



Information Mastery:  
Modeling Lifelong Adaptive Learning

# Learning objectives



Discuss the importance of developing a practice of lifelong learning



Explore barriers to implementing evidence informed decision making in clinical practice and teaching



Demonstrate meaningful resources for cultivating a practice of lifelong learning



*Ceci n'est pas une pipe.*

*Magritte*

In your experience, what barriers prevent implementation of evidence-based practice?

- Word cloud

# Barrier #1: Pathophysiological Reasoning

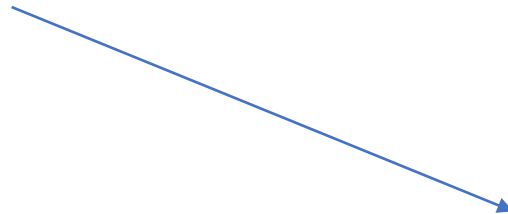


Pathophysiologic  
reasoning

Health Sciences  
Students

Konrad Lorenz

Eminence Based  
Medicine



Evidence Based  
Medicine



## Barrier #2: Long Implementation Time

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# Evidence and Decision making

- Doubling time of medical knowledge
  - 1950: 50 years
  - 1980: 7 years
  - 2010: 3.5 years
  - 2020: projected to be 0.2 years - 73 days
  - Students who began medical school in 2010 will experience approximately three doublings by the time they complete the minimum length of training (7 years)
  - Students who graduate in 2020 will experience four doublings
  - What was learned in the first 3 years of medical school will be just 6% of what is known at the end of the decade from 2010 to 2020

• Densen, Peter. "Challenges and opportunities facing medical education." *Transactions of the American Clinical and Climatological Association* vol. 122 (2011): 48-58.

# Evidence and Decision making

- Most decisions are based on what we THINK is the evidence, not what we KNOW is the evidence
- No one has time to appraise all the evidence
- How do we encounter evidence?
  - Talking to peers
  - Brief readings
  - Conferences



Examples of learners  
knowing new or different  
information?



A decorative graphic consisting of a solid orange square on the left and a large white circle on the right, both partially visible at the edge of the frame.

# Tips for Being a Lifelong Learner

1. Remember the usefulness equation
2. Implement a way of receiving information (foraging tools)
3. Implement a system to answer questions (hunting tools)
4. Develop a way to get CME frequently
5. Establish a collaborative relationships with learners and colleagues



## 1. Usefulness Equation

$$\text{Usefulness} = \frac{\text{relevance} \times \text{validity}}{\text{work}}$$

## 2. Implement a way of receiving information

ESSENTIAL  
EVIDENCE  
PLUS

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### Stricter criteria for diagnosis and treatment of gestational diabetes is not beneficial

Daily POEMsPrinter FriendlyPublished: 2022-10-27© 2022 John Wiley & Sons, Inc.

Clinical question

Does the diagnosis and treatment of gestational diabetes based on lower glucose criteria benefit mothers or infants?

Bottom line

A lower diagnostic glycemic threshold for gestational diabetes of 92 mg/dL fasting or 153 mg/dL at 2 hours after a 75-g oral glucose challenge was not associated with a reduction in the rate of large-for-gestational-age infants. Diagnosis and treatment based on the stricter criteria doubled the proportion of patients diagnosed with gestational diabetes and was associated with increases in induction of labor, use of health services, use of pharmacologic agents, and neonatal hypoglycemia. Multiple other secondary outcomes for mothers and infants were not different. The lower criteria studied should not be implemented in practice.  
(LOE = 1b)

Reference

Crowther CA, Samuel D, McCowan LME, Edlin R, Tran T, McKinlay CJ, for the GEMS Trial Group. Lower versus higher glycemic criteria for diagnosis of gestational diabetes. N Engl J Med 2022;387(7):587-598.

