

# Keeping Students Engaged by Simulating Continuing Medical Education

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Evidence



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# Evidence Based Medicine

Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.

*David Sackett, BMJ, 1996*

# U of A Undergraduate Medicine Objectives

“As Scholars, our graduates will demonstrate a commitment to the acquisition, translation, and application of scientific evidence to improve patient care.”

<http://www.med.ualberta.ca/Home/Education/Undergraduate/>

# CanMEDS Competencies

- 1.5. Pose an appropriate learning question
- 1.6. Access and interpret the relevant evidence
- 1.7. Integrate new learning into practice
- 1.8 Evaluate the impact of any change in practice

<http://rcpsc.medical.org/canmeds/CanMEDS2005/>

# Context:

- Undergraduate Medicine (4 year program)
- Information Literacy Sessions
  - Intro Block (*start of 1<sup>st</sup> year*)
  - Endocrine Block (*middle of 1<sup>st</sup> year*)
  - LINK Block (*start of 3<sup>rd</sup> year, prior to clerkship*)
- Students complete a paper-based evidence-seeking assignment during each block

# Problem:

- Student Feedback:
  - LINK assignment is redundant and not every interesting.
  - EBM is valuable but they did not consider the assignment a priority.
- Instructor Priorities
  - Align instruction with Faculty direction of online delivery
  - Create a more efficient workflow for marking

# Solution:

- Collaboration between the Library and the Centre for Health Evidence (CHE)
- CHE also produces the ePearls™ continuing education courseware for the College of Family Physicians of Canada.

# Objectives:

- To convert a paper-based “seeking and evaluating evidence” assignment to an interactive electronic format, embedded in a course management system.
- To increase student engagement by simulating a continuing medical education system that many participants will use professionally



# Research Questions:

- Does the revised assignment format increase student engagement?
- Do students find the introduction to a real-life continuing medical education environment valuable?

# Literature Review:

- Most of the research on interactive tutorials indicates that they are likely as equally effective as traditional information literacy instruction <sup>(2-4)</sup>, and students respond well to them <sup>(4-5)</sup>.
- To the best of our knowledge, no research explores using continuing medical education in information literacy training.

# Interactive vs Video:

- Anderson & Wilson<sup>(6)</sup> compared an interactive tutorial to a passive video tutorial using a pre- and post-test assessment.
- Learning outcomes were similar in both groups but students perceived the interactive version to be more useful.

# Best Practices

- Employ active learning strategies—offer opportunities for problem solving, simulation, manipulation of screen, and quizzes.
- Remain relevant—ensure instruction supports course assignment.
- Consider design—provide educational objectives, learning outcomes, and major points.
- Use clear navigational techniques—highlight student's position in a tutorial and allow user to enter and exit the tutorial at any point.
- Promote flexibility—allow for different learning styles and levels with branching, the use of modules, and different layers of content.
- Provide access to a librarian.

Blummer & Kritskaya (2009)

# Instruction Session:

- Refresher lecture on EBM Resources on Monday, followed by lab session on Wednesday
- Lab sessions
  - 70 minutes
  - ~25 students per session
  - ~10-15 minute hands-on demonstration of MEDLINE
  - Remainder of lab time to complete the assignment
  - Hand-in on Friday

# Methods:












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- Post-assignment survey designed to measure student satisfaction with the assignment
- Indicators of engagement during lab session
- Feedback from course coordinator

# Roles:

- Sandy Campbell and Dale Storie –
  - instruction
  - adaptation of assignment content
  - designing the survey
- Brettany Johnson and Rob Hayward –
  - Technological details and support
  - Development of the original ePearls software

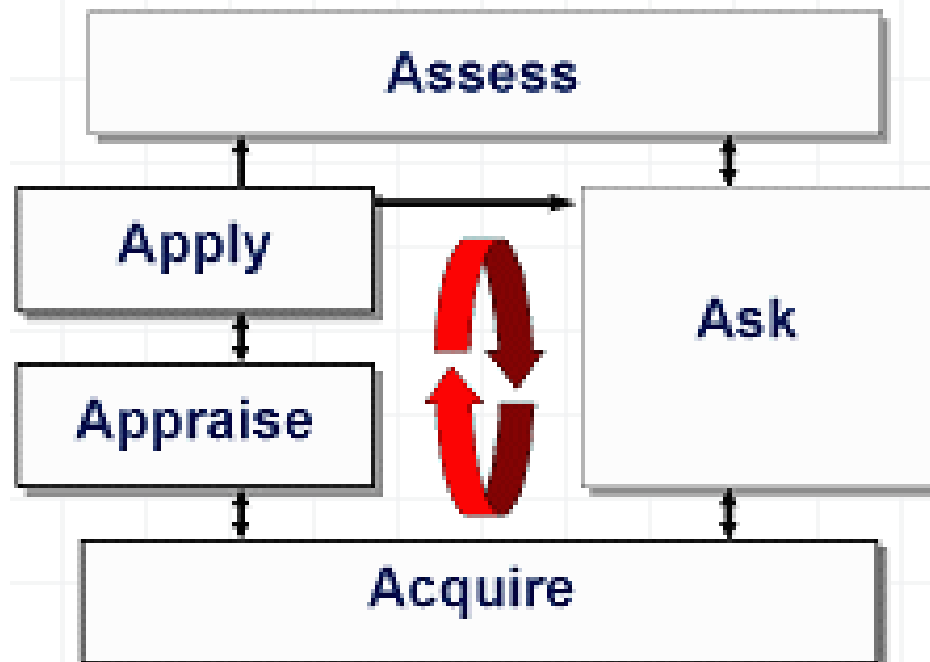
# Course Home Page

MED 532: Link Course (c2012)	
 <input type="text"/> 	
Description	
<p>The objective of MED532 is to bridge the learning opportunities of the first two years (pre-clerkship) to the last two years (clerkship) of medical school. The goal of MED532 is to prepare each student for the practical aspects of the clerkship rotations, such that they have the skills necessary to function effectively in a clinical rotation, and feel more comfortable settling into the first day of a new rotation.</p> <p>A number of laboratory and skills sessions are conducted in small groups to which learners are pre-assigned. Select the group icon above to review your small group allocations.</p> <p><b>Start:</b> 2010-08-09; <b>End:</b> 2010-08-20; <b>Duration:</b> 2 weeks; <b>Cohort:</b> Class of 2012</p>	
Coordinator(s)	
 <a href="#">① Dr. Darren D Nichols</a>	
Key Activities	
 <a href="#">① Link Block AOPN Assignment</a>	
 <a href="#">① Seeking Evidence Assignment</a>	
 <a href="#">① Seeking Evidence Survey</a>	
Key Resources	
 <a href="#">① Examination Information</a>	
 <a href="#">① Faculty Consultation</a>	
 <a href="#">① Link Course learning objectives</a>	
 <a href="#">① Overview Of Link Course</a>	
 <a href="#">① Professionalism Spot-Check</a>	



