

Goals and Objectives

- Describe the resources available at Preston Medical Library
- Update your knowledge on new PubMed (debut 2020) and Google Scholar for high yield search strategies
- Use these technologies for monitoring the literature, finding full text articles and managing citations.
- **Identify what resources your learners are using and help guide them finding and appropriately appraising high value articles.**
- **Roleplay a teaching scenario to highlight several faculty development resources for developing clinical questions, researching and appraising the literature.**

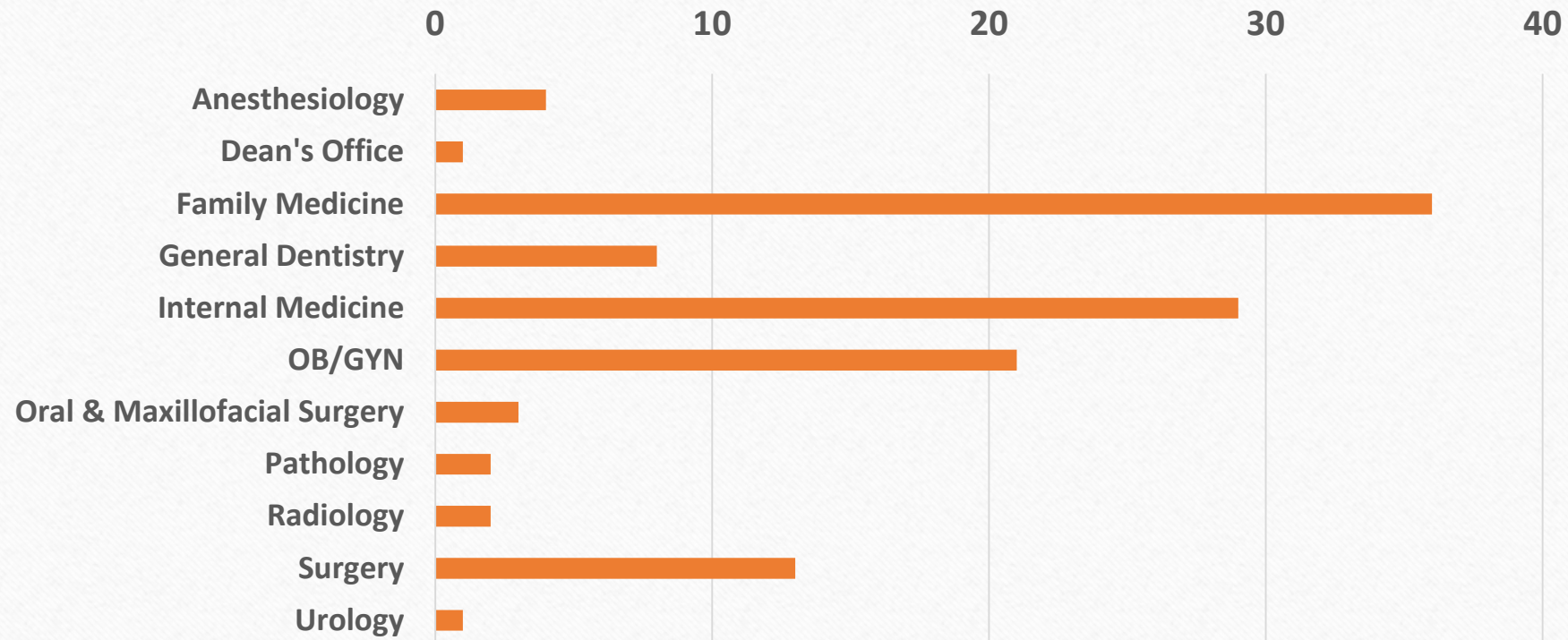
A Busy Place in 2018...