Study design: Randomized controlled trial (nonblinded)

Funding source: Foundation

Allocation: Concealed

Setting: Outpatient (primary care)

Synopsis

This study was a randomized clinical trial conducted in New Zealand to evaluate the diagnosis and treatment of gestational diabetes based on lower glycemic thresholds as compared with usual care. Patients with diabetes mellitus, a history of gestational diabetes, and those with multiple gestation were ineligible. Participants (N = 4061) had a 75-g 2-hour glucose tolerance test at 24 to 32 weeks' gestation as part of their usual prenatal care. After informed consent, they were randomized to a lower diagnostic glycemic threshold for the diagnosis and treatment of gestational diabetes or to usual care. The stricter criteria were 92 mg/dL (vs 99 mg/dL) fasting or 153 mg/dL (vs 162 mg/dL) at 2 hours. The lower diagnostic threshold included the additional criterion of at least 180 mg/dL at 1 hour. The proportion of patients with a diagnosis of gestational diabetes was more than double in the stricter criteria group (310/2022 [15.3%] vs 124/2039 [6.1%]). The primary outcome of a large-for-gestational-age infant was not different between groups (8.8% vs 8.9%; NS). Newborn hypoglycemia occurred more frequently in the strict criteria group (10.7% vs 8.4%; adjusted relative risk [aRR] 1.27; 95% CI 1.05 - 1.54; number needed to treat to harm [NNT] 44; 24 - 203). Multiple other neonatal outcomes showed no significant differences, including small-for-gestational-age, gestational age at birth, preterm birth, and the use of health services. Among mothers, there were associated increases in the strict criteria group for induction of labor (33.7% vs 30.2%; aRR 1.12; 1.02 - 1.22; NNT = 28; 15 - 133), the use of pharmacologic treatment (10.9% vs 4.6%; aRR 2.40; 1.90 - 3.03; NNT = 16; 13 - 21), and more frequent visits for care. Other maternal outcomes did not differ between groups.

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External Links

View article via PubMed

Essential Evidence Plus (\$90/year)

DynaMed

EBM Focus

Metformin First, What Next?

2 minute read

Reference: N Engl J Med. 2022 Sep 22;387(12):1063-1074

✓ Practice Point

For glucose lowering in patients with type 2 diabetes, what you prescribe after metformin doesn't seem to matter as long as it's not a sulfonylurea.

✓ EBM Pearl

Try not to get so lost in the trees that you can't see the forest. Selection of an appropriate and clinically useful endpoint is as important as finding a significant result.

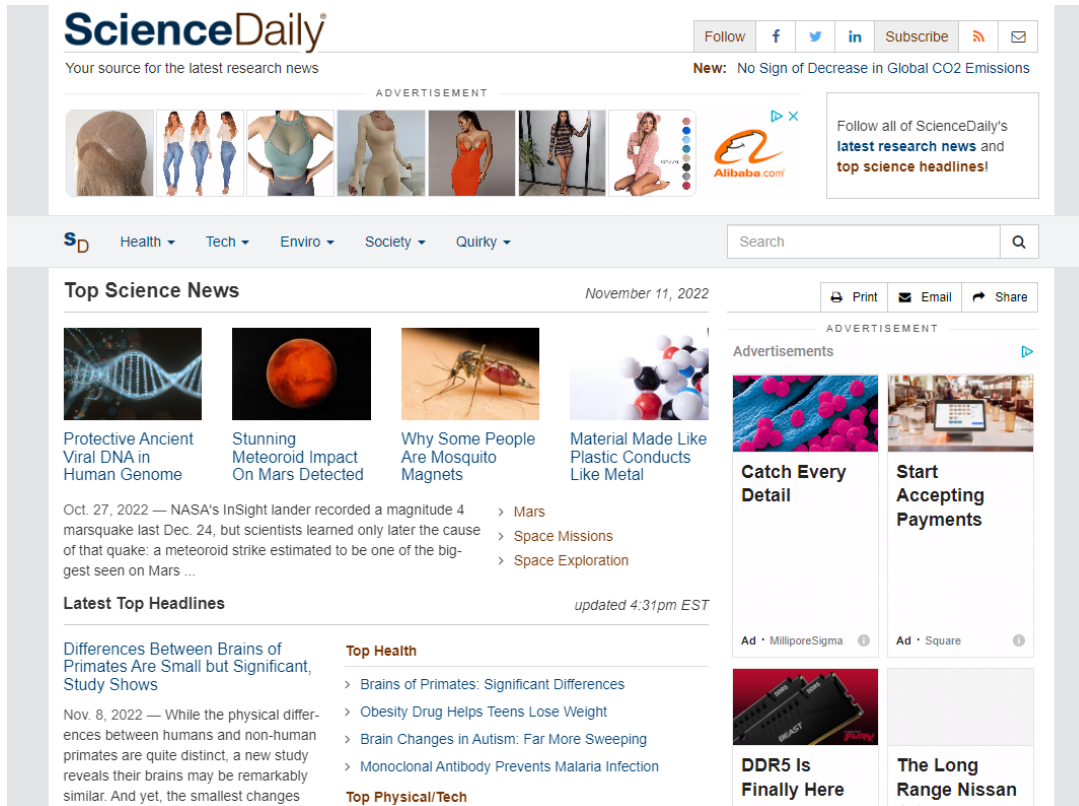
When it comes to type 2 diabetes medication management, clinicians have been hungry for a prescribing algorithm for years — one based on high-quality evidence and devoid of big pharma's influence. Ask and you shall receive, sort of.

