How to help physicians-in-training develop critical-thinking skills

During a period of explosive growth in medical knowledge, physician residents need critical-thinking skills more than ever.

COVID-19 has disrupted health care delivery in profound ways, particularly for today's physician residents. They have been called upon to help treat rapid influxes of acutely ill patients. They're spending more time than their predecessors on documentation while learning the nuances of electronic health records. These and other demands also have impacted their available time for training.

At the same time, residents are overwhelmed by the sheer quantity of medical literature. With 7,500 randomized control trials and 11 systematic reviews[1] published daily, residents would need to subscribe to 2,000 journals to stay current. Instead, millennial residents — the dominant cohort — increasingly turn to search engines, Wikipedia and podcasts for information. A study indicated that up to 70% of medical students and physicians-in-training trust Wikipedia as a source of medical information.[2]

All of these issues combined could contribute to the country's growing rate of medical errors, health care leaders said in a recent Elsevier webinar. Indeed, it is estimated that more than 40,000 adult ICU patients die annually with the wrong diagnosis.[3]

"In lieu of more standard resources, [I worry] that physicians-in-training are building a fund of knowledge the thickness of a slice of Swiss cheese — with as many holes in it," said Todd Thomsen, an emergency medicine physician at Mount Auburn Hospital in Cambridge, Mass., and Boston's Harvard Medical School.

ELSEVIER

ClinicalKey®

Adjusting for millenials' learning styles

Bonita Stanton, M.D.
Founding Dean, Hackensack Meridian School of Medicine, Nutley, N.J.

- Millennials, who make up most of today's resident physicians, **enjoy collaborating with peers over lectures.** Personal relationships are important to them, and they perform better in team environments.

- **Group-based projects** also emulate Hackensack School of Medicine's ideal, interprofessional work environment, which may include residents, nursing students and allied health professionals, Stanton said.

- **Educational resources should provide a "why."** Millennials enjoy gathering new information as long as it is relevant to their roles, Stanton said. Because this generation was raised in a less authoritative environment than previous cohorts, millennials want to know why things are true, they need a certain amount of information and to understand how this will help them, Stanton said.

- They enjoy **informal teaching sessions over traditional lectures**, where they have more freedom to complete assignments and to express themselves creatively.

Data over experience

Data and evidence already are eclipsing the role of empirical knowledge in clinical practice.

Residents must think critically and become accustomed to both analyzing and, where pertinent, applying new evolving information.

"We see physicians of tomorrow practicing more and more from the assimilation of new knowledge through critical-thinking skills, and less and less from their primary experience in residency training or their personal experience," said Drew Furst, M.D., Vice President of Clinical Executives, Elsevier.

They will have to better integrate current, evidence-based knowledge into clinical decision-making.

For example, Mount Auburn Hospital leaders changed their approach to stroke care after a 2015 New England Journal of Medicine study presented cutting-edge information about how to treat stroke patients. Faculty had emergency medicine residents prepare and deliver lectures to paramedic training programs about the new care guidelines, which required the residents to internalize the medical literature.

"I witnessed first-hand how quickly medicine can change, and how practice patterns change," Thomsen said.

Educators cited five ways that other hospital leaders can accelerate critical thinking and the use of evidence-based data among resident physicians:

1 **Simulate care delivery to help with memory retention.** Simulations and case studies help residents absorb information, said Robert Flora,

5 steps to develop critical thinking in residents

Todd Thomsen, M.D.
Emergency Medicine Physician, Mount Auburn Hospital, Cambridge, Mass., and Harvard Medical School, Boston

1 | Faculty should make the critical-thinking process obvious, and distinct from the clinical question at hand.

2 | Educators should ensure that residents are aware, to the best of their abilities, of their own biases. Residents should keep this top of mind as they review new information or care for patients.

3 | Faculty should model and teach inductive reasoning on a daily basis.

4 | Educators must come up with questions to stimulate residents' critical-thinking skills.

5 | Medical schools also need to find ways to assess residents' critical-thinking skills.

