

Creating the Class He Would Have



WILLIAM G. CARLOS | PHOTO

BY NEETA PATWARI

It's rare for medical students to agree much on anything, much learning. One exception seems to be Pulmonary Grand Rounds. In 2019, 89.5 percent of students across the state found that pulmonary ground rounds (PGR) either highly or very highly required higher order thinking skills. Almost 79 percent believed that PGR hit the perfect note between board preparation and clinical experience. That begs the question, what is the respiratory course at IU doing in order to catch such praise and what can other courses do to continue this trend.

In order to answer this question, Neeta Patwari sat down with Dr. William Graham Carlos III, Chief of Internal Medicine at Eskenazi Health and the creator behind the pulmonary ground rounds on his inspiration behind the course, changes in medical education, and his opinion on technology's role in future medical education.

Neeta Patwari: What inspired the idea of teaching respiratory in a grand rounds style?

William Graham Carlos: So I was asked to take over the respiratory teaching initially for just the Indianapolis campus

and I was honored and thrilled to do that because I love to teach. So as I sat down at my desk, I really truly thought about if I were a student right now in the second year class, how would I want it to be when I was a student here. And I remembered how hard it was to try to memorize all the information and then I always struggled both in seeing some of the clinical application for some of the stuff I was being asked to learn but I also struggled with putting it all together because there would be a lecture on pharmacology and a lecture on physiology and then there be clinical lectures.

And I just wish they could all be together. And so this dream was that I could learn respiratory, pharmacology and physiology in the context of a clinical case with everything together at the same time so I could see the relevance of why this drug matters for this disease because of this bit of pathology and this physiology. So that was the original inspiration bring everything together at once for learning.

NP: How have you seen a change in medical education from when you were a student to now?

WGC: I have seen some shifts. For example, I've seen more of an emphasis on small group non-didactic style teaching. I have seen students go from studying off of transcribed notes, which

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is the way I studied as a student because we didn't have lecture recordings. There weren't very many board review books back then too. Now, students are embracing online learning and watching videos at two and three times speed and rushing the content. I know that students are adapting to the challenges of being a student and I feel like we need to adapt with our students by leveraging video technology and being really good about engaging students with technology and with board relevance and keeping an emphasis on how this [material] is clinically relevant as well.

NP: Did your education involve a lot of physical textbooks and transcribing from that or transcribing from lecture?

WGC: Yes, we had both. And we also had Harrison's textbook of Internal Medicine. I remember trying to study and read about adrenal insufficiency and just being overwhelmed flipping through the pages. Now, I have a smartphone and I can look up adrenal insufficiency and have my answer in seconds. I find that in our day and age of medicine, I think the equality of accessing quality information and identifying what is reliable to use and take care of patients is equally or maybe more important than memorizing the key components of a particular disease. I don't memorize doses of medications anymore because the EMR helps me through it. If I've forgotten something I now can look it up instantly. We used to actually go to the library and look stuff up like literally. We didn't have up-to-date. We didn't have the electronic resources that we have now. That's definitely changed as well.

The amount of information that you guys have to learn has also grown and I worry about the amount of stuff that we now have to teach you about. A great example in my field of pulmonary medicine is all these tumor markers. We didn't have and thus, didn't need to know about them way back when. Now, you have to remember ALK mutations and EGFR mutations in lung cancers and why they're important. I don't know that we have subtracted the stuff that's no longer relevant as much as we should have in order to make the amount of information coming at you appropriate. I need to do a better job with that too.

NP: Different professors have different ideas on outside resources and board material for studying. Do you have an opinion?

WGC: Yeah, so I buy them all and I make sure that I'm covering what's in them. I've written letters to some of the officers when I found some errors in

those books actually, but I embrace it. I think that they present the information succinctly and in ways that help you remember them like in a mnemonic or a picture in a sketchy. It just helps you remember things deep in your hippocampus. So whatever students are doing to learn the information, I am all for. I embrace it and welcome it.

NP: Do you have any concerns about some of the ways the material is presented?

WGC: My overarching concern is that it seems a tremendous focus of the first couple years of medical school leading up to step 1 is just memorization, and I wish it was more application. When I work with third and fourth year students, I'll ask them questions that were objectives from class in second year that I knew were clearly presented and clearly stated, and they'll have forgotten the information. And that's just the way the brain works. There has to be a relevance for it to stick. So I believe learning should be in the context of deliberate practice where you're taking and applying the information. That's why there seems to be more of a push towards small groups style learning.