The recent GRADE trial compared safety and effectiveness of four diabetes medications (glargine, liraglutide, sitagliptin, and glimepiride) in more than 5,000 fairly diverse adults with a mean baseline A1c of 7.5% (range 6.8%-8.5%) who were already taking high-dose metformin. (SGLT-2 inhibitors were not FDA-approved in the U.S. at the time of enrollment.) If you want to cut this short now, the 'effectiveness' goes in this order: liraglutide, glargine, glimepiride, sitagliptin. But that's not nearly the whole story.

DynaMed EBM focus

(sign-up for the alerts is free)

## 2. Implement a way of receiving information



The ScienceDaily website features a clean layout with a header containing the logo, navigation links (Health, Tech, Enviro, Society, Quirky), and social media icons. A prominent advertisement for Alibaba.com is displayed. The main content area is titled "Top Science News" and includes a date filter for November 11, 2022. It lists several articles, such as "Protective Ancient Viral DNA in Human Genome" and "Stunning Meteoroid Impact On Mars Detected". A sidebar on the right contains additional advertisements and a "Latest Top Headlines" section.

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DDR5 Is Finally Here The Long Range Nissan

**Latest Top Headlines** updated 4:31pm EST

Differences Between Brains of Primates Are Small but Significant, Study Shows

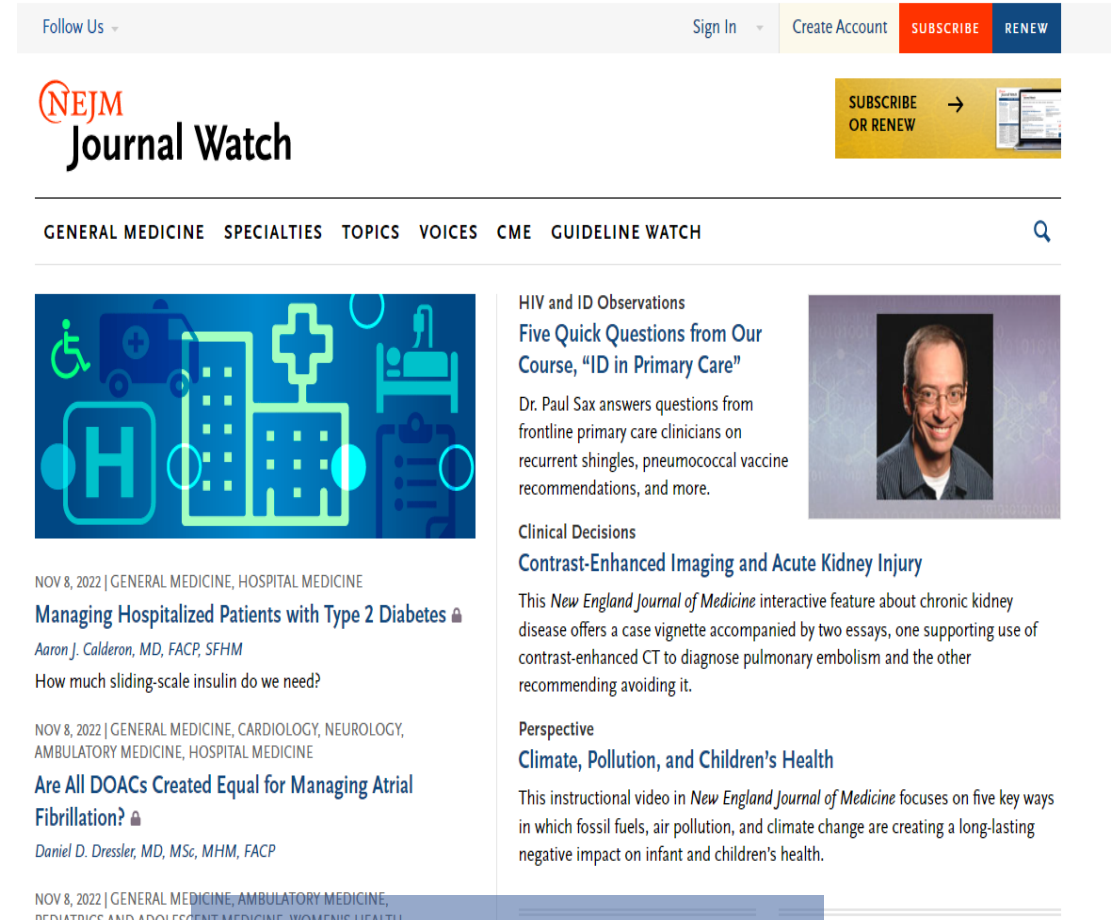
Nov. 8, 2022 — While the physical differences between humans and non-human primates are quite distinct, a new study reveals their brains may be remarkably similar. And yet, the smallest changes