- Over 54,000 people have visited PML this year (GSM, public, staff)
- Over 26,000 unique hits to the Preston Medical library webpage
- Over 5,000 hours of study/conference room use
- 70 sessions taught and over 1150 people trained by librarians
- Over 2,200 full-text article requests fulfilled

Literature searches by the numbers

- For calendar year 2018, the librarians conducted 343 literature searches
- Average literature search was completed in less than 4 days, with median time at 1 day
- Approximately 40% of all literature searches come from GSM employees

Number of Literature Search Requests by Department 2018



Literature Search Requests

- Via email – can also use library@utmck.edu
- Online form – under “Services” on library homepage
- Call– x9525, or come in

Librarians as part of the clinical team

Banks et al., Decreased hospital length of stay associated with presentation of care associated with presentation of cases at morning report with librarian support. *J Med Libr Assoc.* 95(4) October 2007.

- Case-control study with 55 cases and 136 controls. Out of 105 eligible cases (2004-2005), 55 had at least one matched control. Controls chosen from 19,210 admissions at LSU 200-2005.



- Cases vs Controls: **LOS 3 days vs 5 days (p<0.024), Hospital charges \$7,045 vs \$10,663** for control. No difference in 30 day readmission.

How do you and your learners come up with searchable questions and important topics?

Using SNAPPS –PLUS to diagnose learner stage and generate questions

- Learner summarizes history and exam.
- Have your learner narrow differential diagnosis to a few possibilities.
- Analyze the differential by guided comparing and contrasting
- Faculty can probe by asking about ambiguities, different approaches
- Learner suggest a plan for patient management
- Learner (with guidance) selects a topic for further learning and frame the topic as a question, preferably in PICO format.

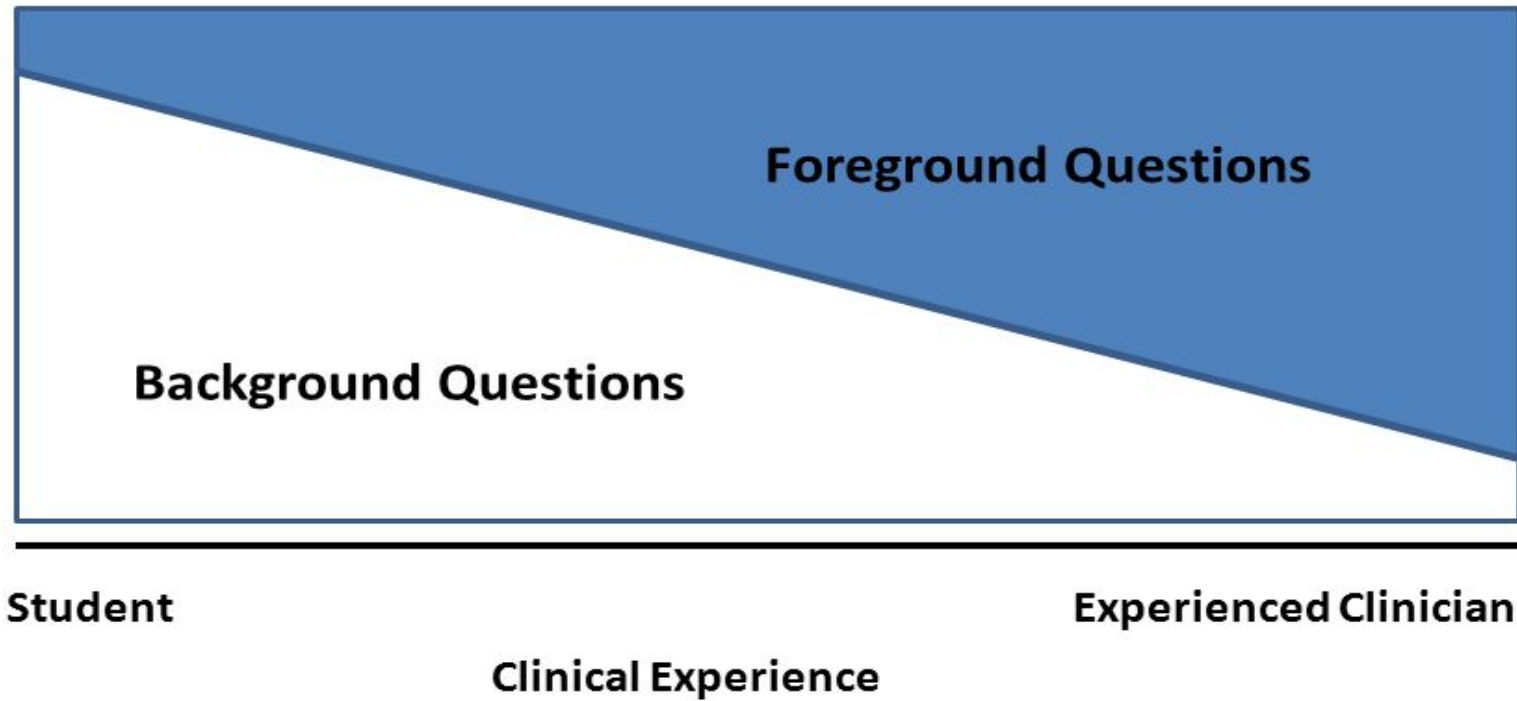
Nixon et al, 2014.

