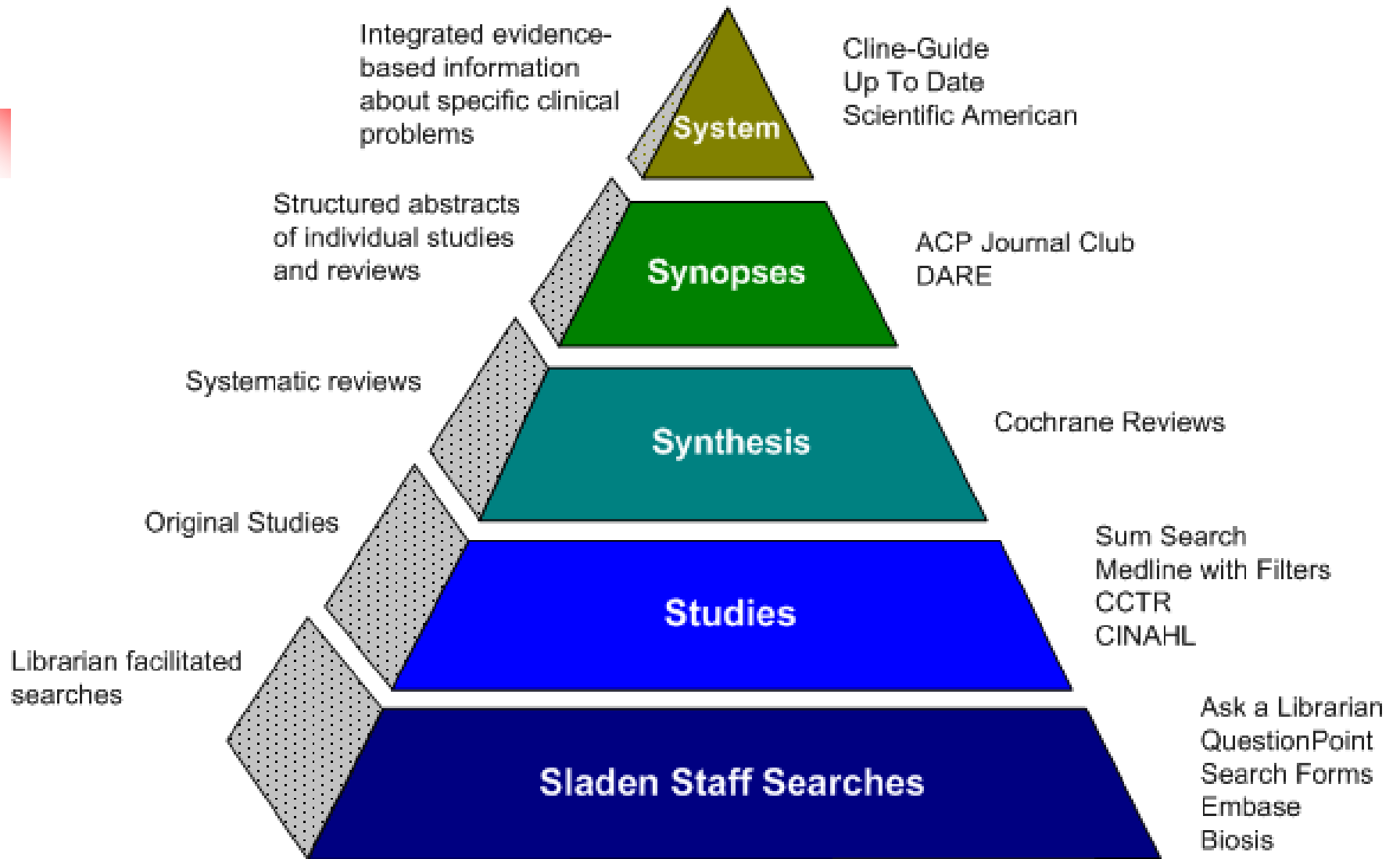
**Last year's best  
might not be this year's best**