**Top Health**

- > Brains of Primates: Significant Differences
- > Obesity Drug Helps Teens Lose Weight
- > Brain Changes in Autism: Far More Sweeping
- > Monoclonal Antibody Prevents Malaria Infection

**Top Physical/Tech**

Science Daily (free)



The NEJM Journal Watch website has a professional design with a header for user registration and subscription options. The main navigation bar lists various medical specialties. The featured article, "Managing Hospitalized Patients with Type 2 Diabetes," includes a detailed summary, author information, and a date filter for November 8, 2022. A sidebar on the right provides additional context and related content.

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**Managing Hospitalized Patients with Type 2 Diabetes**

NOV 8, 2022 | GENERAL MEDICINE, HOSPITAL MEDICINE

Aaron J. Calderon, MD, FACP, SFHM

How much sliding-scale insulin do we need?

NOV 8, 2022 | GENERAL MEDICINE, CARDIOLOGY, NEUROLOGY, AMBULATORY MEDICINE, HOSPITAL MEDICINE

**Are All DOACs Created Equal for Managing Atrial Fibrillation?**

Daniel D. Dressler, MD, MSc, MHM, FACP

NOV 8, 2022 | GENERAL MEDICINE, AMBULATORY MEDICINE, PEDIATRICS AND ADOLESCENT MEDICINE, WOMEN'S HEALTH

HIV and ID Observations

**Five Quick Questions from Our Course, "ID in Primary Care"**

Dr. Paul Sax answers questions from frontline primary care clinicians on recurrent shingles, pneumococcal vaccine recommendations, and more.