Question Categories
Bedside SNAPPS-Plus Presentations (190) on Internal Medicine Clerkship,
University of Minnesota Medical School, 2006-2010

Topic	Definition	No. (%)
Clinical diagnosis		37 (19%)
Data Acquisition	How to properly gather findings; H+P; tests	
Data Interpretation	How to interpret findings from H+P; tests	
Therapy	How to select treatment	112 (59%)
Harm		5 (3%)
Patient Safety	Preventable medical errors	
Complications	Complications from treatment/tests/exposure	
Prognosis	Estimate patient's likely course and anticipate complications	11 (6%)
Prevention	How to reduce the chance of disease by identifying/modifying risk factors and diagnosing earlier by screening.	8 (4%)
Cost Analysis	Cost comparisons	0 (0%)
Basic Science/Other	Basic Science, Physiology, Pharmacokinetics, Other	7 (4%)

Nixon et al, 2014; Sackett DL, 2000.

The relationship between foreground and background questions and the clinician's experience



PICO – creating an effective search

	<u>Broad Search</u>	<u>Narrow Search</u>
Patient	Leave Blank	Age range, Age descriptor, Sex, Ethnicity
Intervention	General descriptor/category	Specific intervention
Comparison	Leave Blank or general descriptor	Comparison intervention
Outcome	General outcome/mortality/morbidity	Specific diagnosis, clinical outcome, cost

PICO Scoring Rubric

From a Study of Internal Medicine Clerkship Students and Bedside SNAPPS Presentations,
University of Minnesota Medical School, 2006-2010

Pattern ^a	Score	Example ^b
[P?]	1	What is celiac sprue?
[I]	2	Is a D-dimer useful?
[P] [I?]	3	What therapy is best for patients with pulmonary embolism?
[P] [I?][O?]	4	What is the best treatment for analgesic rebound headaches?
[P] [I] [O?]	5	Could stimulants be useful for chronic fatigue syndrome?
[P] [I] [O]	6	What antibiotics eradicate <i>Helicobacter pylori</i> ?
[P] [I] [C] [O?]	7	Do acetaminophen and an NSAID combined improve osteoarthritis better than either one alone?
[P] [I] [C] [O]	8	In patients with suspected PE is CT Pulm Angio vs VQ scan more sensitive to r/o PE?

GRADING RUBRIC PICO elements clearly stated 0=no, 1=somewhat, 2=yes

Nixon et al, 2014; Thomas et al, 2001; Huang et al, 2006.

Resources if your learner is having trouble coming up with questions

- GoogleScholar or PubMed
- Choosing Wisely
- Podcasts sponsored by major journal and/or societies involving debate/discussion.
- “What not to do” SHM
- Institute for HealthCare Improvement.
- Reviewing “apps” basis in data.
- High Impact Journals
- Pre-reviewed CATS (critically appraised topics)
ACP journal club
- UptoDate
- New meds, new resources
- Medicare, our hospital’s and other quality indices.

