
# Information Mastery:
# Modeling Lifelong Adaptive Learning

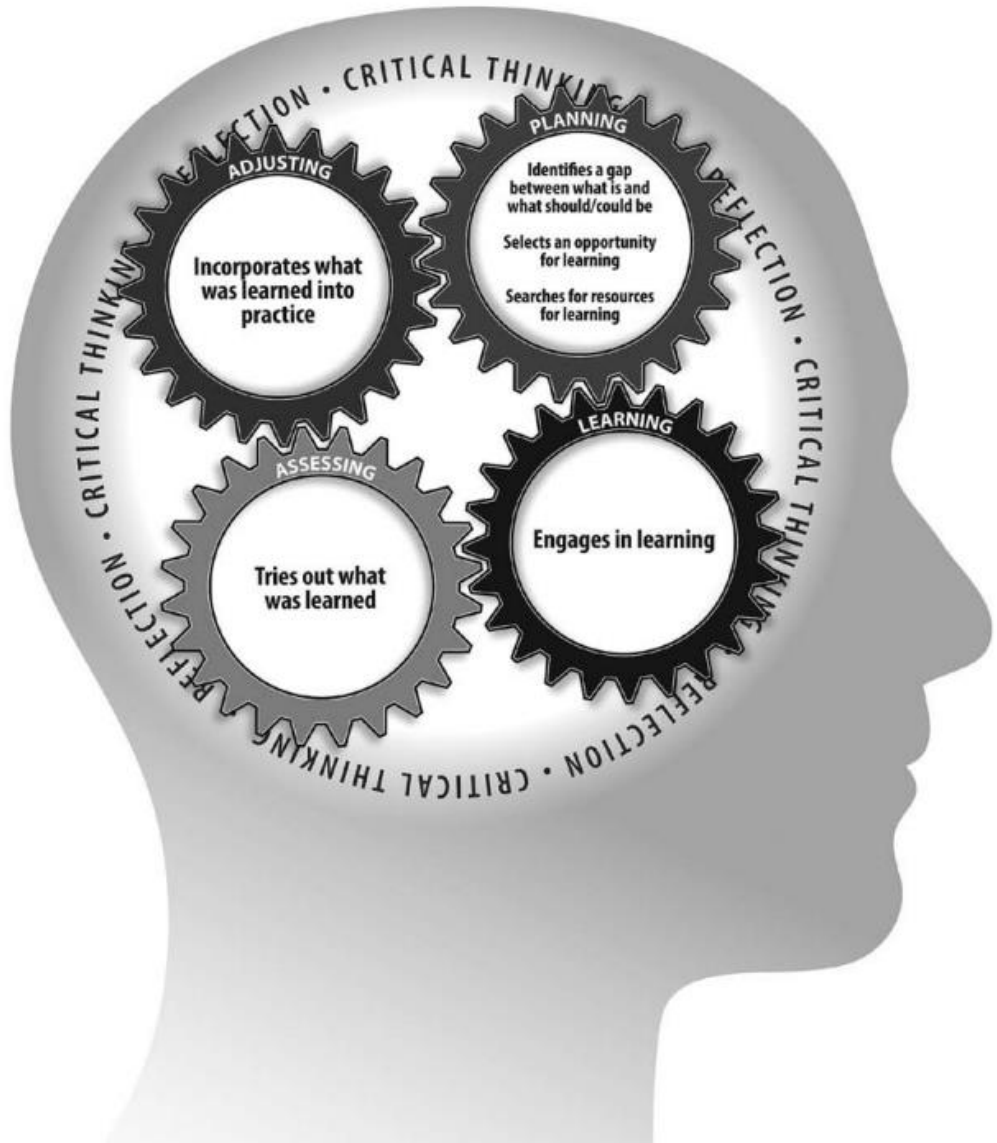
# Learning objectives

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

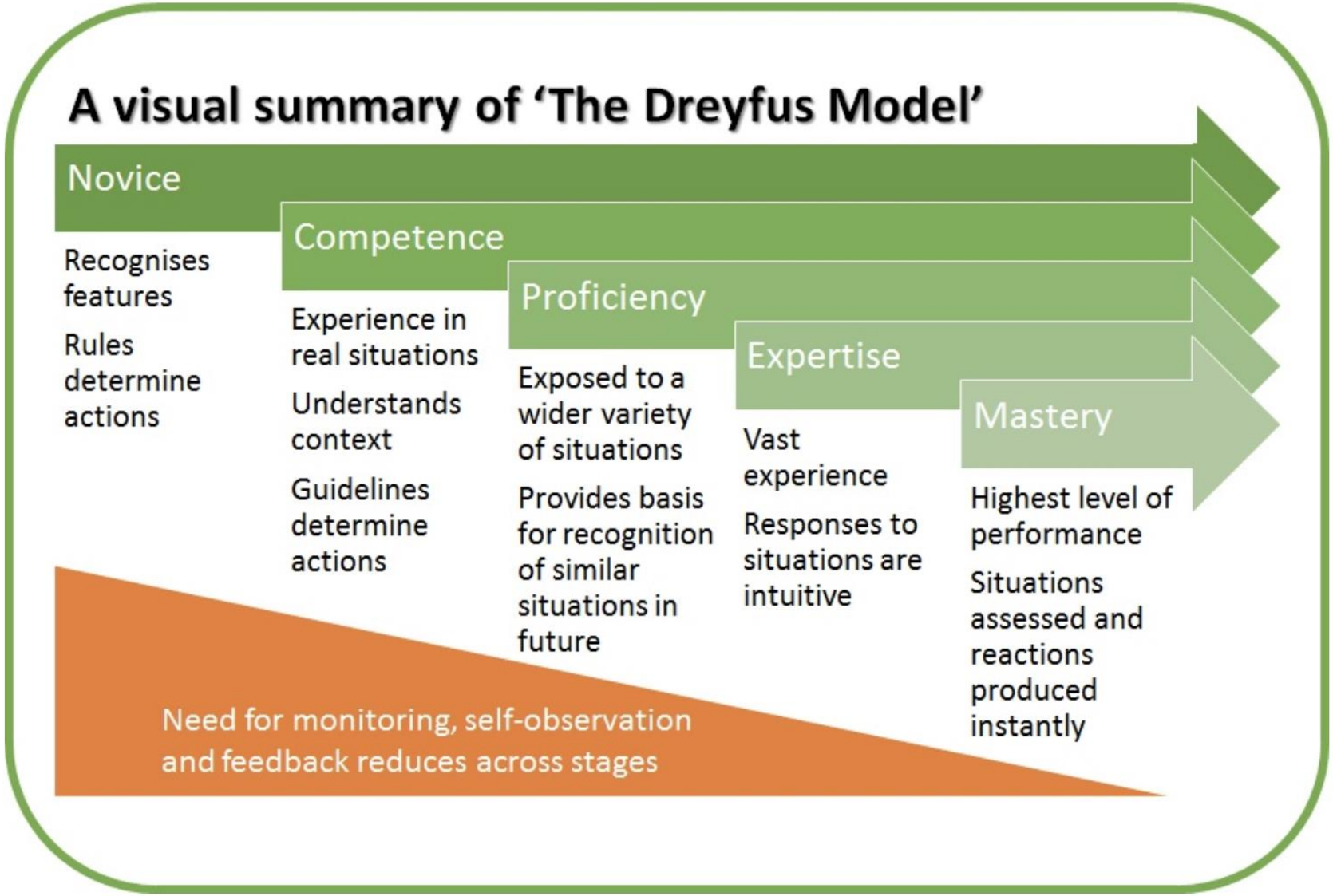

Ceci n'est pas une pipe.


