

Online course to train medical pros on use of mechanical ventilators

April 10 2020, by Nate Herpich



Credit: AI-generated image ([disclaimer](#))

his week, Harvard and [EdX](#), the virtual learning platform founded by Harvard and MIT, announced the launch of a [free online course](#) designed to train frontline medical professionals to operate the mechanical ventilators needed to treat COVID-19 patients. The class was developed by Susan Wilcox, the division chief of critical care at Massachusetts

General Hospital (MGH) and an associate professor of emergency medicine at Harvard Medical School, and Thomas Piraino, clinical specialist for mechanical ventilation for the Centre of Excellence in Mechanical Ventilation at St. Michael's Hospital in Toronto. The Gazette spoke with Wilcox about the genesis of her project and how it will work.

Q&A: Susan Wilcox

GAZETTE: Clearly there's a need for this kind of course now, as more and more medical professionals are called to help battle the COVID-19 pandemic. Is that what motivated you to put this course together?

WILCOX: I've been interested in teaching mechanical ventilation to groups that historically have not managed it for years. The principles are relatively straightforward, but mechanical ventilation is actually one of the most important things that we do when we're taking care of critically ill patients. I've long thought that if we could encourage people to be more invested in managing ventilated patients, we could improve outcomes. I wrote a textbook about mechanical ventilation with a couple of colleagues from the Emergency Department a couple of years ago now, and with COVID-19 becoming a ventilator crisis, I distributed a version of that text widely on the internet. I was approached then by [the philanthropic organization] Schmidt Futures, which was looking to create a course on mechanical ventilation education for the masses, and they wanted to know if I wanted to collaborate. So, I can't take credit for having the idea of creating the course: They came to me.

GAZETTE: How were you able to create this so quickly?

WILCOX: Normally, we'd spend three to six months putting together a course like this, but obviously, with the rapid spread of COVID-19, we don't have that kind of time. As we move forward, we look forward to continuing to improve the course based on feedback from participants, and also as we learn more about this novel coronavirus.

GAZETTE: We've heard a lot about the need for ventilators to treat many of those individuals who are hospitalized with COVID-19. Why are these machines so important in battling this pandemic?

WILCOX: The predominant pathology of COVID-19 really seems to be profound respiratory failure. Patients are coming in with extremely [low oxygen levels](#), and it's clear that either the virus or the immune response to the virus is causing significant damage to portions of the lung and causing the little blood vessels inside the lung to be damaged. To treat that, we have to make sure that we give people sufficient support until their bodies are able to heal and fight the virus off. The good news about this is that, as is the case with most other critically ill patients who come to us with respiratory failure, low tidal volume, low-pressure ventilation does seem to be the best way to protect these patients' lungs and give them the time they need to fight the virus off.

GAZETTE: How long do most patients need to be on them?

WILCOX: We are recognizing that it takes a really long time to defeat COVID-19; that the patients who are on the ventilators are requiring 10 to 14 days. Every disease is different, but we usually think of four to five days on ventilators as being a common length for many of the conditions that we see.

GAZETTE: Is that part of the reason why many communities seem to be experiencing a shortage of equipment during this pandemic?

WILCOX: I'm very confident in the care that we can provide at MGH. We are lucky in that we still have the resources to be able to serve the growing number of patients we see with this virus every day, and this number is definitely growing, day to day. And yes, what we need as a health care community is time. This is exactly the concept behind the flatten-the-curve initiative. Even if we have the same number of patients over the course of the entire pandemic, as long as we can prevent the health care system from being overwhelmed at various points throughout, I'm optimistic we can get many patients through this.

GAZETTE: Who is normally trained to use these machines, and who is using them now?