Create life long learners!
Are you looking at what you are doing in practice?



BOWLING WITH SISYPHUS

How to approach critical appraisal of the literature

A Patient and Resource Centered Approach to Assessing the Abstract for Relevance

Title and Abstract
Patient Population

Does this interest you? Is it important to your practice?
Evaluate Figure 1 !
Does the patient population look like your patient?

Intervention

Is the intervention one that is available to you?

Comparison

Is the comparison one that is used at your institution?

Outcome

Patient Oriented? Morbidity, Mortality, Quality of Life
or just
Disease Oriented? Number PVC's, Time to procedure

Is the outcome difference clinically significant?
Cherchez la "p" ! Is the p-value <0.05 (or better $p < 0.01$)

Levels of Evidence

Level of Evidence	Type of Study
1a	Systematic review of randomized controlled trials (RCT's)
1b	One well-designed RCT (multi-centered, well powered)
2a	Systematic Review of cohort studies
2b	Individual cohort studies and low-quality RCT's
3a	Systematic reviews of case-controlled studies
3b	Individual case-controlled study
4	Case Series, poor quality cohort and case-control studies
5	Expert opinion based on clinical experience; bench research

Look at the Statistics

A Couple of Terms

Hypothesis – Usually null (no change). You are trying to disprove the null hypothesis.

P- Value

It's the Probability Statistic.

$P \leq 0.05$ corresponds to 1.96 (about 2) standard deviations for a normal distribution (2-tailed test)
This approximates about a 1 in 22 probability of being disproving the null hypothesis by chance alone.

Power

The likelihood that the study correctly rejects the null hypothesis.
Power analysis calculates minimum sample size.

Characteristics	Article Year			p-value
	1990 (n = 133)	2000 (n = 122)	2010 (n = 106)	
Descriptive statistics	124 (93.2%)	122 (100%)	106 (100%)	-
Low-level statistical measures [†]	108 (81.2%)	116 (95.1%)	105 (99.1%)	<0.001
Morbidity & mortality	76 (57.1%)	60 (49.2%)	73 (68.9%)	0.011
ANOVA	26 (19.5%)	24 (19.7%)	18 (17.0)	0.844
Chi square	54 (40.6%)	51 (41.8%)	51 (48.1%)	0.471
Fisher exact	19 (14.3%)	18 (14.8%)	20 (18.9%)	0.583
Mantel-Haenszel	11 (8.3%)	15 (12.3%)	7 (6.6%)	0.301
Epidemiologic statistics [‡]	28 (21.1%)	34 (27.9%)	33 (31.1%)	0.190
t-test	28 (21.1%)	31 (25.4%)	28 (26.4%)	0.577
Power	7 (5.3%)	7 (5.7%)	28 (26.4%)	<0.001
p-trend	6 (4.5%)	17 (13.9%)	14 (13.2%)	0.023
Pearson correlation coefficient	13 (9.8%)	10 (8.2%)	5 (4.7%)	0.340
Logistic regression	27 (20.3%)	42 (34.4%)	28 (26.4%)	0.039
Simple linear regression	12 (9.0%)	17 (13.9%)	13 (12.3%)	0.460
Poisson regression	0 (0.0%)	11 (9.0%)	8 (7.5%)	0.003
Log-rank test	2 (1.5%)	9 (7.4%)	15 (14.2%)	0.001
Multi-level modeling	3 (2.3%)	11 (9.0%)	34 (32.1%)	<0.001
Multiple comparison	7 (5.3%)	8 (6.6%)	9 (8.5%)	0.609
Multiple regression	32 (24.1%)	52 (42.6%)	51 (48.1%)	<0.001
Non parametric test	17 (12.8%)	19 (15.6%)	23 (21.7%)	0.173
Wilcoxon Rank	13 (9.8%)	14 (11.5%)	19 (17.9%)	0.150
Survival analysis	19 (14.3%)	27 (22.1%)	46 (43.4%)	<0.001
Cox models	10 (7.5%)	17 (13.9%)	34 (32.1%)	<0.001
Kaplan Meier	5 (3.8%)	13 (10.7%)	24 (22.6%)	<0.001
Sensitivity analysis	30 (22.6%)	44 (36.1%)	52 (49.1%)	<0.001
Intention to treat	6 (4.5%)	18 (14.8%)	24 (22.6%)	<0.001
Transformation	9 (6.8%)	12 (9.8%)	10 (9.4%)	0.6374