In pulmonary grand rounds, what I've tried to do through using engagement questions and Top Hat questions is to achieve the same goal of practice and relevance by having students ask questions and answer questions in class.

NP: If you could change anything about IUSM curriculum what would you change?

WGC: I'm biased in my answer but I feel like after three years of multi-campus live stream pulmonary grand rounds, we have



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accumulated enough feedback from students and have made enough changes that I recognized the students really like this style of learning that they're not afraid to participate online as long as they have the ability to ask and get their questions answered. The style that we use enables me to hand pick the panelists in the discussion, so I know that the content delivery is strong at each campus. And so I like this format of engaging online learning coupled with small group application exercises. So I think it's a both and situation.

I know from statistics that didactic PowerPoint lectures are often not well attended for various reasons. But after pulmonary grand rounds through what we saw on top hat and our engagement data, we had over two-thirds of the class of 2022 this past fall zoom in for a non-mandatory session live. So I feel like we figured out it out. It's hard to really figure out what are the hooks to get students to engage in class. Make it high-quality make it relevant make it efficient. Make it fun. Make it must-see TV if you're zooming in.

NP: I know in terms of students that students at other campuses sometimes feel the material is presented between the different campuses in a disjointed manner and I'm sure it was a similar situation when you were a student. Is there anyway, you can think of that allows us to bridge the gap between the nine campuses?

WGC: Yeah, so that was one of the great things about the way we did the pulmonary grand rounds is that it was the same professor for all 9 campuses. Everybody was running the same stuff the

same way at the same time and I know the students highly value that. I asked a question at the end of Indianapolis Grand rounds and there were about 200 students who responded. The question was "was it worth it to only have one live session at your campus and have the other eight live stream in order to have an equivalent experience across all 9 campuses in this course?" And we got I believe it was 190 responses and 189 were yes, and one was no. So 99.9% of the class says yes, there is value in having us all learn the same material from the same doc in the same time. So to get to there we need to identify professors who are at each site who are great at whatever topic it is that needs to be learned by the whole school and get them in front of the live stream so that the students from all over the state can benefit from their teaching methods and style and what they have to share. It's also nice to have as we did one professor who has a top of the mountain view and is able to see what is repetitive information and what's new information so that you're not teaching in silos. And then you have that big view.

Finally, it's great to feel as a student, that you're not missing anything. Medical students are all very driven and worried that something is given a different emphasis in one campus because it might be on the exam or something is explained more clearly and another campus that would enable the students to understand it better and memorize it better. And that creates anxiety, and anxiety increases cortisol levels and cortisol stresses people out and we want it to be stress-free. So having one talk across all 9 campuses or one discussion is great. Then when it comes to the

smaller groups, I don't think students freak out as much because that's just application and there is usually an answer sheet and the experience can be more organic in that regard. So yeah, I think you're onto something with the different campuses and the worried students have about disparity between them.

NP: Compared to the way you and your colleagues have learned medicine, do you think there has been a shift in how the material is presented? What are some aspects from your education and what would you have wished you would have had when you were studying?

WGC: Well, I studied off of transcribed lecture notes and we paid a fee to one of the classmates to type up their tape from a cassette tape player recording of the lecture. So, the student would sit in the front row, type whatever the professor said and then sometimes he would couple that with like a printout of the slides. Sometimes you didn't have that. For example, gross anatomy was taught with an overhead projector and colored markers drawing on plastic overhead projected images without a recording.

So imagine what that would be like to try to learn Anatomy with no visual.



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You had Netter and you had a transcript and you had the anatomy lab. So it forced me to spend a lot more time in the anatomy lab with the cadaver.

The library and having to look stuff up on clinical rotations brought us together as a team when we were all trying to figure out the answer to a question. I miss some of that.

I've noticed that the amount of resources, podcasts, things online is so huge that it is hard for student to figure out what resource they should be using for each course and each question. Back in the day, you didn't have all of these different resources. It was this or nothing. So that maybe is a new challenge for students that didn't exist when I went through.