PLANNING
Identifies a gap between what is and what should/could be
Selects an opportunity for learning
Searches for resources for learning
LEARNING
Engages in learning
ASSESSING
Tries out what was learned
ADJUSTING
Incorporates what was learned into practice
CRITICAL THINKING • REFLECTION • CRITICAL THINKING • REFLECTION • CRITICAL THINKING • REFLECTION • CRITICAL THINKING • REFLECTION

# Does medical education foster adaptive learning?

- MCAT
- Content Area Exams
- Step 1
- Shelf Exams
- Step 2
- Step 3
- Boards
- Maintenance of Boards

- Entrance exam for nursing program
- Content Area Exams
- NCLEX
- Nursing certification Exams for specialty areas
- More for NP and DNP




*https://richrtesting.com/the-dreyfus-model-a-visual-summary/*

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

results

# Barrier #1:  Pathophysiological Reasoning


Eminence Based Medicine
Evidence Based Medicine

# Barrier #2:  Long Implementation Time

# 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?

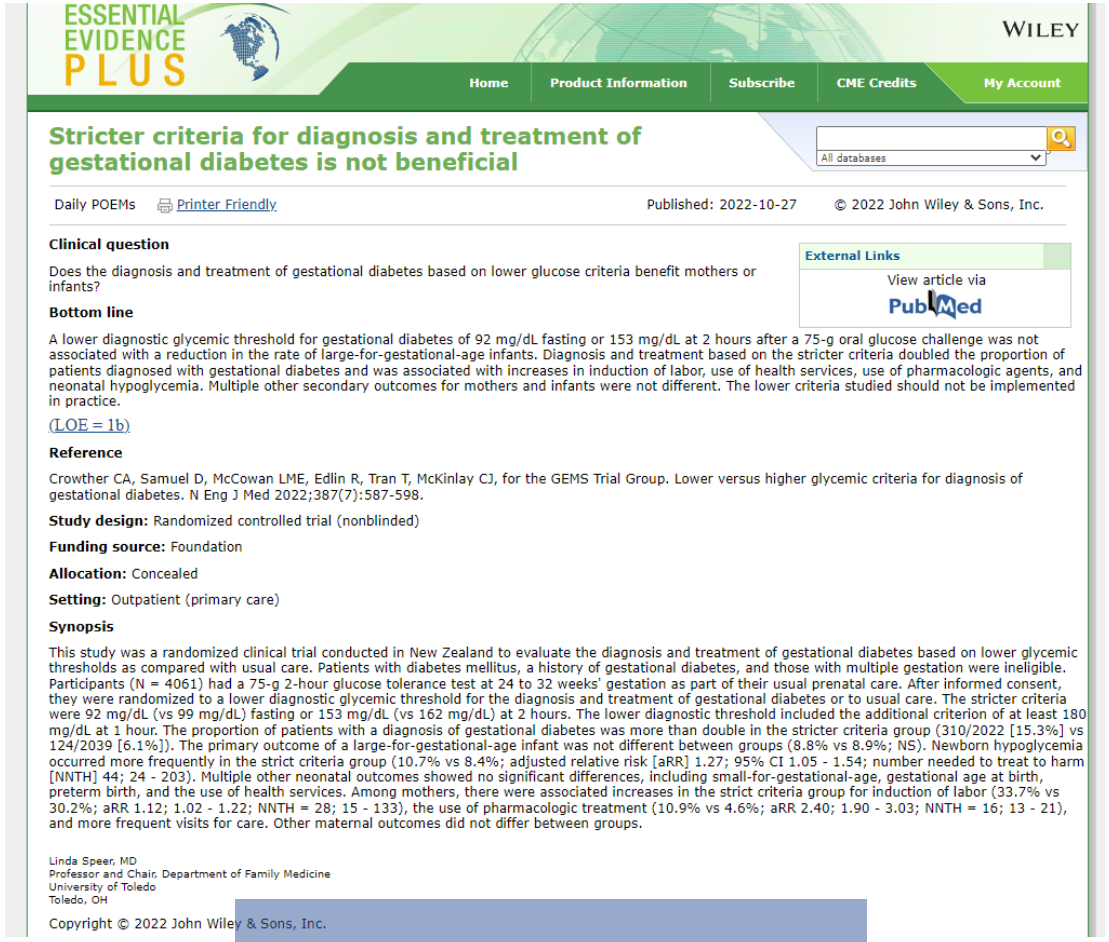
# Tips for Being a Lifelong Learner

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

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

# 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

All databases

Daily POEMs | Printer Friendly | Published: 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?

External Links

View article via PubMed

**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 Eng 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 [NNTH] 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; NNTH = 28; 15 - 133), the use of pharmacologic treatment (10.9% vs 4.6%; aRR 2.40; 1.90 - 3.03; NNTH = 16; 13 - 21), and more frequent visits for care. Other maternal outcomes did not differ between groups.