Arnold et al, 2013.

Statistical Knowledge: Where are we starting from?

In 2006, 277 internal medicine residents completed a biostatistics test of statistics used in the literature.

- Percent of correct answers **41%**
- Percent residents who said they **did not understand** all the concepts they encountered in the literature **75%**
- Percent that thought it was important to understand these concepts to be an effective literature reader **95%**

More recent studies (2012, 2016) indicate that we have not made much progress with plastic surgery residents or pharmacists despite increased emphasis on EBM topics in medical schools.

The Statistician on Your Team



R. Eric Heidel, Ph.D
Division of Biostatistics
Graduate School of Medicine

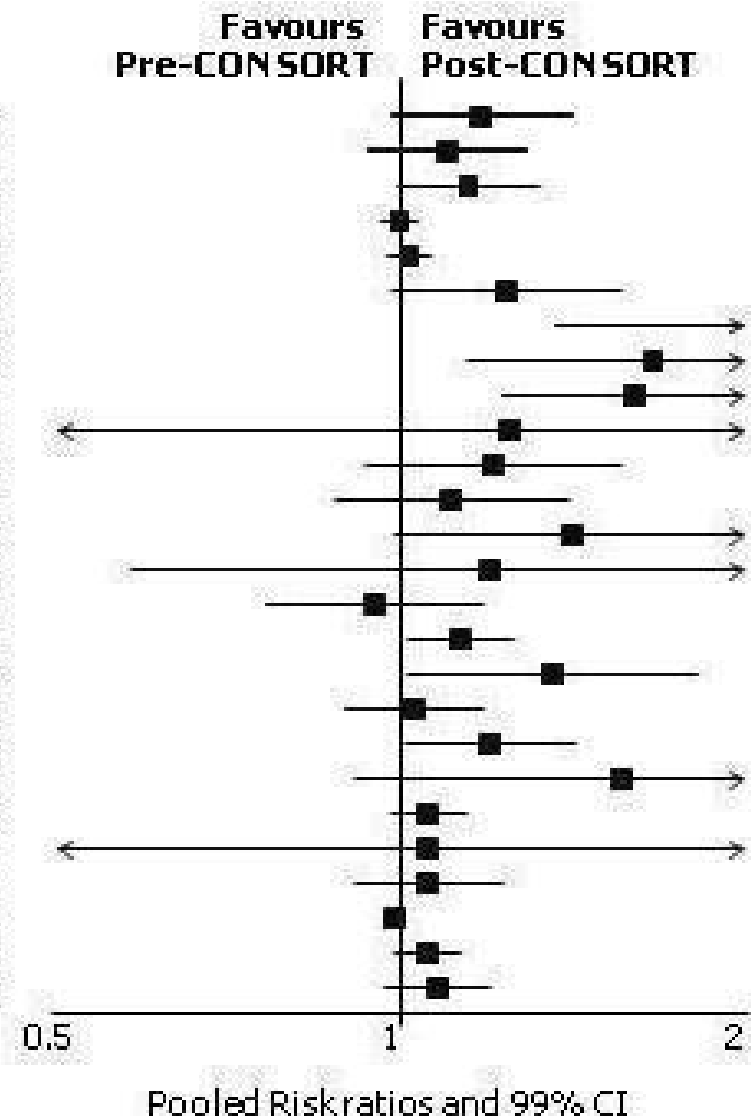
Available for GSM faculty and residents
Mentors grad students from UTK

Areas of interest: education, simulation, research design, QI, clinical outcomes, survey creation, psychometrics, diagnostic testing, epidemiology.