Clinical Decisions

**Contrast-Enhanced Imaging and Acute Kidney Injury**

This *New England Journal of Medicine* interactive feature about chronic kidney disease offers a case vignette accompanied by two essays, one supporting use of contrast-enhanced CT to diagnose pulmonary embolism and the other recommending avoiding it.

Perspective

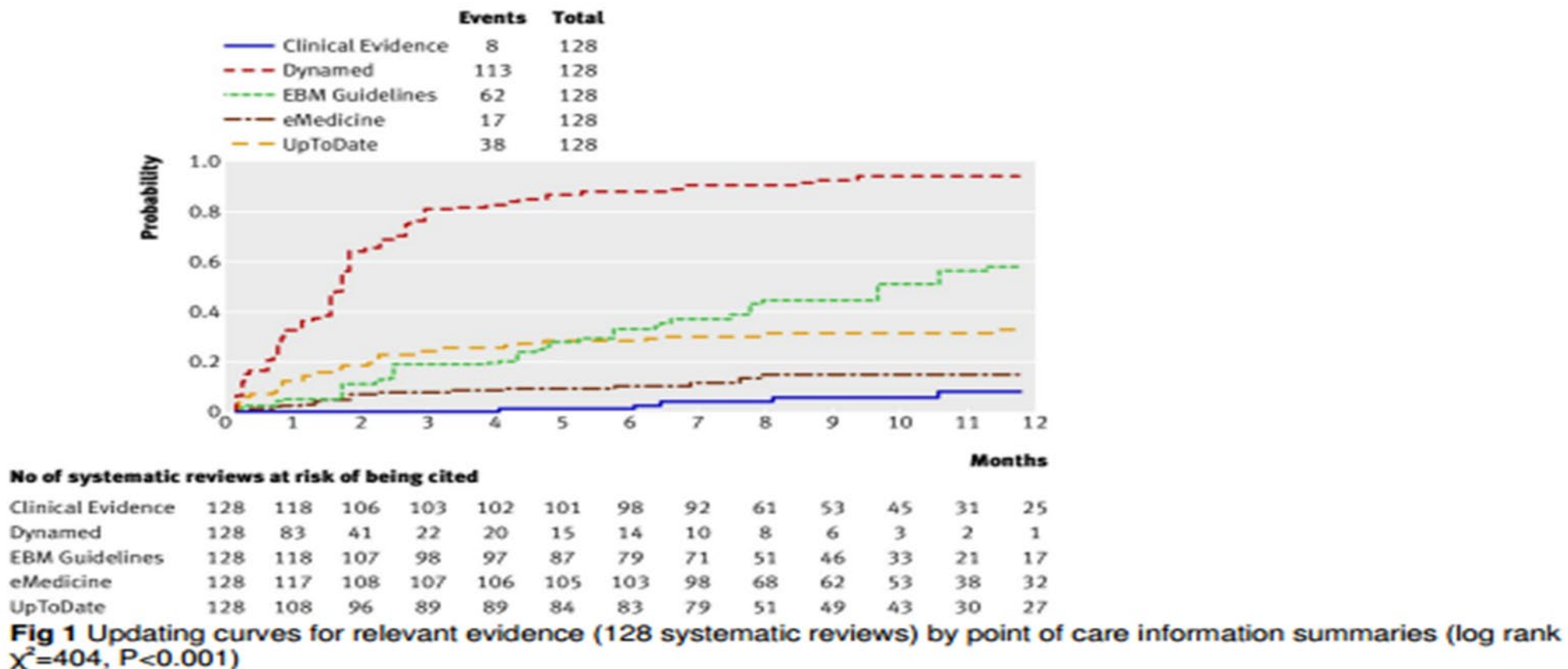
**Climate, Pollution, and Children's Health**

This instructional video in *New England Journal of Medicine* focuses on five key ways in which fossil fuels, air pollution, and climate change are creating a long-lasting negative impact on infant and children's health.