M.D., Chief Academic Officer and Vice President of Academic Affairs at McLaren Health Care in Michigan. While residents may retain 10% of what they learn from lecture or didactic teaching, they will remember up to 70% of information gleaned from clinical simulation or case studies, he said. "Access to knowledge that's current and accurate is the most important," Flora added.

2 **Foster critical thinking with digital learning tools.** Bonita Stanton, M.D., Founding Dean, Hackensack Meridian School of Medicine, Nutley, N.J., said that interactive digital activities can stimulate student interest and improve academic achievement. "We like to think that digital learning allows a kind of scaffolding, like our curriculum, that will help [residents] solidify skills so that they're able to use this to go back and build on prior knowledge," Stanton said.

Also, according to Stanton:

- **Games and simulations are powerful educational tools.** They can activate prior knowledge, help residents apply that knowledge in new settings, test hypotheses, search for patterns, use evidence and logic to make arguments, and encourage them to take ownership of their own learning. Digital learning environments increase the accessibility of content by offering learners more options and different ways to apply this knowledge and skill.

- **Students are able to grasp complex concepts when key information is explained using a wide array of modalities.** Faculty should teach both verbally and visually, using lectures and graphic displays. A technology-rich environment helps students find new information and analyze it from multiple points of view.

- **Multimedia learning environments**, such as simulated patient scenarios, enable students to apply knowledge in potentially real-world contexts.

ELSEVIER

ClinicalKey®

3 **Reduce medical errors by identifying bias.** When assessing patient treatment plans with residents, Harvard Medical School faculty encourage residents to reflect on any biases that may have played into their decision-making. Was there an availability bias? Confirmation bias? Anchoring bias?

Because biases and cognitive errors are extremely difficult to recognize in real time, faculty members practice spotting them with residents in simulated care environments, and then debrief later.

4 **Ingrain critical thinking patterns with journal clubs.** By repeatedly reviewing medical literature in PhD-led journal clubs, "it's almost like getting muscle or mind memory in terms of critically thinking through and critically appraising the literature," Flora said.

"It's not good enough just to say that you have a journal club. You have to actually say, 'We can prove — we have outcomes to show — that our residents can critically appraise the literature," he said.

5 **Teach research methods through library science.** Librarians at Seton Hall University have joined the Hackensack Meridian School of Medicine to help medical students and residents access, assess and understand the latest medical literature.

They help residents properly form research questions, navigate hundreds of thousands of electronic books, and use point-of-care resources when practicing evidence-based medicine.

Stanton says that the Cochran Database, the Finding Information Framework [originally developed by the Boston University School of Medicine Evidence-based Medicine Vertical Integration Group] and Elsevier's ClinicalKey have been particularly helpful to residents as they develop these competencies.

"Today's information is probably tomorrow's wrong information," Stanton said. "[Residents] have to learn that they never know enough."

....

Resources

[1] Bastian, Hilda et al. "Seventy-Five Trials and Eleven Systematic Reviews a Day: How Will We Ever Keep Up?" U.S. National Library of Medicine/National Institutes of Health, PLoS Medicine, vol 7(9), Sept. 21, 2010. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2943439/

[2] Hasty, Robert T. et al. "Wikipedia vs. Peer-Reviewed Medical Literature for Information About the 10 Most Costly Medical Conditions." The Journal of the American Osteopathic Association, 114:368-373, May 2014. https://jaoa.org/article.aspx?articleid=2094721 and https://www.researchgate.net/publication/261956472_Wikipedia_vs_Peer-Reviewed_Medical_Literature_for_Information_About_the_10_Most_Costly_Medical_Conditions

[3] Winters, Bradford et al. "Diagnostic errors in the intensive care unit: a systematic review of autopsy studies." BMJ Quality & Safety, 21:894-902, 2012. https://qualitysafety.bmj.com/content/21/11/894.abstract

Click HERE to learn how ClinicalKey can help you foster residents' critical-thinking skills.

ClinicalKey®