GUIDE YOUR LEARNERS TO CORE JOURNALS TO ASSURE SOME INCREASED TRANSPARENCY AND REVIEW

- As of August 1, 2018 there are **5,293** journals indexed for MEDLINE.
- **AIM (Abridged Index Medicus)** aka “Core journals” is a subset of PubMed
- CONSORT is a joint agreement among journals about transparency and consistency with statistics reporting of RCT’s. In 2010, this was updated with a checklist.
- Only about 500 journals have endorsed (require) CONSORT checklist.

CONSORT Checklist Item	# of Evaluations	# of RCTs	RR	99% CI
Title and Abstract	7	8,225	1.18	(0.98, 1.42)
Introduction	8	8,293	1.10	(0.94, 1.29)
Participants	6	8,368	1.15	(0.99, 1.33)
Interventions	7	8,224	1.00	(0.96, 1.04)
Objectives	5	8,028	1.02	(0.97, 1.07)
Outcomes	7	9,315	1.24	(0.98, 1.57)
Sample Size	10	9,568	2.45	(1.37, 4.39)
Sequence Generation	11	9,934	1.67	(1.14, 2.45)
Allocation Concealment	12	9,772	1.61	(1.23, 2.10)
Implementation	4	490	1.25	(0.41, 3.80)
Blinding of Participants	10	8,108	1.21	(0.93, 1.58)
Blinding of Intervention	7	586	1.11	(0.87, 1.41)
Blinding of Outcome Assessor	3	600	1.42	(0.99, 2.04)
Blinding of Data Analyst	4	14	1.20	(0.58, 2.49)
Blinding Any description	1	1,660	0.95	(0.76, 1.19)
Statistical Methods	7	8,223	1.13	(1.01, 1.26)
Participant Flow	8	8,373	1.36	(1.01, 1.83)
Recruitment	5	8,024	1.03	(0.89, 1.19)
Baseline Data	6	8,114	1.20	(1.01, 1.43)
Numbers Analysed	8	1,307	1.57	(0.91, 2.70)
Outcomes and Estimation	9	8,613	1.06	(0.98, 1.15)
Ancillary Analyses	5	8,738	1.06	(0.47, 2.39)
Adverse Events	6	8,186	1.06	(0.91, 1.24)
Interpretation	4	7,989	0.99	(0.98, 1.00)
Generalisability	4	8,010	1.06	(0.99, 1.14)
Overall Evidence	4	8,010	1.08	(0.97, 1.21)



Use Appraisal Worksheets

- McMaster Centre for Evidence Based Medicine

“Teaching Evidence-Based Medicine” Workshop

<https://ebm-tools.knowledgetranslation.net/worksheet>

- Same worksheets but with relevance questions and distilled to one page from Tufts.

<https://medicine.tufts.edu/Education/Academic-Deaprtments/Clinical-Departments/Family-Medicine/Information-Mastery/Worksheets>

- One for each type of questions (Diagnosis/Treatment/Prognosis/Harm).
- Checklists include various important components (gold standard, blinding, biases)

CATs (Critically Appraised Topics)

Your Teaching Cheat Sheet

- ACP Journal Club (uses same rubric as critical appraisal worksheets)
 - Impact scores rated by volunteer doctors in different specialties
 - Standard approach for analysis
 - Calculates NNT, Sensitivity and Specificity for you.
- Other Suggestions for sources of CAT's from other specialties?

SNAPPS PLUS and MYTHBUSTERS!
teaching tools

For SNAPPS Faculty Development:

Roles: Medical Student, Teacher, Teaching Observer for case presentation and question formation

1. Student presents case with feedback from teacher about presentation.
2. Student formulates questions
3. Teacher gives some pearls, gives guidance about topic, questions and additional questions.
4. Observers come up with a rubric to assess what would be a good session.