# 5A's Health Information Cycle

**PEP - Welcome!**



# 5A's Health Information Cycle

- **Assessing** an initially disorganized information mix in order to recognize and detect important patient problems;
- **Asking** relevant questions that suggest an appropriate source of information and are specific enough to facilitate an efficient search for evidence;
- **Acquiring** the most important evidence from an ever-expanding health literature;
- **Appraising** the best information to expose overt bias and variability; and
- **Applying** useful, valid and important evidence while monitoring health outcomes to see whether the patient or population goals are achieved.

Users' Guides to the Medical Literature (2008)

# Opening Screen

## Start of Seeking Evidence Assignment

Please read the following and then select the Next button to proceed or the Last button to exit.

### Welcome!

This assignment is designed to mimic the PEARLS Continuing Education Program offered by the College of Family Physicians of Canada. In this assignment you will be guided through a structured evidence-seeking process called a Personal Evidence Project (PEP).

Where appropriate, additional tips, tools and links will provide you with guidance.

**Navigate back and forth between screens by using the navigation buttons.**



# Evidence-based Process

## Seeking Evidence Assignment

You can progress to a section of the project by clicking on one of the sections listed below.

Your Personal Evidence Project will be built, step by step, by progressing through the evidence-based information cycle outlined in the steps below.

**Q Start to build your PEP by clicking on the first step (1. Assess):**

1. Assess

2. Ask

3. Acquire

4. Appraise

5. Apply

Submit Assignment




# Example:

Mr. Jones is a 55 year old man. He has just been diagnosed with Type 2 Diabetes. Although you regularly prescribe Metformin to help regulate blood glucose levels in new diabetics, Mr. Jones wants to try using regular exercise and diet to improve his blood sugar. How will you treat him?

# Clinical Scenario

## PEP Assess - Issue

Please enter your response as text in the space provided. (< 500 characters)

 **Type your scenario here:**

Mr. Jones is a newly diagnosed Type 2 diabetic. He has been offered Metformin, but would like to try to regulate his blood sugar using diet and exercise.




# Search for Background Information


Link to Medical Libguide

## PEP Assess - Background Information

Please enter your response as text in the space provided. (< 5000 characters)

Issue: ""

If you are unfamiliar with the condition  problem described, you will need seek background information. Click [here](#) to find medical textbooks, where you find background information.

 You may want to record your notes about the topic here (optional):

## MEDICINE

Last update: Jul 27th, 2010

[Home](#) [Clinical Resources](#) [Find Articles](#) [Find Books](#) [Find Images](#) [Evidence Based Medicine](#)

### Quick Search

Find books, ebooks, and articles

search

WorldCat advanced search

### Medicine E-books

- **Access Medicine**  
E-books in clinical medicine and basic science, including Harrison's Online, Hurst's The Heart, Current Medical Diagnosis and Treatment, Metabolic and Molecular Bases of Inherited Disease (MIMBID) and other major texts, with updates and a drug index.
- **MD Consult**  
Fulltext access to 45+ clinical journals, 35+ core medical textbooks, over 600 clinical practice guidelines, and drug information references
- **StatRef**  
Over 60 full-text e-books, plus dictionaries, calculators, evidence updates and AnatomyTV.
- **Books@OVID**  
Over 200 ebooks in medicine and the health sciences.
- **Thieme Medical Ebooks**  
Over 40 full-text ebooks covering a variety of medical specialties

### Drug Information

- **e-Therapeutics+**  
Includes Therapeutic Choices and e-CPS (online version of Compendium of Pharmaceuticals and Specialties) which lists drugs and pharmaceuticals available in Canada
- **MedicinesComplete**  
Online version of major drug handbooks
- **Rx files**  
Objective comparisons for optimal drug therapy (Saskatoon Health Region).

# Question Domains

## Seeking Evidence Assignment

A response to this question is required in order to proceed.

Please select the one best response from the options listed below.

Your issue: ""

Your next step is to determine the clinical question type that fits your issue. You may want to review the [JAMA Evidence Users' Guides](#) if you need assistance.

**Please select the one question type that best fits what you want to ask (there are other question types but one of the following should be the focus of a PEP):**

- |  |   |
|--|---|
| <input checked="" type="radio"/> Therapy     | <input type="radio"/> Causation or Harm       |
| <input type="radio"/> Diagnosis or Screening | <input type="radio"/> Prognosis or Prediction |

Responses are saved with the save or forward buttons



Hayward RS. © Centre for Health Evidence (2005-03-18)

Link to JAMA Evidence



# Creating a focused clinical question:

- PICO framework for creating clinical questions
  - Patient/Population
  - Intervention/Exposure
  - Comparison
  - Outcomes

Richardson et al. (1995)

# PICO Builder

The screenshot shows the PICO Builder interface. At the top, a flowchart illustrates the process: 'Assess' leads to 'Apply', 'Appraise', and 'Acquire'. 'Apply' and 'Appraise' are connected to 'Ask' by a red circular arrow, indicating a feedback loop. Below the flowchart is a dropdown menu set to 'THERAPY'. The form contains several sections: 'Patient' with 'Type 2 Diabetics', 'Intervention' with 'metformin', 'Comparison' with 'exercise and diet', and 'Outcome' with 'improved blood glucose regulation'. A 'Draft question' button is located below the outcome field. The 'Question' section displays the generated question: 'Among Type 2 Diabetics is metformin more effective than exercise and diet in achieving/avoiding improved blood glucose regulation?'. At the bottom, there are 'Tips' and 'Show How' buttons.

Students select a question domain and type in relevant PICO terms that describe their clinical scenario

Automatically generates a focused clinical question based on what the student has entered into the PICO form.