WILCOX: Normally, the people who manage mechanically ventilated patients are predominantly intensivists, or physicians who have done additional specific training in critical-care medicine. These doctors work in close collaboration with respiratory therapists, who are highly trained medical professionals who focus very specifically on taking care of patients with respiratory disorders. Traditionally, an intensivist and a respiratory therapist will collaborate on providing care to mechanically ventilated patients. And while a lot of doctors may get exposure to taking care of ventilated patients during their residencies, these experiences are usually fairly brief. If they don't go on to specialize in critical care or anesthesiology, they're unlikely to have seen a mechanically ventilated patient in quite some time. Even in the Emergency Department, while emergency physicians frequently intubate patients and put them on the ventilator, the in-depth management of the ventilator has not traditionally been a large focus of Emergency Medicine practice.

GAZETTE: How are things changing in emergency rooms and intensive-care units across the country with regard to who is providing care with ventilators?

WILCOX: The rising numbers of individuals we're seeing with COVID-19 means that we now must bring in nurses and physicians who are highly trained in other areas to take care of ventilated patients. We're fortunate that at MGH, we're still able to, for now, have these nurses and physicians collaborate with those medical professionals who provide care through mechanical ventilation on a frequent basis. Of course, it certainly behooves these medical professionals to have some working understanding of mechanical ventilation going in, and that is part of the impetus behind creating this course.

GAZETTE: Tell us more about the course itself.

WILCOX: It's important to say that first off that it's not going to turn anyone into an intensivist or a respiratory therapist; it's rather to give people foundational knowledge to be able to collaborate with one of these [medical professionals](#) who regularly works with mechanical ventilation. The course is made up of 10 different sections. It begins with the basics—an intro to the physiology of mechanically ventilated patients and to the ventilator in and of itself. It then moves into more advanced topics that go into in-depth rationale of what we do with the ventilator, while providing particular scenarios that could occur. We cover topics like management of acute respiratory distress syndrome, or ARDS, which is the major pathophysiology behind COVID-19. And we have a specific COVID-19 module, which covers mostly mechanical ventilation, but also other medical management of the condition. Each course is made up of 12 to 20 minutes of video depending on content, along with more in-depth readings. The video is fairly dynamic, with lots of illustrations and graphics to drive home points and to emphasize

clinical decision-making. The writings get more into theory and in-depth background for learners who want to more fully understand the concepts.

GAZETTE: You said that you hope to continue to improve the course as you move forward. Can you explain more about your vision for doing this?

WILCOX: Normally, when we talk about research and studying medical conditions, it's a many-months-to-many-years process. We will do studies that go through peer review, and we make sure we have all of our facts straight before anything gets published. Clearly with the rapid pace of this pandemic, that's just not practical. We need to get information to people as quickly as we can. Some of the controversies right now with regard to [mechanical ventilation](#) and COVID-19 involve exactly when we should be putting people on the ventilators, as well as some of the details on how we should be optimizing these machines for patients. Since we've only seen patients with COVID-19 for about three weeks now in earnest at the time of this interview, we only have three weeks of data. In terms of the medical literature that's nothing, so we're doing the very best we can for all of these patients. With time we are going to better understand how we can improve their care, and we want to be able to communicate these learnings to those individuals who are taking this class.

GAZETTE: What have your days been like over the past few weeks?

WILCOX: I'm in a similar position to so many of my colleagues. We go to the hospital and see the hospital full of critically ill patients, and we work really hard to resuscitate all of them and give them the best care that we can. Then we all come home and then we go right back to work trying to read what our colleagues are publishing about this condition, or

trying to write new protocols so we can stay up to date with the best literature. Many of us are finding we have extremely long workdays just trying to keep up with everything that's going on. I'm not complaining; I'm very glad to be able to help. It's just the reality of these times. We're lucky to have so many people working really hard to battle this pandemic on every front.

This story is published courtesy of the [Harvard Gazette](#), Harvard University's official newspaper. For additional university news, visit [Harvard.edu](#).

Provided by Harvard University

Citation: Online course to train medical pros on use of mechanical ventilators (2020, April 10) retrieved 4 May 2024 from <https://medicalxpress.com/news/2020-04-online-medical-pros-mechanical-ventilators.html>

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