



ROCKET SCIENCE: Since 1973, 23 physicians have flown in space for the U.S. One of them was Dr. Jay Buckley, a longtime member of the Dartmouth Medical School faculty. He oversaw neuroscience experiments on a 1998 mission on the space shuttle *Columbia*.

THEN & NOW

A reminder of the pace of change, and of timeless truths, from a 1961 publication titled *Medical Education and Dartmouth*:

“Unfortunately the good health Americans have come to take for granted is threatened by an imminent critical shortage of doctors. This alarming conclusion was reached in November 1959 by a special Consultant Group appointed by the U.S. Surgeon General.”



141

Ratio of doctors per 100,000 people in 1961

228

Ratio of doctors per 100,000 people in 2000

30%

Increase over 2002 medical school enrollments now called for by some experts, who fear a shortfall of physicians by 2025

Crohn’s tool is a “home-made” solution

Fortunately for people with Crohn’s disease, Dr. Corey Siegel and his wife, Lori, like to bring their work home. Corey Siegel is a Dartmouth gastroenterologist, and Lori Siegel is an environmental engineer. Together, they developed a tool to help Crohn’s patients make difficult treatment decisions.

There is no cure for Crohn’s disease—an inflammatory bowel disease that can cause pain, ulcers, and other complications that sometimes require surgery.

But medication can also be effective. The problem is figuring out which patients will benefit from which drugs.

Drugs: Traditionally, doctors started patients on mild drugs like antibiotics and switched them to stronger ones only if the weaker drugs failed. But, Corey Siegel says, “we’ve realized that if we . . . use our strongest medications sooner, we do much better. We can prevent complications. We can prevent surgeries.”

But the stronger drugs have more serious side effects. Immunomodulators, which suppress the immune system, can be very effective but can also lead to infections, and even death in 15 of every 10,000 patients. Drugs called biologics also carry risks, albeit minuscule, of life-threatening complications such as lymphoma. “We don’t want to expose anybody to possible side effects who doesn’t need those medications,” Siegel says.

That’s where Lori Siegel, and

her Ph.D. in environmental engineering, came in handy. She uses computers to model complex natural systems, such as weather. “The climate is about as complex as you can get—like the human body,” she says.

As the Siegels talked to each other about their work, they realized that it might be possible to use a computer model to predict a patient’s risk of complications and likelihood of benefiting from

Lori Siegel notes that patients don’t want to hear statistical jargon.

different treatments. So they created a program that takes a patient’s age, gender, location of the inflammation, and blood test results—and predicts the risk of a serious flare-up in the next three years. A physician can then enter different treatments into the program and see the risks and benefits of each option. The results appear as two lines on a graph, baseline risk in blue

and risk with treatment in red.

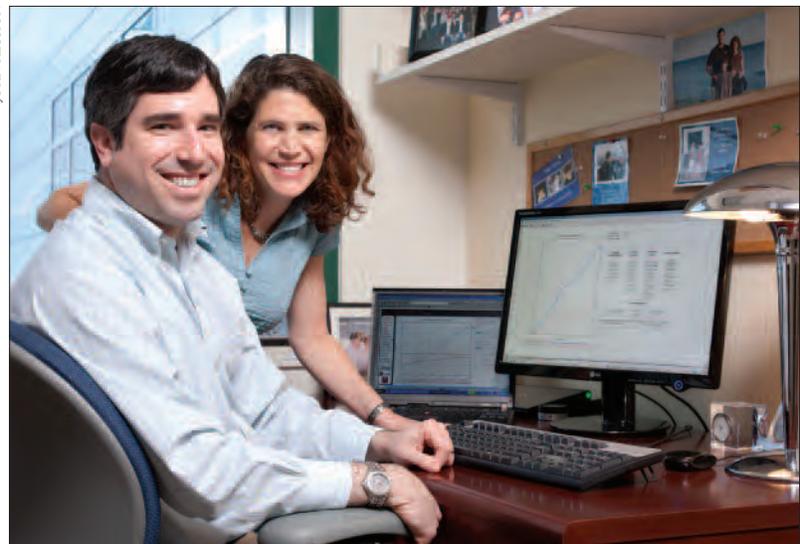
“This model isn’t to convince people to go on medications, it’s to try to find the right people who need those medications,” Corey Siegel says.

Lori Siegel notes that when patients are considering treatment options, they don’t want to hear statistical jargon. “They want to see what their personal risk is and how to make sense of that,” she says.

Data: The Siegels used data from about 800 children with Crohn’s disease to create the program. They plan to validate it by testing its predictions against a second set of patients. If the predictions line up with what that dataset shows, the tool could then be rolled out for use with patients. For now, it will be limited to use in children, but the Siegels hope soon to start collecting the data they’ll need to create a similar tool for adults with Crohn’s disease.

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The Siegels show off a screen shot of one of the graphs that their tool produces.