# Define Search Concepts


## PEP Acquire - Concepts

Please enter your response as text in the space provided. (< 50 characters)

Your question:

""

**Core Concepts:** Given your question, identify key concepts that will form the basis for a search strategy. We suggest that the first concept refer to the health condition of interest (e.g. diabetes or menopause) and the second concept refer to a health intervention of interest (e.g. glycosylated hemoglobin or hormone replacement therapy). A concept should be represented by no more than a few words.

 **Please enter your concepts (health condition and intervention) below. These are the words that you will use in your search for evidence:**

Type 2 Diabetes

metformin vs diet and exercise



# Find the Evidence


## Seeking Evidence Assignment

Please enter your response as text in the space provided.

Your question: ""  
Your concepts: "", ""

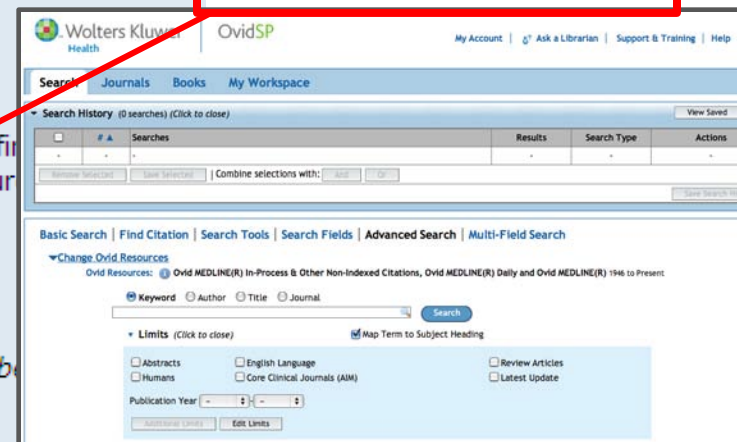
It's time to choose a resource and start searching. In future, you may find the following JAMA Evidence sections helpful when choosing information sources:

[Categories of Information Sources](#)  
[Criteria for Choosing Sources](#)

For this assignment you will be using **Medline**. Click on the  button below to start searching.

**Remember! You should identify one best article that provides high quality evidence to answer your question.**

Link to Medline



The screenshot shows the OvidSP search interface. At the top, there are navigation tabs for 'Search', 'Journals', 'Books', and 'My Workspace'. Below this is a 'Search History' section with a table of searches. The main area is titled 'Basic Search' and includes a search bar with a dropdown menu set to 'Keyword'. There are also options for 'Author', 'Title', and 'Journal'. A 'Limits' section is expanded, showing checkboxes for 'Abstracts', 'English Language', 'Review Articles', 'Humans', 'Core Clinical Journals (AIM)', and 'Latest Update'. A 'Publication Year' dropdown is also visible. The Ovid logo is located in the top left corner of the interface.



# Appraisal of Validity, Importance and Applicability

## PEP Appraise - Validity

Please enter your response as text in the space provided. (< 5000 characters)

**Validity:** appraisal guides (see the links below) can help you decide whether to believe the evidence you have found. Focus on significant flaws and be succinct.

You may want to refer to the appropriate Users' Guides chapter to assist you:

[Therapy: Are The Results Valid?](#)

[Diagnosis or Screening: Are The Results Valid?](#)

[Caustion or Harm: Are The Results Valid?](#)

[Prognosis or Prediction: Are The Results Valid?](#)

**Q** Appraise the **VALIDITY** of the methods and results section of your article.



# Direct link to JAMA Evidence

## Are the Results Valid?

### *Did Intervention and Control Groups Start With the Same Prognosis?*

#### Were Patients Randomized?

Consider the question of whether hospital care prolongs life. A study finds that more sick people die in the hospital than in the community. Many people easily reject the naive conclusion that hospital care kills because we understand that hospitalized patients are sicker than patients in the community.

Although the logic of prognostic balance is clear in comparing hospitalized patients with those in the community, it may be less obvious in other contexts. Until recently, clinicians and epidemiologists (and almost everyone else) believed that hormone replacement therapy (HRT) reduced the *risk* of coronary events (death and myocardial infarction) in postmenopausal women. The belief arose from the results of many studies showing that women taking HRT to have a decreased *risk* of coronary events.<sup>5</sup> Results of the first large *randomized trial* of women with established coronary artery disease (CAD) provided a surprise: HRT failed to reduce the *risk* of coronary events.<sup>6</sup> Even more recently, the Women's Health Initiative found that HRT also failed in the *primary prevention* of CAD.<sup>7</sup>

Other surprises generated by *randomized trials* include the demonstration that antioxidant vitamins fail to reduce gastrointestinal cancer risk. For example, such agent, vitamin E, may actually increase all-cause mortality<sup>8</sup>—and that a variety of initially promising drugs increase mortality in patients with heart failure.<sup>10-15</sup> Such surprises occur periodically when investigators conduct *randomized trials* to test the observations from studies in which patients and physicians determine which treatment a patient receives (see Chapter 9.2, *Surprising Results of Randomized Trials*).

The reason that studies in which patient or physician preference determines whether a patient receives treatment or control (observational studies) can yield misleading results is that morbidity and mortality result from many causes, of which treatment is only one. Treatment studies attempt to test the effect of an intervention on such events as stroke, myocardial infarction, and death—occurrences that we call the trial's *target outcomes*. A pa

# Apply the Evidence


## PEP Apply - Decision

Please enter your response as text in the space provided. (< 5000 characters)

Finally, reconsider your original decision-making challenge:

Your issue: ""

**Q** Based on what you have discovered, describe how will you treat your patient below. Once you have done so, write your order on the *paper* orders sheet provided to you.

You can use the link  below to review your answers to previous sections.


Mr. Jones will be enrolled in a diabetes education program, where he will receive counselling on appropriate diet and exercise. He will be monitored for the first two months. After that Metformin will be added as required. |




# CME Reminder

## Conclusion of Seeking Evidence Assignment

Please read the following instructions.

Use the link  button to review your completed PEP  
(close the pop-up to return to this screen)

To submit your assignment, please select the  button below.