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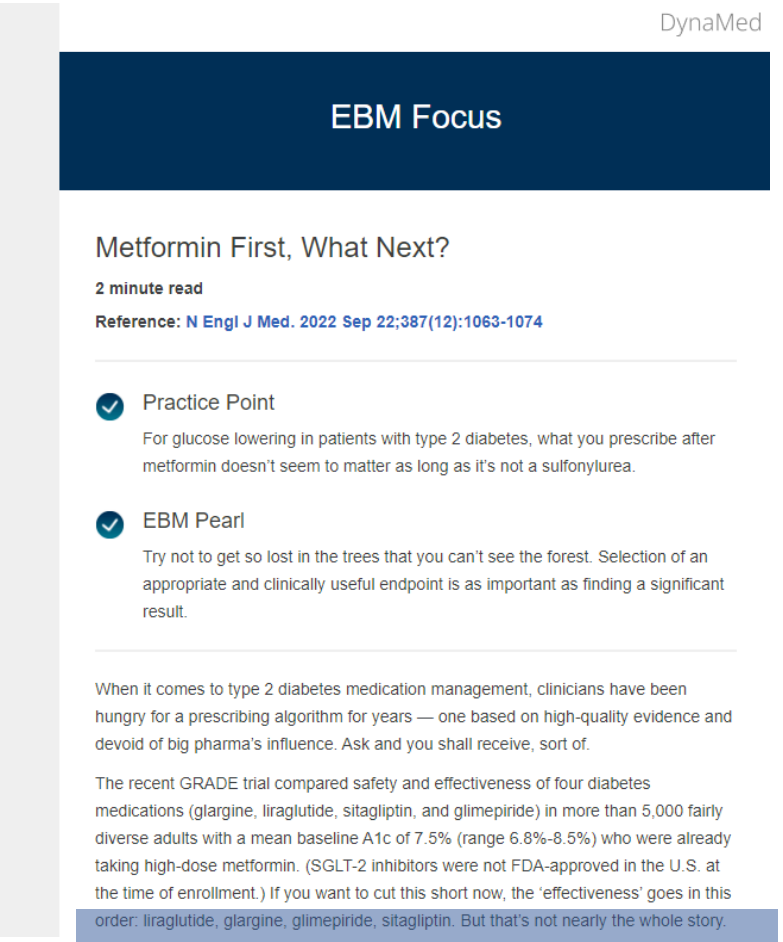
Toledo, OH



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.

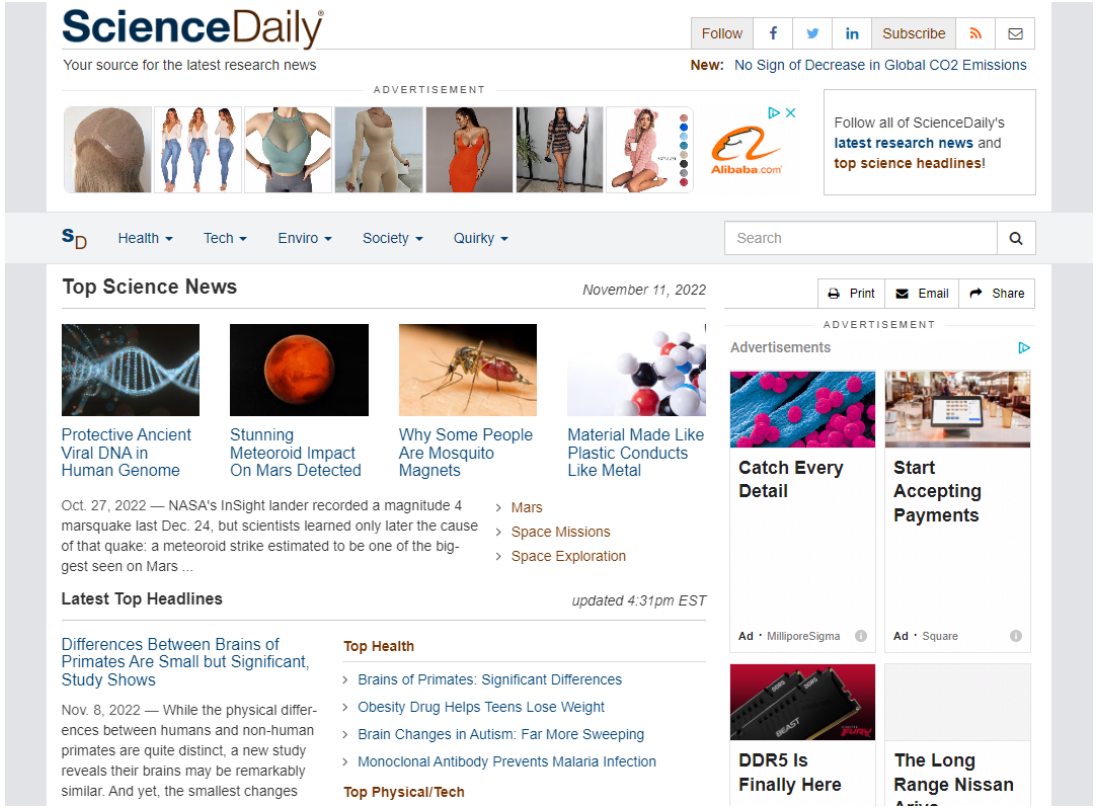
When it comes to type 2 diabetes medication management, clinicians have been hungry for a prescribing algorithm for years — one based on high-quality evidence and devoid of big pharma's influence. Ask and you shall receive, sort of.

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.