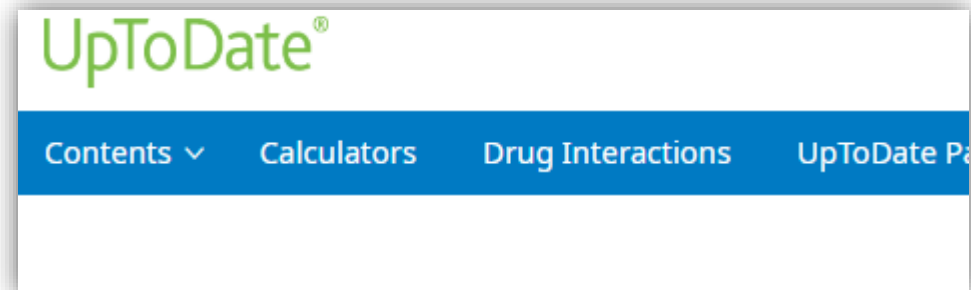
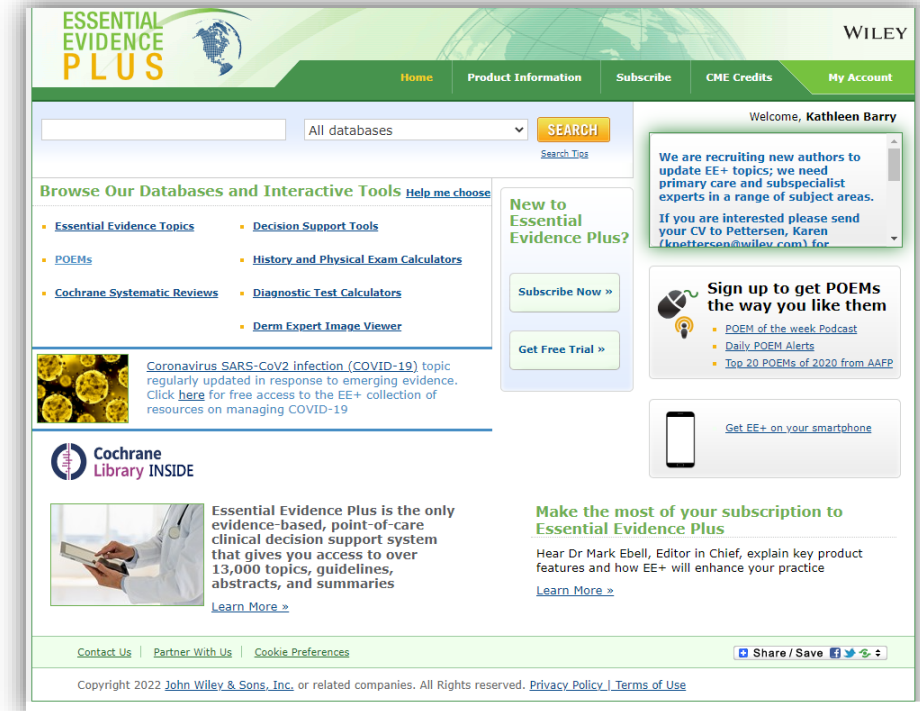
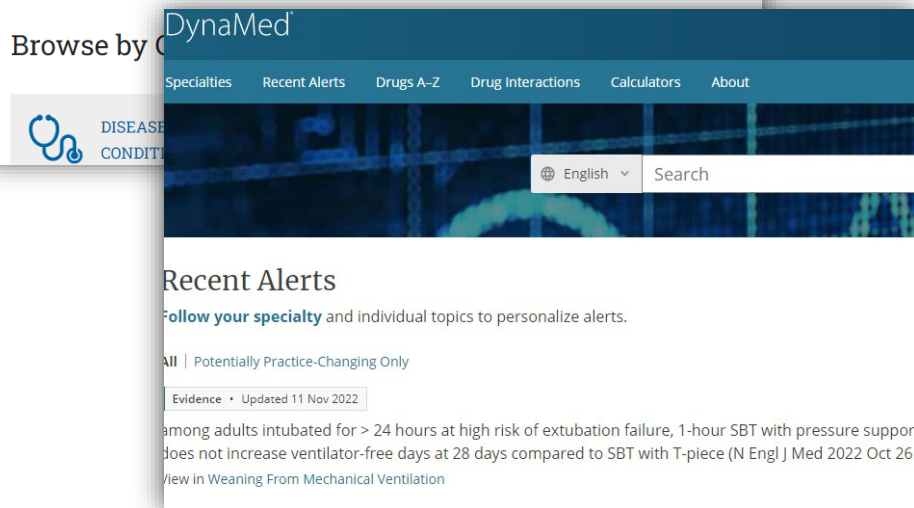
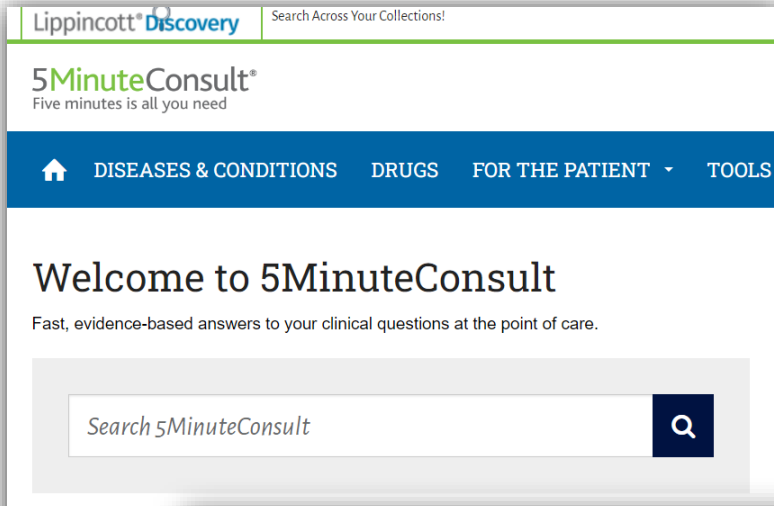
Journal Watch (\$119): from NEJM  
Daily Update