*In a Professional Continuing Education system, you would now be awarded CME points, which could be used towards a Maintenance of Certification Program.*

**You are now invited to participate in a research study focused on information literacy and the effectiveness of online professional development activities. Please click on the 'Seeking Evidence Survey' link from the course homepage.**





# Evaluation

Student Name Column	Location	Started	Saved	Score	Skips	Time	Status	Actions
	<a href="#">142.244.23.245</a>	9/8/2010 13:00	9/9/2010 15:57	100	0	4		
	<a href="#">142.244.23.245</a>	9/8/2010 13:00	9/10/2010 14:07	100	0	33		
	<a href="#">142.244.23.245</a>	9/8/2010 13:00	9/11/2010 09:43	100	0	7		
	<a href="#">142.244.23.245</a>	9/8/2010 13:00	9/11/2010 17:41	100	0	29		
	<a href="#">142.244.23.245</a>	9/8/2010 13:00	9/10/2010 22:12	0	0	48		
	<a href="#">142.244.23.245</a>	9/8/2010 13:00	9/10/2010 15:30	0	0	55		
	<a href="#">142.244.23.245</a>	9/8/2010 13:01	9/10/2010 13:58	0	0	0		
	<a href="#">142.244.23.245</a>	9/8/2010 13:01	9/9/2010 19:30	0	0	3		
	<a href="#">142.244.23.245</a>	9/8/2010 13:01	9/10/2010 12:54	0	0	1		
	<a href="#">142.244.23.245</a>	9/8/2010 13:02	9/10/2010 13:00	0	0	27		
	<a href="#">142.244.23.245</a>	9/8/2010 13:04	9/8/2010 16:49	0	0	0		
	<a href="#">142.244.23.245</a>	9/8/2010 13:06	9/10/2010 08:11	0	0	2		
	<a href="#">142.244.23.245</a>	9/8/2010 13:08	9/9/2010 16:37	0	0	1		
	<a href="#">142.244.23.245</a>	9/8/2010 13:08	9/10/2010 13:43	0	0	8		
	<a href="#">142.244.23.245</a>	9/8/2010 13:08	9/8/2010 23:29	0	0	176		
	<a href="#">142.244.23.245</a>	9/8/2010 13:09	9/8/2010 14:47	0	0	56		
	<a href="#">142.244.23.245</a>	9/8/2010 13:09	9/9/2010 18:01	0	0	2		
	<a href="#">142.244.23.245</a>	9/8/2010 13:09	9/10/2010 14:40	0	0	32		

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☐ 16. [HOMER\_QOD|1023130] PEP Apply - Decision (Response)

**Describe how you will treat your patient, based on the evidence that you have discovered:**

Your answer:

Based on the evidence I have found, I will not prescribe antibiotics for my patient as it has not been shown to significantly decrease the incidence of infection, but I will ensure that the wound is properly cleansed and sterilized.

Your points:  (out of 1) [Update](#)

Feedback:

Edit Feedback:

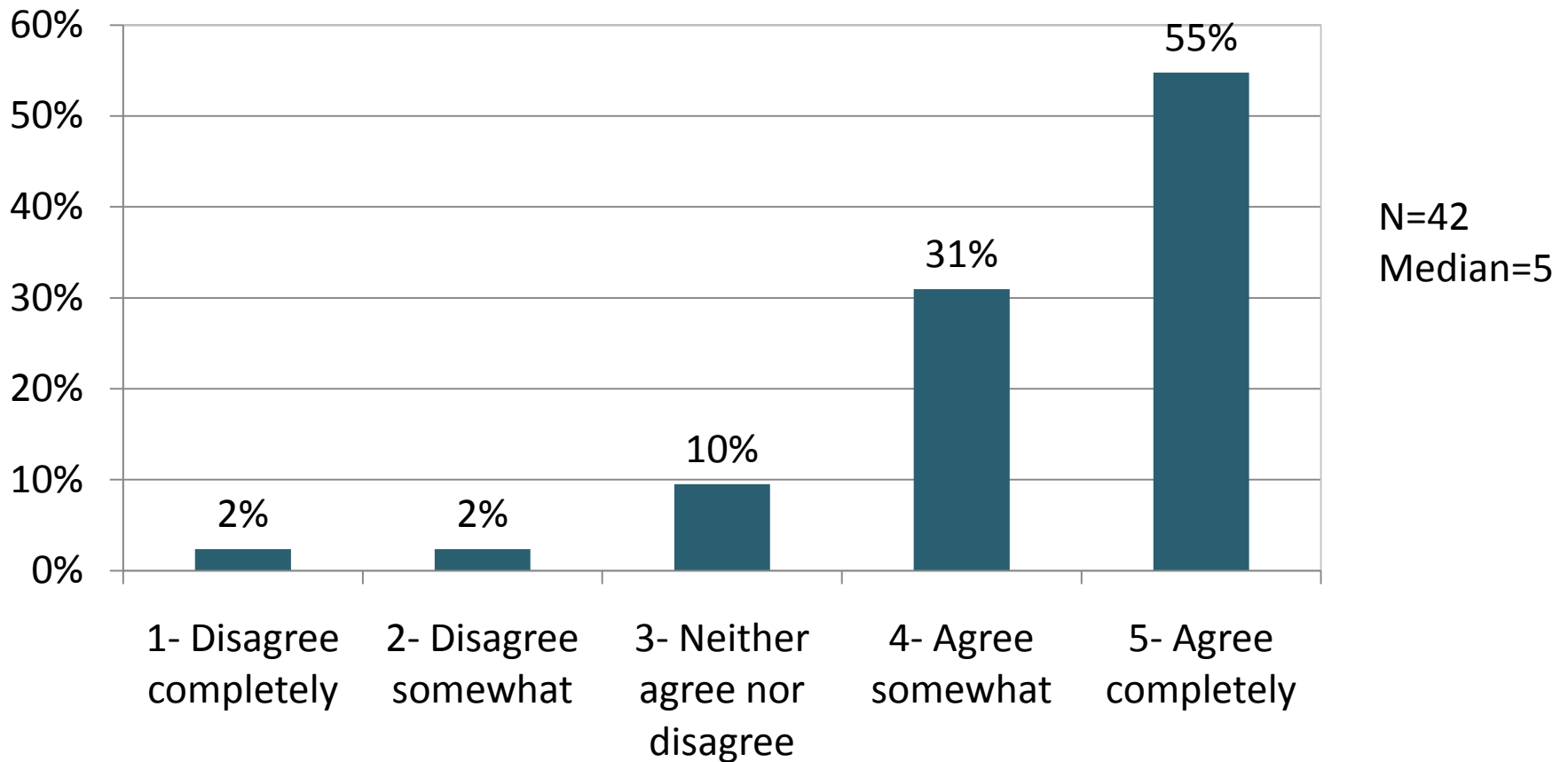
# Results:

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- 155 students in the class
- 42 survey respondents (27% response rate)

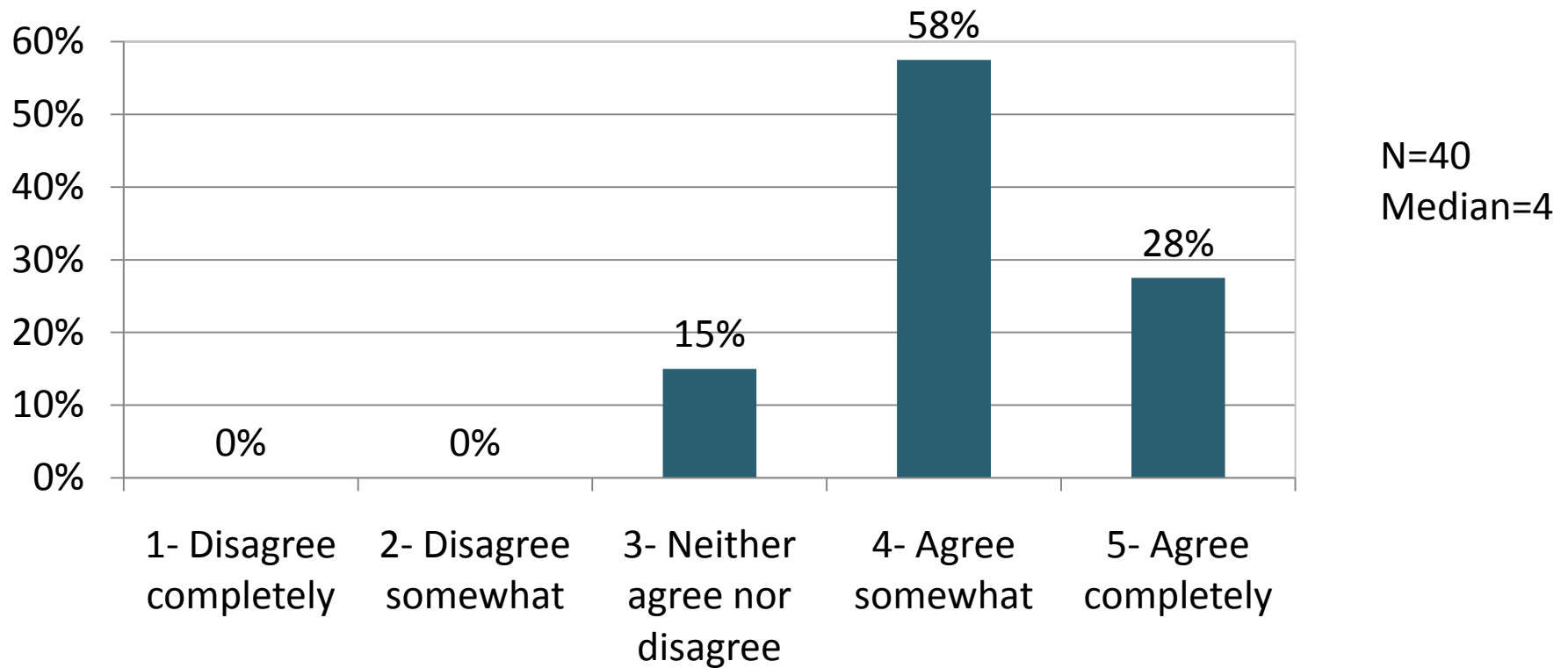
# Results:

I preferred doing the assignment in the electronic environment.



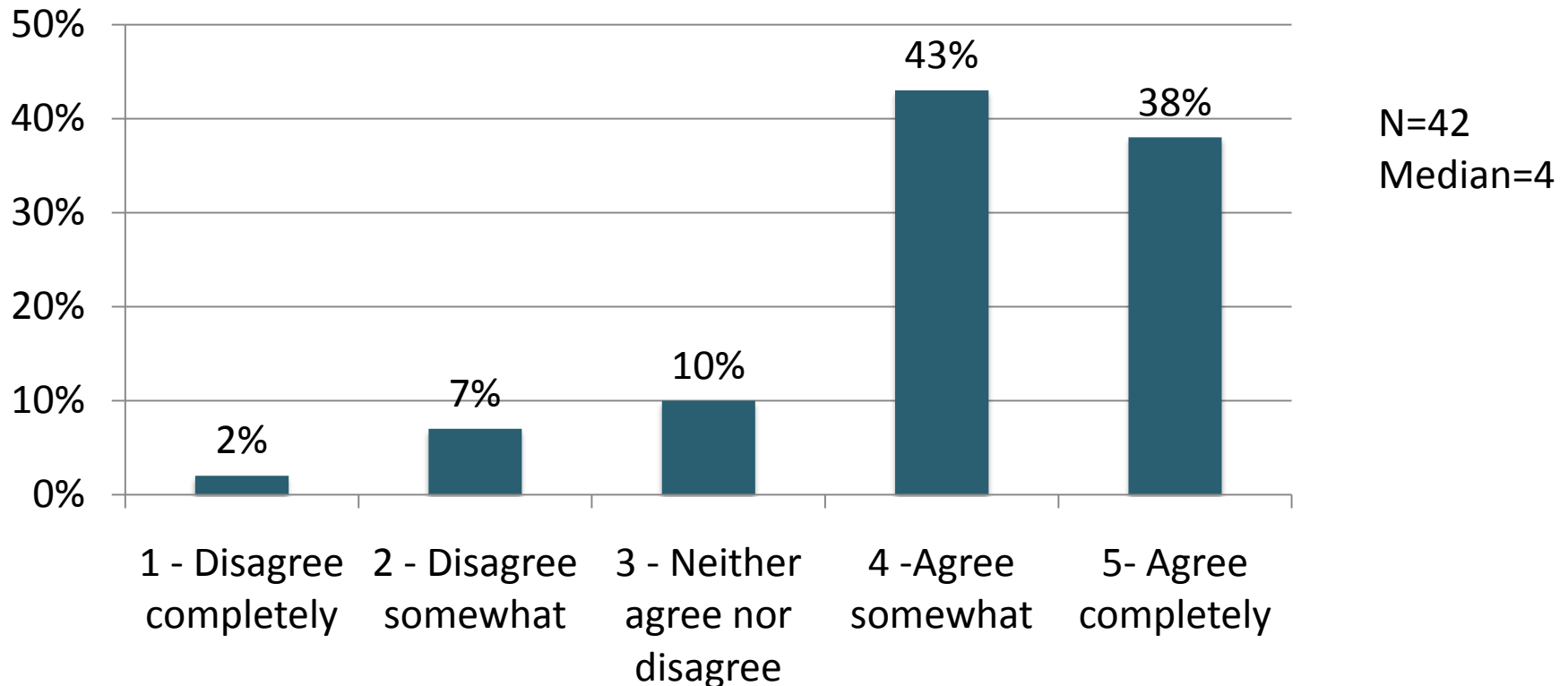
# Results:

**I think that it will be helpful to me to have experienced the continuing education environment through this assignment.**



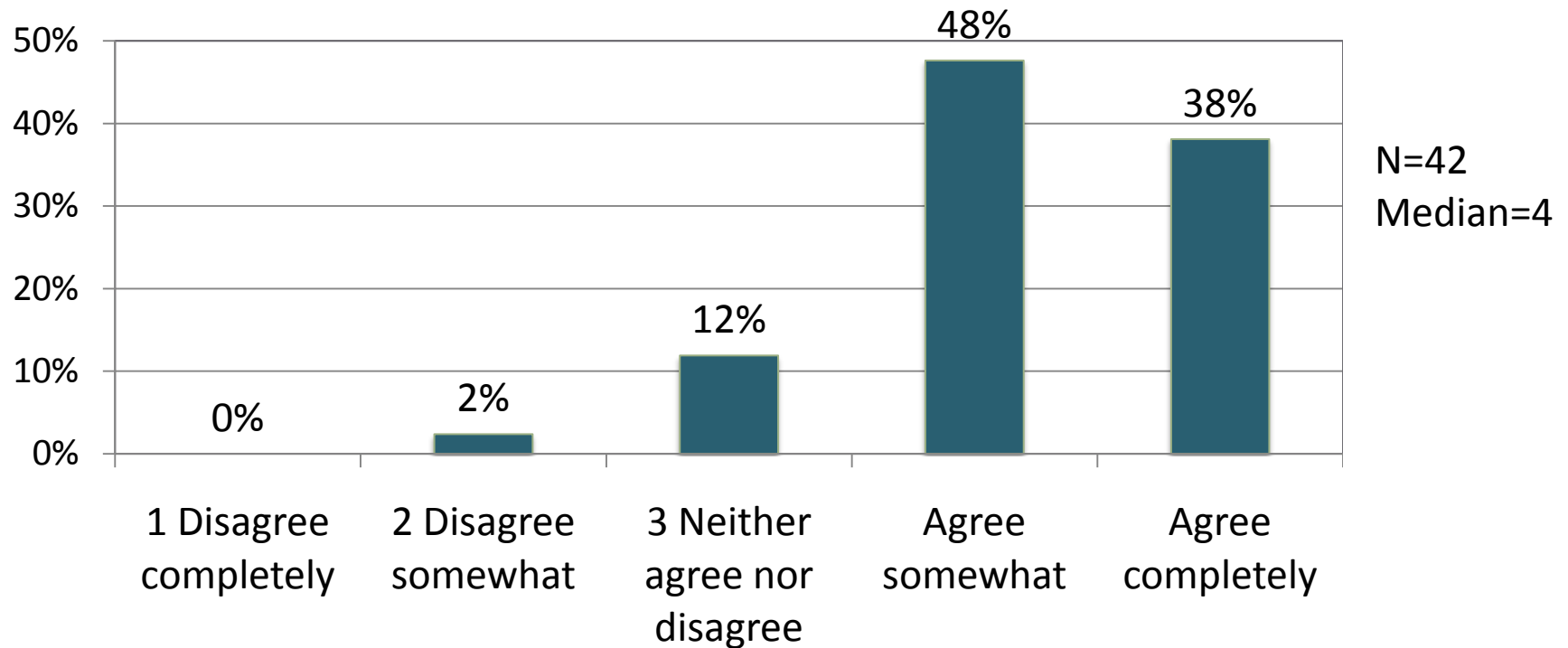
# Results

**Doing this assignment in the continuing education environment was easier than doing an assignment in the paper environment.**



# Results:

I think that the Library should move more of its assignments into a learning environment like the one used for this assignment



# Comments:

## **Step-by-step structure and linking to resources**

“Assignment was very well outlined. The information bar on the right was exceptionally helpful in guiding the formulation of question. Also links provided were excellent in helping access current conditions.”



# Comments:

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## Immediate practice after learning

“You showed us how to do it, then we had time to complete it online then and there.”