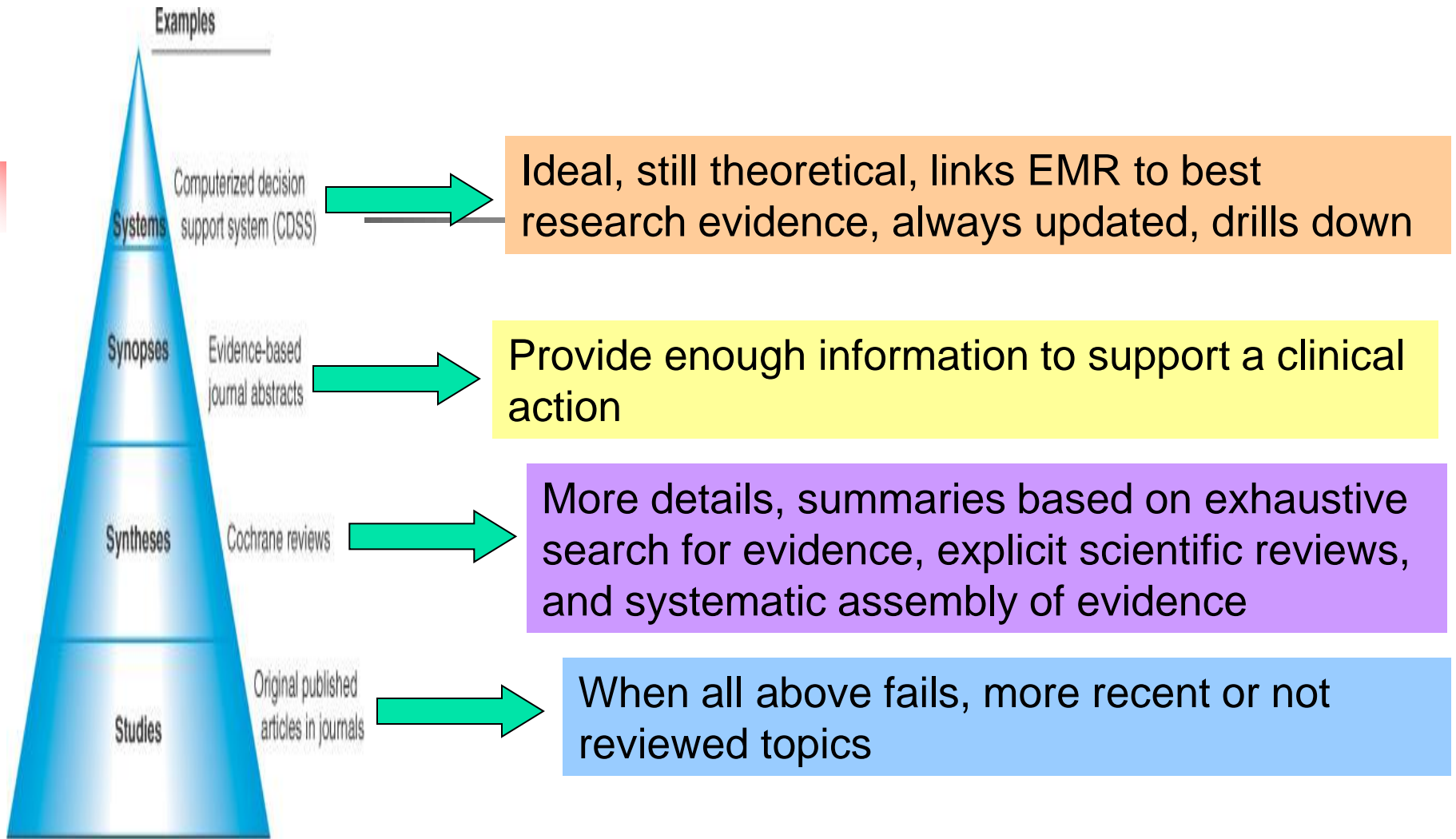


# How to Learn About Best Information Resources?

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- **From librarians (hands-on training)**
- **From experts in medical informatics**
- **Courses/ Tutorials**







# Systems

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- **Clinical Evidence (BMJ)**
  - URL: <http://www.clinicalevidence.com>
  - Contains limited range of clinical questions
- **PIER (the Physician's Information and Education Resource) by ACP**
  - URL: <http://pier.acponline.org>
  - Only for members
- **UpToDate®**
  - URL: <http://www.uptodate.com>
  - Updated quarterly
  - Extensively referenced
- **ACP Medicine (Formerly Scientific American Medicine)**
  - URL: <http://www.acpmedicine.com>

# Systems

## Harrison's Principles of Internal Medicine

- URL: <http://www.harrisonsmed.com>
- Only updated every 3 years

### ■ Evidence Based on Call

- URL: <http://www.eboncall.org/content.jsp.htm>

### ■ Evidence-Based Pediatrics and Child Health

- URL: <http://www.evidbasedpediatrics.com>

### ■ Evidence Based Cardiology

- URL: <http://www.evidencebasedcardiology.com/>

**OVID** includes and links EBMR (Cochrane, ACP Journal Club, the Database of Abstracts of Reviews of Evidence (DARE), and Medline



# Synopses

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- **ACP Journal Club**  
**<http://www.acpjc.org/>**
- **Give the summary and links to the evidence**
- **Ex: “Low Molecular Weight Heparin is Effective and Safe in the Acute Coronary Syndromes”**





# Syntheses

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- **Cochrane Library**

- URL: <http://www.cochranelibrary.com/>

- **OVID's EBMR**

- (Includes ACP Journal Club, Cochrane Database of Systematic Reviews (CDSR), and DARE)

# Studies

## Specialized

### ACP Journal Club:

[www.acpjc.org](http://www.acpjc.org)

- Evidence Based Medicine:

[www.ebm.bmjournals.com](http://www.ebm.bmjournals.com)

- Evidence Based Nursing:

[www.ebn.bmjournals.com](http://www.ebn.bmjournals.com)

- Evidence Based Mental Health:

[www.ebmh.bmjournals.com](http://www.ebmh.bmjournals.com)

## General

- Cochrane Central Register of Controlled Trials (Therapy)

- MEDLINE:

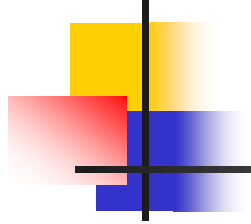
<http://www.ncbi.nlm.nih.gov/PubMed/>

- Using the Clinical Queries Search

- ASK MEDLINE

<http://askmedline.nlm.nih.gov/ask/ask.php>

Make use of your Library and Institutional subscriptions



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# When all fails

Google™

it



# Evidence that Finds Us

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- **Cancel full-text journal subscriptions**
  - **We need to read 86-107 articles (top 5 full-text journals) to find one that meets the basic criteria for quality and relevance**
  - **This is 3 hours (at 2 minutes per article)**
  - **PubMed has also the feature of “related articles”, and “Links”**

# Evidence that Finds Us



**Invest in evidence-based journals and online services (see synopses).  
Synopses are linked to full text articles**

- **With synopses we can set it up to:**
  - **Be alerted when new articles cite this review**
  - **Be connected to similar synopses on similar articles in the publisher's other journals**
  - **E-mail the item to a friend or colleague**
  - **Download the synopsis**

# Evidence that Finds Us



Can have the current contents of certain journal in our specialty sent to us

- **Other specialty-based services:**
  - **PedsCCM Evidence Based Journal Club**  
[http://pedsccm.wustl.edu/EBJournal\\_club.html](http://pedsccm.wustl.edu/EBJournal_club.html)
  - **Family Practice Journal Club (POEMS)**  
<http://www.infopoems.com/>
  - **Critical Care** <http://ahsn.lhsc.on.ca>

# If You are on Your Own



- **PubMed**

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- **BioMed Central (Open access journals)**

<http://www.biomedcentral.com>

- **Public Library of Science**

<http://www.publiclibraryofscience.org/>

- **SCHARR**

<http://www.shef.ac.uk/~scharr/ir/netting/>



# Top Five Used Resources

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- **In a Survey of commonly used resources, the top 5 resources used:**
  1. **Clinical Evidence**
  2. **UpToDate®**
  3. **DynaMed®**
  4. **ACP PIER**







# Evidence to Action

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- **Aware**
- **Agree**
- **Adopt**
- **Adhere**

Pathman DE, Konrad TR, Freed GL, et al.  
Med Care 1996;34:873-889.



# So What is “The Truth”?

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**A probability statement... that  
what we do for patients does  
more good than harm**

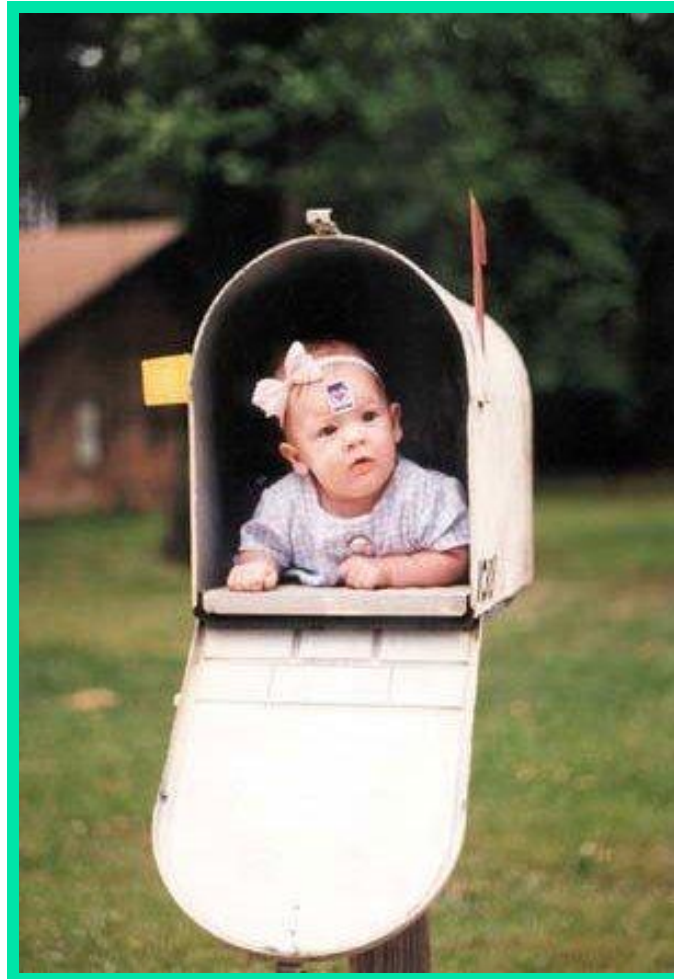


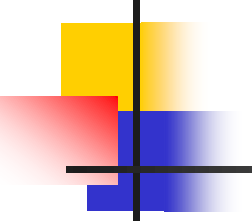
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**So.....**

**Why EBM??!!**

# Because Patients Do Not Come With Instructions!!!





**EBM is here to stay. It has become an essential way of teaching and practicing in the uncertain world of medicine. The challenge is to engage the whole healthcare team in learning about it and making it part of the routine of clinical practice.**

**Editorial**

**BMJ 2004;329:989-990**

# Evidence-Based Medicine