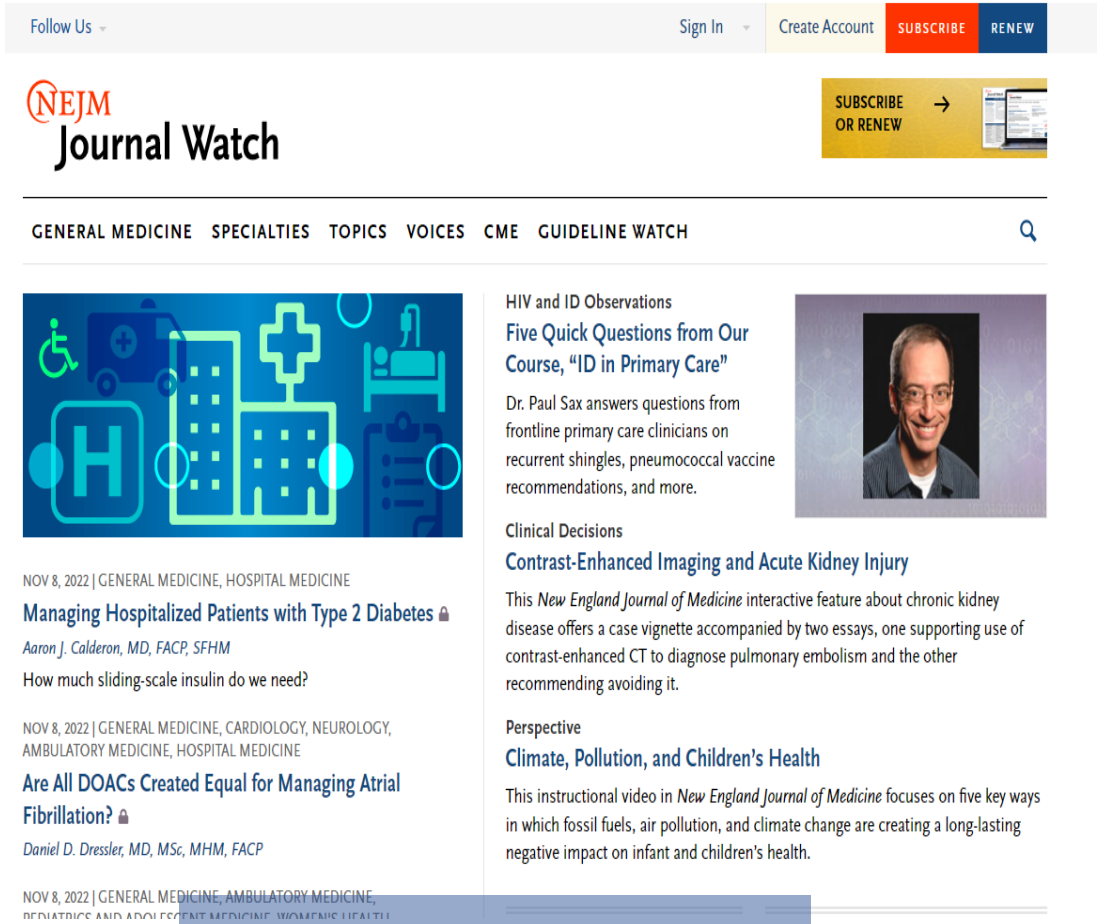
DynaMed EBM focus

(sign-up for the alerts is free)

# 2. Implement a way of receiving information



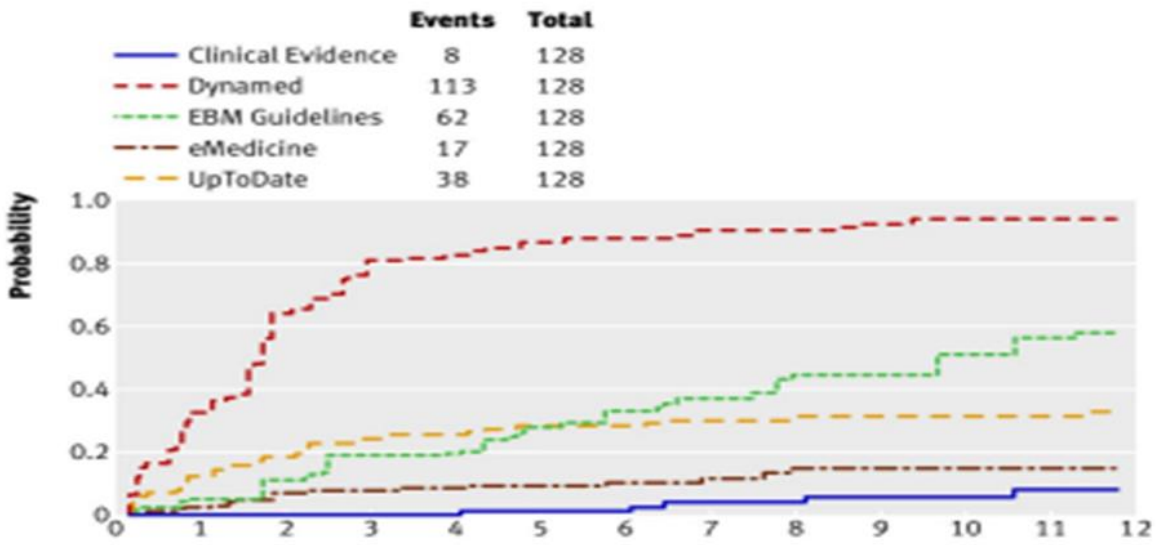

Science Daily (free)




Journal Watch ($119): from NEJM Daily Update

# 3. Implement a system to answer questions

## Figures



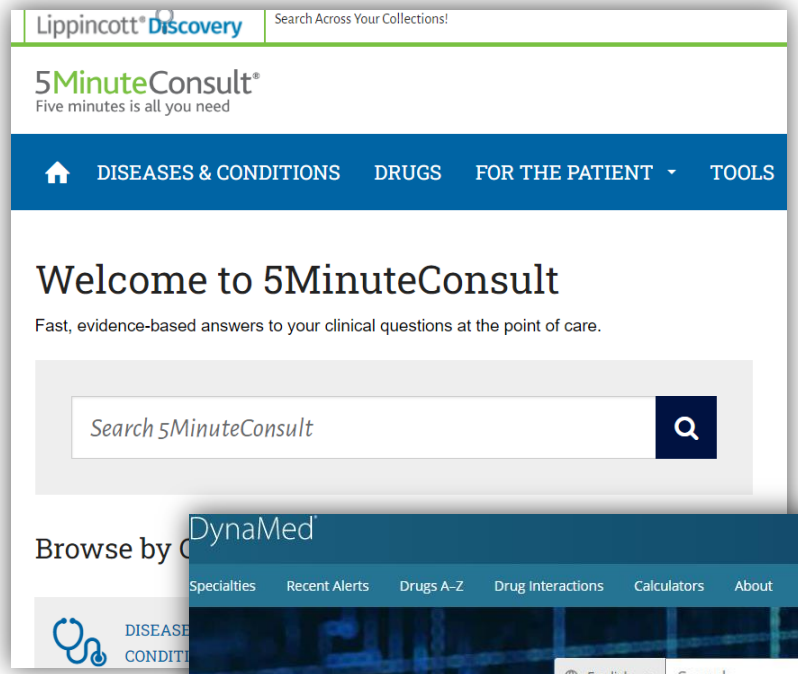

**No of systematic reviews at risk of being cited**

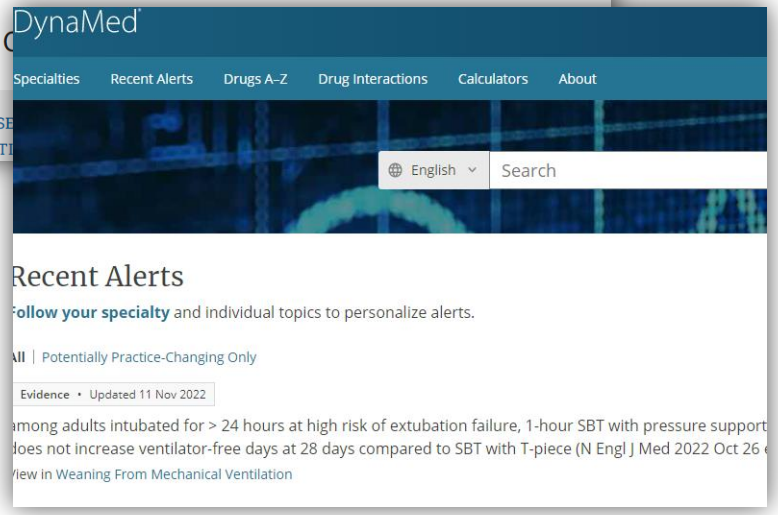
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clinical Evidence | 128 | 118 | 106 | 103 | 102 | 101 | 98 | 92 | 61 | 53 | 45 | 31 | 25 |
| Dynamed | 128 | 83 | 41 | 22 | 20 | 15 | 14 | 10 | 8 | 6 | 3 | 2 | 1 |
| EBM Guidelines | 128 | 118 | 107 | 98 | 97 | 87 | 79 | 71 | 51 | 46 | 33 | 21 | 17 |
| eMedicine | 128 | 117 | 108 | 107 | 106 | 105 | 103 | 98 | 68 | 62 | 53 | 38 | 32 |
| UpToDate | 128 | 108 | 96 | 89 | 89 | 84 | 83 | 79 | 51 | 49 | 43 | 30 | 27 |