# Comments:

## **Professionally and clinically relevant**

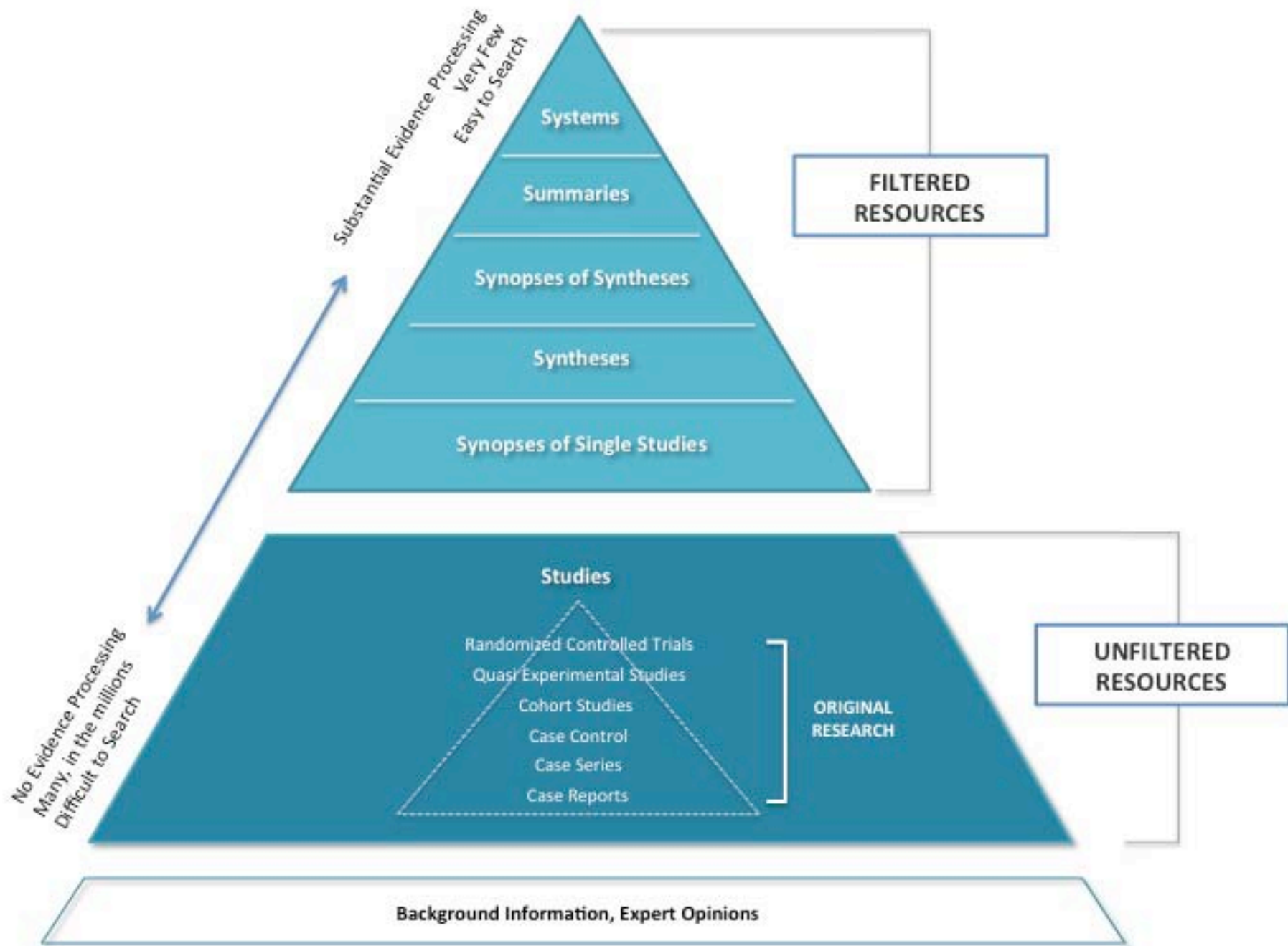
“I like that this was an opportunity to get an idea of what CME (Continuing Medical Education) is like. It made have a better understanding about things we will actually do as physicians in the future.”