Lastly, I'll say that just using electronic medical record has been a huge game changer. We used to have to write out our notes and order on paper and it would take much longer. So nowadays, we should be able to leverage technology to use more time for teaching moments. At the bedside with an ultrasound, looking at the heart, learning aspects of the clinical exam. But what I've seen instead is that the EMR has caused more students, residents and faculty to spend more time in front of a computer, typing notes, looking stuff up, answering questions, and doing transfers and discharge summaries. So that's a challenge both ways. They didn't exist when I was a medical student.

The last thing I'll say is that Step One has changed. Because the applications for residencies have gone sky high, residency program directors need metrics to screen students. And they cannot look at 10,000 applications. So, they set a Step One cut-off line. Which is unfortunate because I believe it causes a lot of medical students a lot of anxiety and grief. And it causes residency programs to miss fantastic applicants.

I would, if I were in charge, give students a cap on the number of programs that they can apply to. With the idea being that number one, you would be more likely to go to the programs you apply to. Then I would do a secondary match or a modified version of the way they do scrambling now to fill the remaining spots. I hope that cutting down the number of applications that residency programs get each year will afford them more time to be intentional with their screening and avoid setting this hard cut line that creates so much of this anxiety over Step One and casts a shadow over the first two years of medical school. I have had countless students complain about hearing stories about patient care during first and second year and professors talking too long about clinical things that may not appear on step one but are immensely clinically relevant.

While these students embrace hearing more about what's its like being a doctor, they are worried that the amount of information that is coming at them is so huge, that if it not relevant to step one, they don't have space for it in their brain. And they don't want to spend time on it. I think that's a travesty because you really do need to know more than what is just one step one. But unfortunately, that other stuff you need to know doesn't count in the same way that step one does. It will pay off when you are on your clinical rotation third and fourth year when you've learned and heard more clinically relevant things. So, that the other big change since I was a medical student: this huge emphasis on step one.

NP: Other doctors have mentioned buzzword culture for medical students where they remember four key words. Was that also a thing when you were a medical student?

WGC: I don't remember it a lot like that. We had a small book at

the time called Surgical Recall, it may still be published. Surgical Recall would have things on it like Beck's Triad, and Light's criteria and memorizing things in three words. Or common associations like parakeet and lung problem equals psittacosis and making those connections. I think I use a little bit of that style in my teaching. In pulmonary grand rounds in South Bend, we did a lot of buzzwords. Legionnaires, you think hyponatremia, diarrhea, and pneumonia, and you put it together. I find that this way helps remember things through association.

The problem with buzzwords is that it doesn't help you apply things. So, I think you need both. Both strategies and tools in order to memorize such as mnemonics but you also need to try and apply those things to a case in order to achieve a diagnosis or start the right treatment.

NP: For future medical student classes, you and other course directors have talked about implementing changes from student feedback, class feedback, LCME recommendations. What do you think the future of technology in medical education will look like in five to ten years?

WGC: I believe artificial intelligence is coming with the ability of computers and systems to make diagnoses and put things together. But I think that the future of medicine will always have to have great emphasis on humanism, because a computer cannot replace a touch or an encouraging word. It might be able to help a surgeon to remove part of a prostate but it cannot talk the patient into having part of their prostate removed.

So, I'm hopeful that as AI helps the information overload that we have right now in medicine, that doctors will be able to have more time with patients and with the actual caring of medicine, with counseling, with teaching and with enjoying what it's like to be a part of somebody's recovery.

I think the future of medicine; we need to embrace systems and strategies to help with the amount of information that needs to be retained. That might be through artificial intelligence because it just keeps getting bigger and bigger and bigger.

Finally, I'll say that medical students nowadays are on Reddit and on Snapchat and getting information so quickly through their phones. I also think there may become a space to use those types of things to teach medicine. So, in pulmonary grand rounds this year, we created a twitter hash tag. I have slowly been growing my Twitter presence. So, what I've noticed is that rather than having intentional study time, just flipping through Reddit and finding a healthcare topic of interest you learn an incredible amount of information. Based on who you follow on twitter, if you want to become an orthopedic surgeon and you're on Reddit or twitter and are following people who are educators and respected in their field, you're going to learn things. So I think that's another thing we could look to embrace in medical education.

Follow Dr. Carlos on Twitter for updates on his work.

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