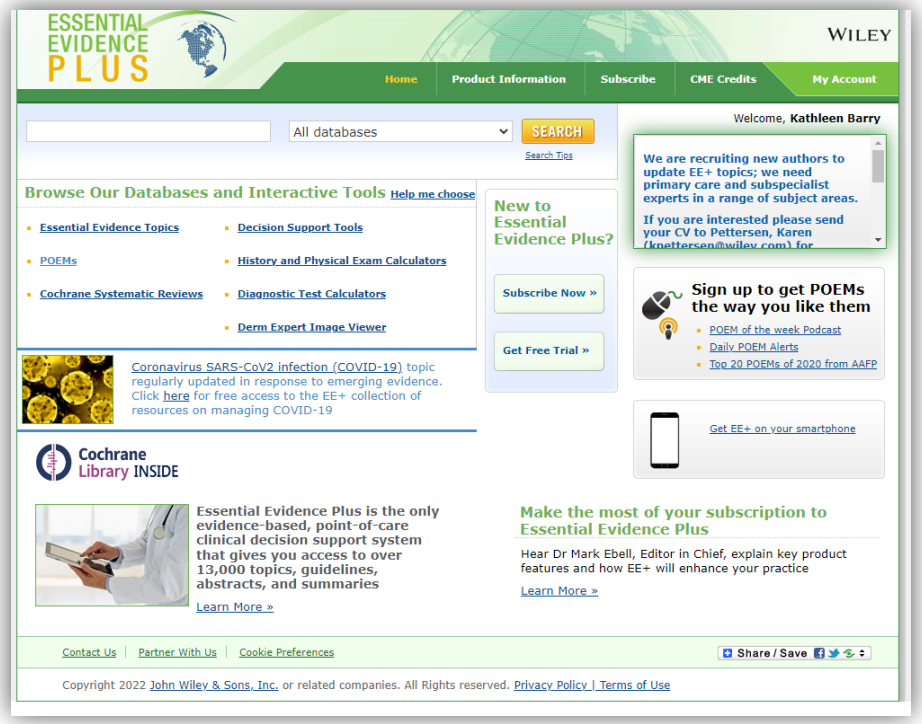
**Fig 1** Updating curves for relevant evidence (128 systematic reviews) by point of care information summaries (log rank $\chi^2$=404, P<0.001)

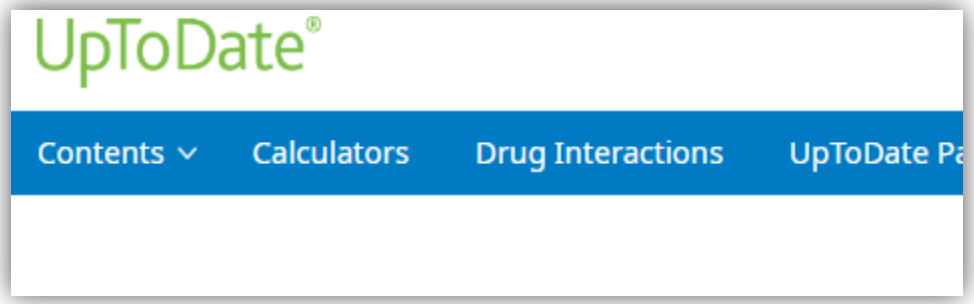
Banzi R, Cinquini M, Liberati A, et al. Speed of updating online evidence based point of care summaries: prospective cohort analysis. The BMJ. 2011;343:d58 56. doi:10.1136/bmj.d5856.