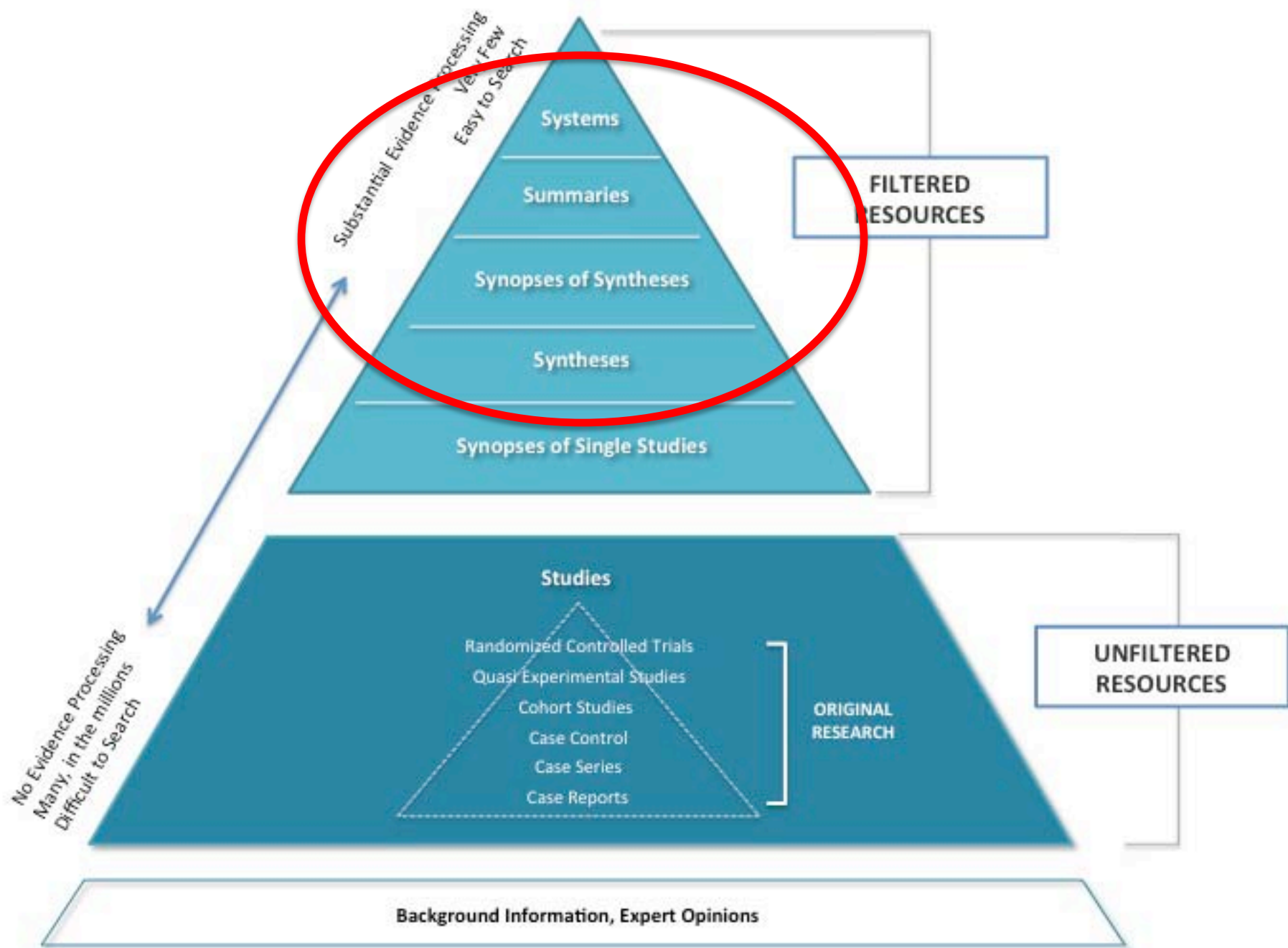
# Clinical usefulness of MEDLINE

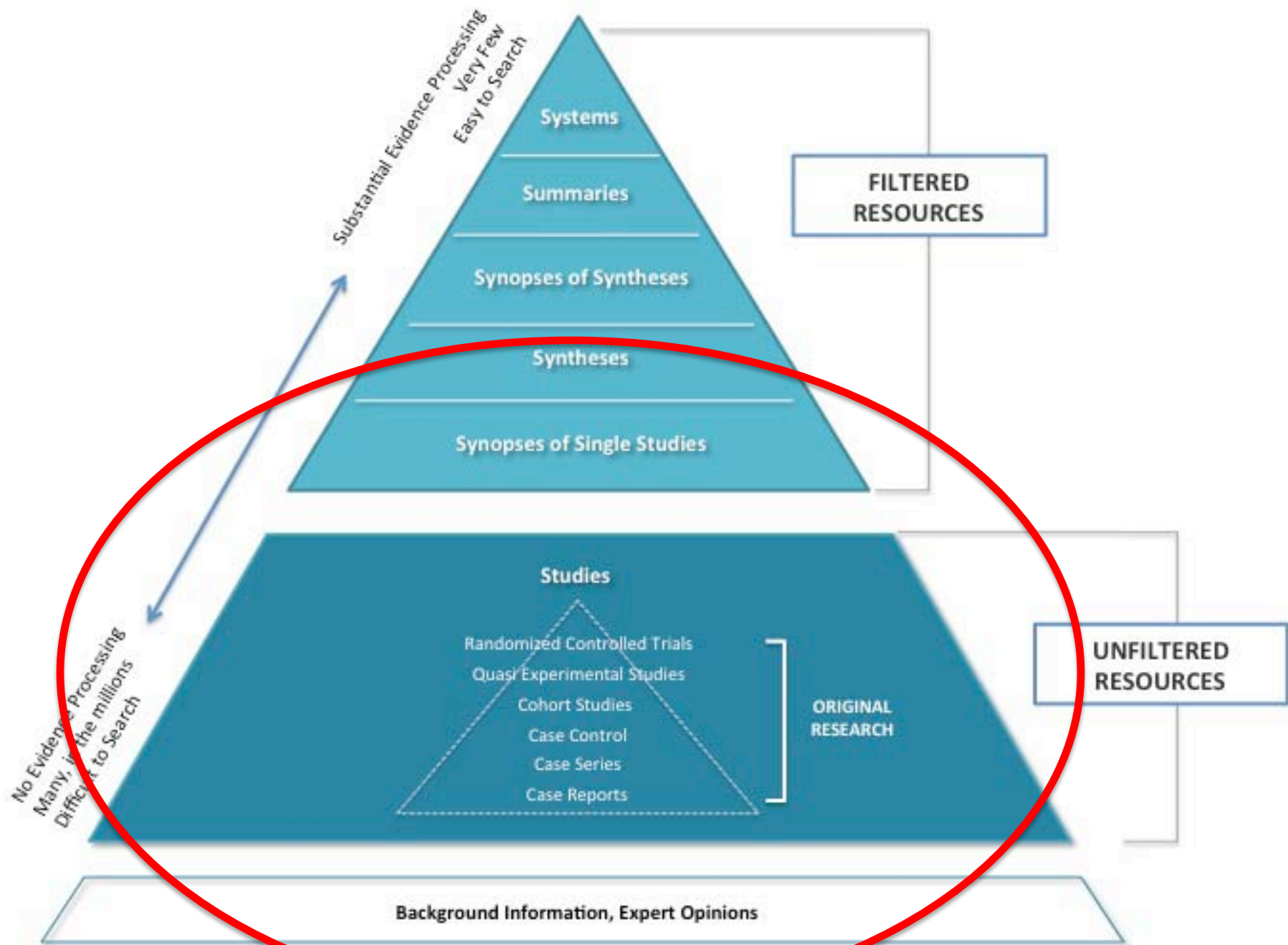
“The assignment seemed reasonable, although I doubt I would ever do a medline search for a treatment for a patient when there are other broader and more robust data for a medication or other therapy. I found using something like Dynamed far more useful than a Medline search”

# Clinical usefulness of MEDLINE

- Initial information literacy sessions are focused on teaching filtered resources intended for clinical reference, such as practice guidelines, point of care tools, and drug handbooks.







# Clinical usefulness of MEDLINE

- Prior survey of 3<sup>rd</sup> year students indicated that they perceived a need for advanced database searching skills.
- Faculty feedback also indicated that they wanted clerkship students and medical residents to have better database searching skills



# Problems

- Technical issues e.g. linking problems and limited number of concurrent users for JAMA Evidence
- Time
- Students wanted an example of a completed assignment
- Students needed refresher on statistics.

# Other feedback

- Challenging at an appropriate level
- Students complained that it was tough (better than being boring!)
- Quality of assignments was comparable to or better than previous years.

# Best Practices

- Employ active learning strategies—offer opportunities for problem solving, simulation, manipulation of screen, and quizzes.
- Remain relevant—ensure instruction supports course assignment.
- Consider design—provide educational objectives, learning outcomes, and major points.
- Use clear navigational techniques—highlight student's position in a tutorial and allow user to enter and exit the tutorial at any point.
- Promote flexibility—allow for different learning styles and levels with branching, the use of modules, and different layers of content.
- Provide access to a librarian.

Blummer & Kritskaya (2009)

# Conclusions

- Overall, the revised assignment was a success
- Students preferred electronic over paper.
- Students found value in knowing this was a CME activity.
- We have already implemented a simplified version for incoming medical students, with more curriculum development to come.

# Thanks

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- Dr. Darren Nichols, MED 532 Coordinator
- The team at CHE

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