### 3. Implement a system to answer questions

#### Figures



### 3. Implement a system to answer questions



## 4. Develop a way to get CME frequently



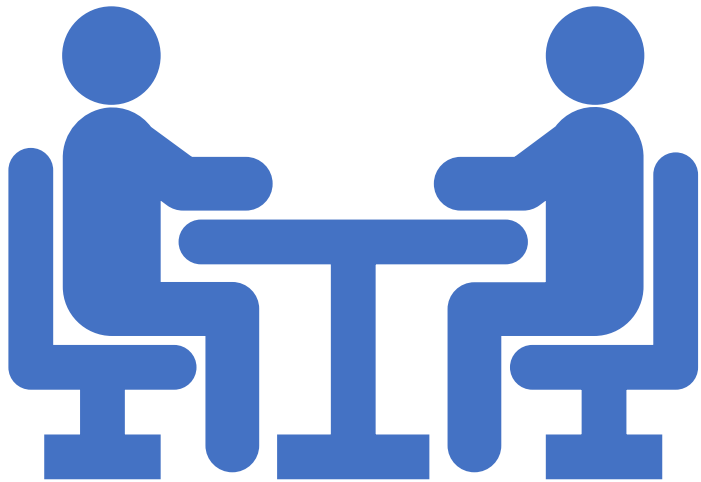
### Medical Podcasts offer CME

- Frankly Speaking About Family Medicine
- POEM of the week
- Curbsiders
- What other podcasts

### Integrated into Hunting Tool

### ABFM journal club

#### 4. Establish a collaborative relationships with learners and colleagues



- *I'm not sure, let's look that up together*
- *I hadn't heard that before. Can you tell me where you got that information?*
- *Tell me more about that*

# Learning objectives



Discuss the importance of developing a practice of lifelong learning



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Thank you!