# 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?

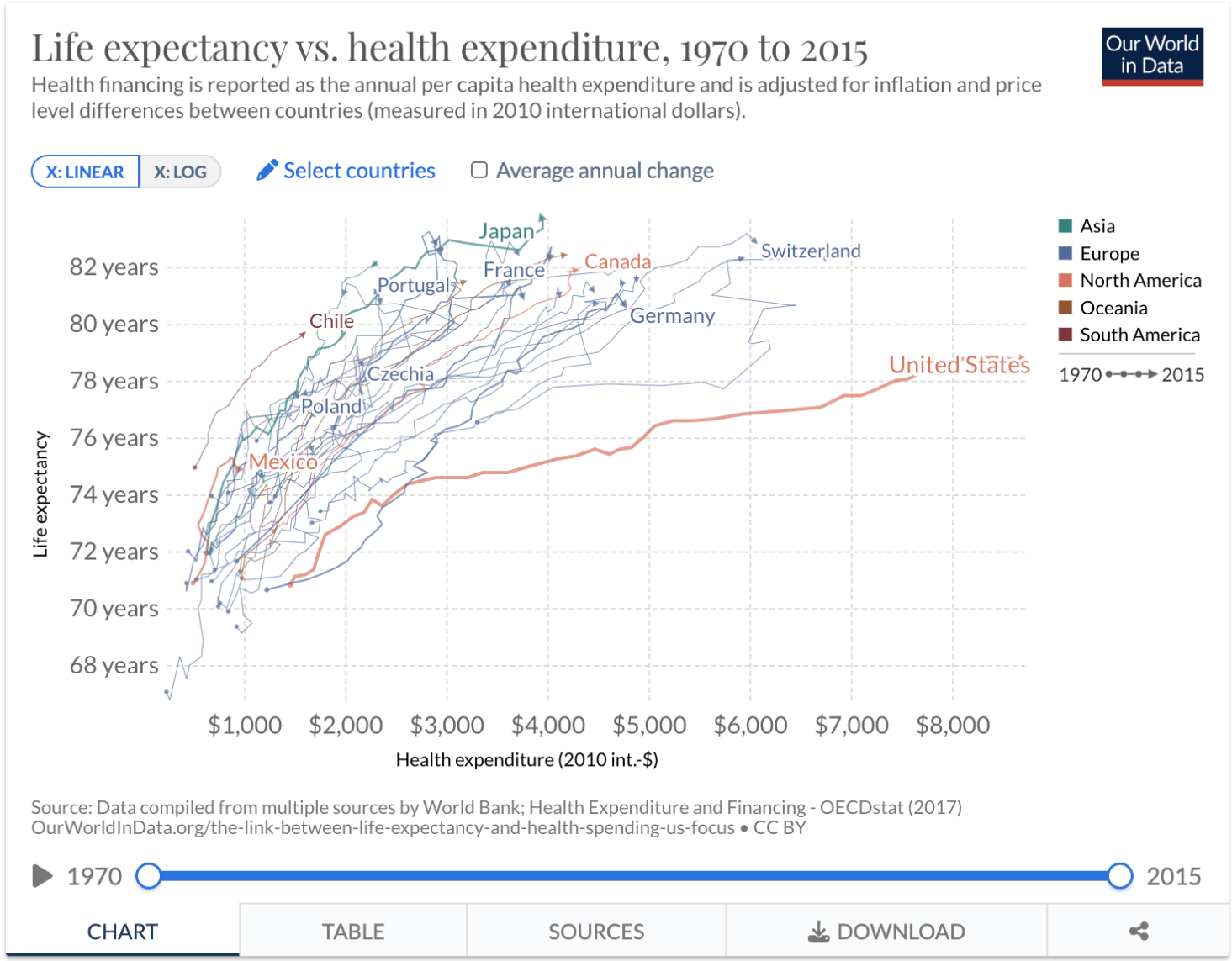
**Integrated into Hunting Tool**

**ABFM journal club**

# 5. Establish a collaborative relationships with learners and colleagues

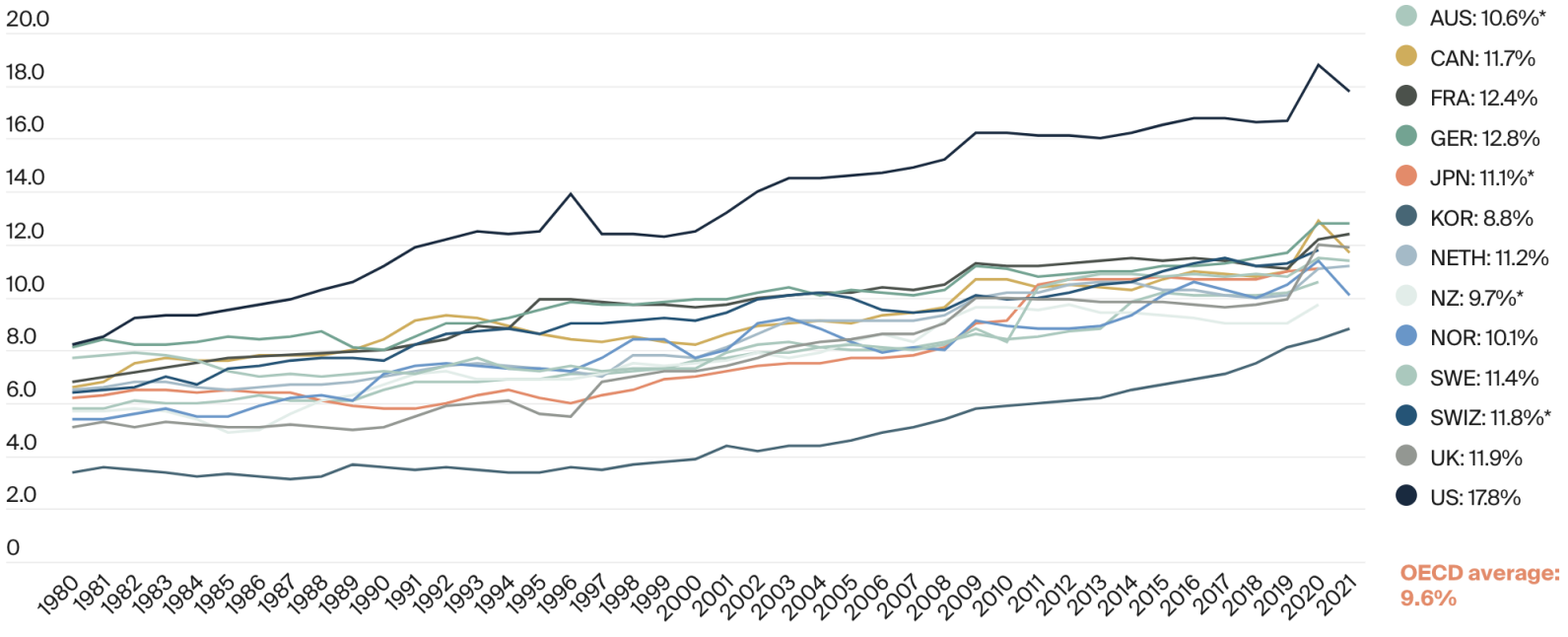
- *I'm not sure, let's look that up together*
- *I hadn't heard that before. Can you tell me where you got that information?*
- *Tell me more about that*

# What is at stake?



# The U.S. is a world outlier when it comes to health care spending.

*Percent of GDP spent on health, 1980–2021**




2021 data (or latest available year)*:

- AUS: 10.6%*
- CAN: 11.7%
- FRA: 12.4%
- GER: 12.8%
- JPN: 11.1%*
- KOR: 8.8%
- NETH: 11.2%
- NZ: 9.7%*
- NOR: 10.1%
- SWE: 11.4%
- SWIZ: 11.8%*
- UK: 11.9%
- US: 17.8%

**OECD average: 9.6%**

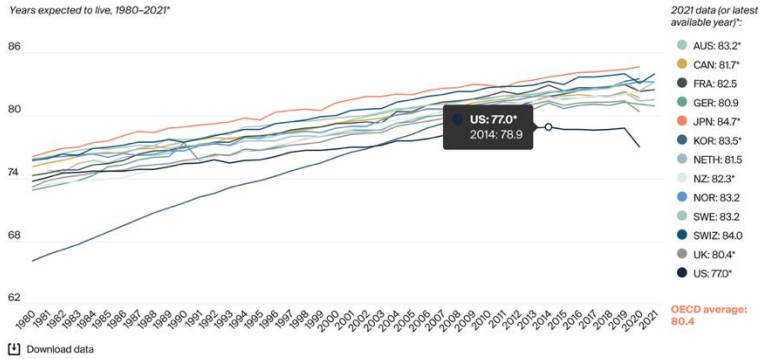
Download data

Notes: * 2020 data. Current expenditures on health for all functions by all providers for all financing schemes. Data points reflect share of gross domestic product. Based on System of Health Accounts methodology, with some differences between country methodologies. GDP = gross domestic product. OECD average reflects the average of 38 OECD member countries, including ones not shown here.

Data: OECD Health Statistics 2022.

Source: Munira Z. Gunja, Evan D. Gumas, and Reginald D. Williams II, *U.S. Health Care from a Global Perspective, 2022: Accelerating Spending, Worsening Outcomes* (Commonwealth Fund, Jan. 2023). https://doi.org/10.26099/8ejy-yc74

## U.S. life expectancy at birth is three years lower than the OECD average.



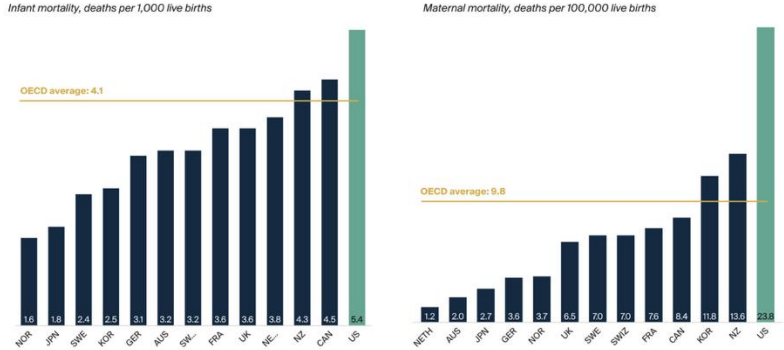

Download data

Note: * 2020 data. Total population at birth. OECD average reflects the average of 38 OECD member countries, including ones not shown here. Because of methodological differences, JPN and UK data points are estimates.

Data: OECD Health Statistics 2022.

Source: Munira Z. Gunja, Evan D. Gumas, and Reginald D. Williams II, *U.S. Health Care from a Global Perspective, 2022: Accelerating Spending, Worsening Outcomes* (Commonwealth Fund, Jan. 2023). https://doi.org/10.26099/8ejy-yc74

## The U.S. has the highest rate of infant and maternal deaths.

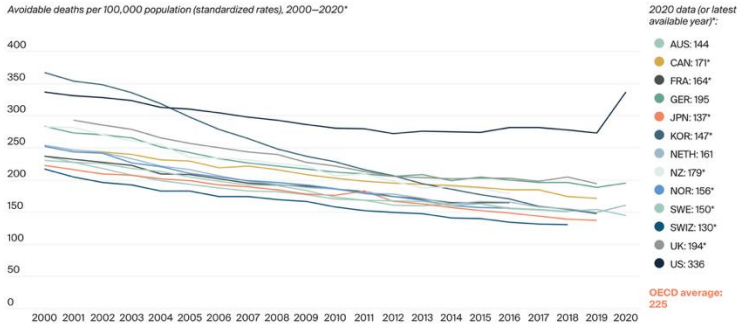



Notes: Infant mortality rates reflect no minimum threshold or gestation period or birthweight. Infant mortality 2021 data for FRA and SWIZ; 2020 data for AUS, CAN, GER, JPN, KOR, NETH, NOR, SWE, UK, and US; 2018 data for NZ. Maternal mortality 2020 data for AUS, CAN, GER, JPN, KOR, NETH, NOR, SWE, and US; 2019 data for SWIZ; 2018 data for NZ, 2017 data for UK; 2015 data for FRA. OECD average reflects the average of 38 OECD member countries.

Data: OECD Health Statistics 2022.

Source: Munira Z. Gunja, Evan D. Gumas, and Reginald D. Williams II, *U.S. Health Care from a Global Perspective, 2022: Accelerating Spending, Worsening Outcomes* (Commonwealth Fund, Jan. 2023). https://doi.org/10.26099/8ejy-yc74

## Avoidable deaths per 100,000 population in the U.S. are higher than the OECD average.

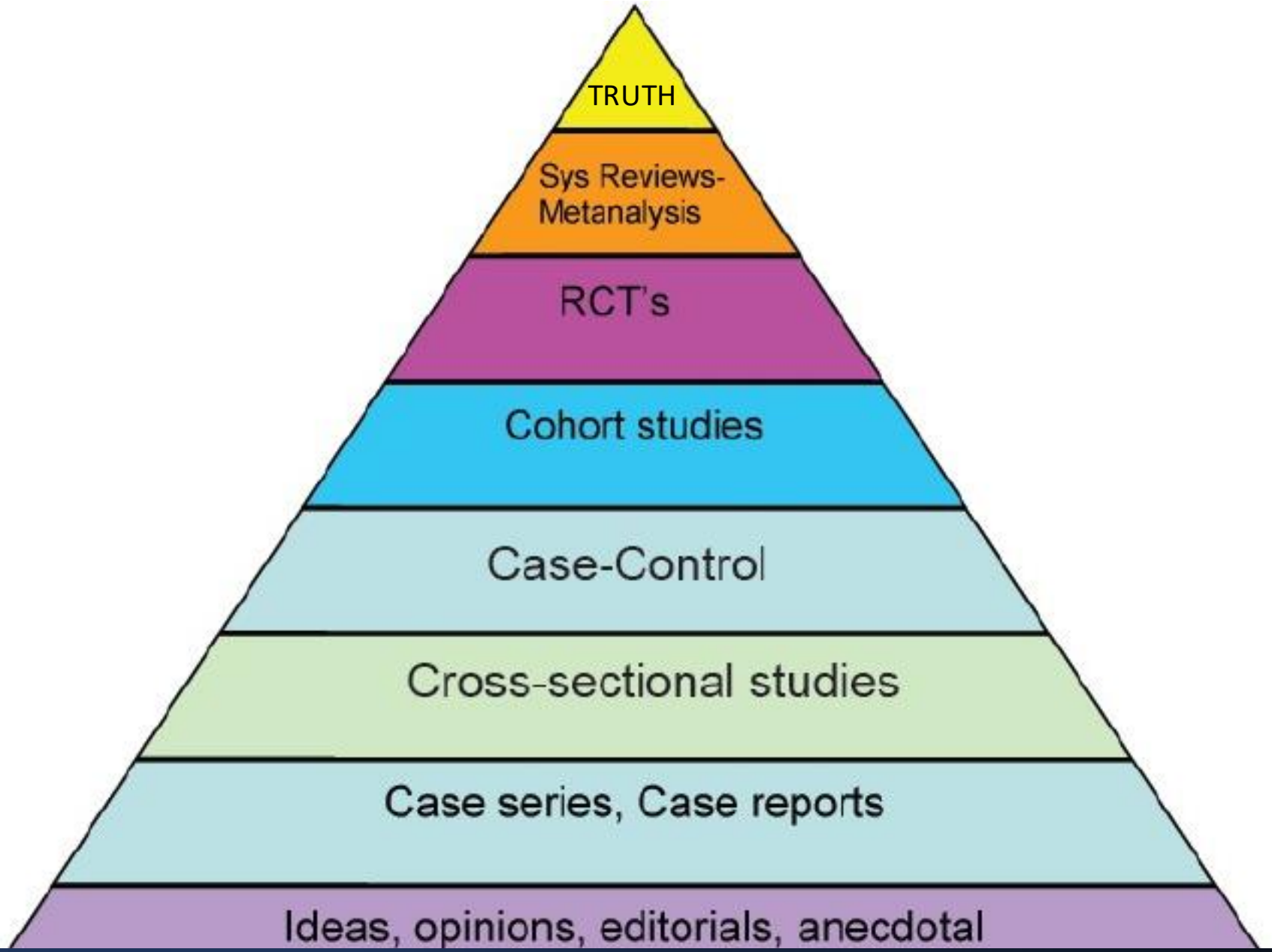



Download data

Notes: Rates reflect age-standardized rates. Avoidable mortality includes deaths which are preventable and treatable. * 2019 data for CAN, JPN, KOR, and UK; 2018 data for SWE and SWIZ; 2016 data for FRA, NZ, and NOR.

Data: OECD Health Statistics 2022.

Source: Munira Z. Gunja, Evan D. Gumas, and Reginald D. Williams II, *U.S. Health Care from a Global Perspective, 2022: Accelerating Spending, Worsening Outcomes* (Commonwealth Fund, Jan. 2023). https://doi.org/10.26099/8ejy-yc74


TRUTH
Sys Reviews-
Metanalysis
RCT's
Cohort studies
Case-Control
Cross-sectional studies
Case series, Case reports
Ideas, opinions, editorials, anecdotal

# Vitamin D and Dementia

AAFP Family Medicine Today
News provided exclusively for AAFP members

March 7, 2023

## Top News



**Vitamin D Supplementation May Be Viable Strategy For Dementia Prevention**

Medscape (3/6, Brooks) reports, "Vitamin D supplementation has the potential to be a viable dementia prevention strategy, especially when initiated early...research suggests." In the "large prospective cohort study, people who took vitamin D were 40% less likely to develop dementia than peers who did not take vitamin D." According to the findings published in Alzheimer's and Dementia: Diagnosis, Assessment and Disease Monitoring, "the effects of vitamin D were most pronounced in women, those with normal cognitive function, and apolipoprotein E (APOE) ε4 noncarriers."



**TABLE 1** Baseline demographics of dementia-free NACC participants with baseline exposure to vitamin D versus those without any exposure prior to dementia diagnosis.

| | No vitamin D ($N = 7,751$) | Vitamin D ($N = 4637$) | Estimate[a] | *p*-value |
|---|---|---|---|---|
| Age | | | | |
| Mean (SD) | 71.2 (11.2) | 71.2 (8.5) | 0.28 | 0.782 |
| Median [min, max] | 72.0 [18.0, 104] | 71.0 [29.0, 100] | | |
| Sex | | | | |
| Female | 3632 (46.9%) | 3269 (70.5%) | 656.14 | **<0.001** |
| Male | 4119 (53.1%) | 1368 (29.5%) | | |
| Years of education | | | | |
| Mean (SD) | 15.5 (3.22) | 16.2 (2.80) | −12.10 | **<0.001** |
| Median [min, max] | 16.0 [0, 29.0] | 16.0 [0, 30.0] | | |
| Race | | | | |
| White | 6281 (81.0%) | 3824 (82.5%) | 16.39 | **<0.001** |
| Black | 1170 (15.1%) | 594 (12.8%) | | |
| Other | 300 (3.9%) | 219 (4.7%) | | |
| Cognitive diagnosis | | | | |
| NC | 4748 (61.3%) | 3328 (71.8%) | 140.87 | **<0.001** |
| MCI | 3003 (38.7%) | 1309 (28.2%) | | |
| Depression status | | | | |
| Negative | 6863 (88.5%) | 4254 (91.7%) | 31.86 | **<0.001** |
| Positive | 888 (11.5%) | 383 (8.3%) | | |
| *APOE* ε4 status | | | | |
| Carrier | 2844 (36.7%) | 1620 (34.9%) | 3.80 | 0.051 |
| Non-carrier | 4907 (63.3%) | 3017 (65.1%) | | |

Abbreviations: *APOE*, apolipoprotein E; MCI, mild cognitive impairment; NACC, National Alzheimer's Coordinating Center; NC, normal control; SD, standard deviation.
[a]The estimates represent the *t*-statistic value for continuous variables and the chi-squared value for categorical variables.

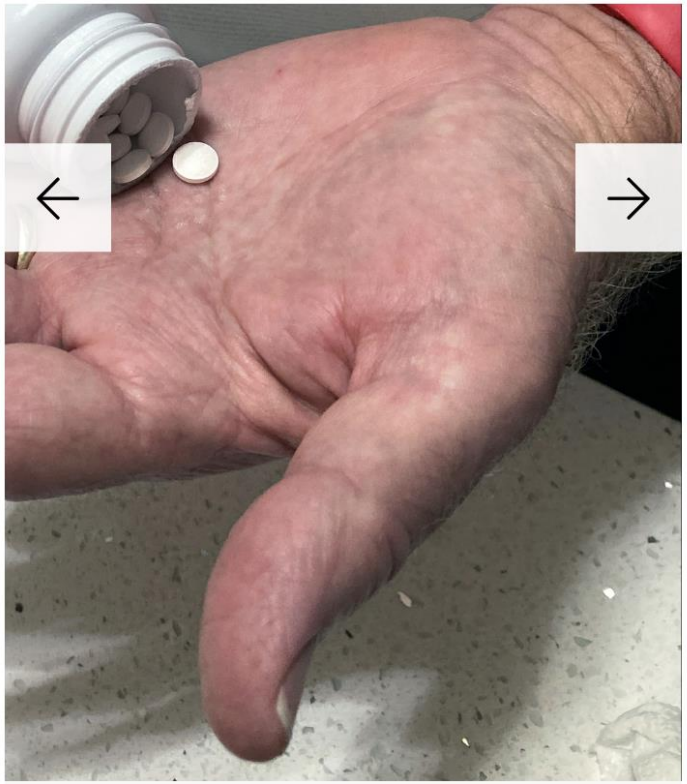
# Long-term use of melatonin supplements to support sleep may have negative health effects

American Heart Association Scientific Sessions 2025, Abstract MP2306

**Research Highlights:**

- A review of 5 years of health records for more than 130,000 adults with insomnia who had used melatonin for at least a year found they were more likely to be diagnosed with heart failure, require hospitalization for the condition or die from any cause.
- The association between melatonin and increased risk of heart failure or death found

Related Images



Man taking melatonin

copyright American Heart Association

**Download (939.9 kB)**

# 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

Thank you!


# Thank you!

# Thank you!