



ON HER TOES

AS A RESEARCHER,
CLINICIAN, MENTOR,
AND EDUCATOR,
RENEE STAPLETON,
M.D., PH.D., IS
ALWAYS IN ACTION.

BY SARAH ZOBEL PHOTOGRAPHS BY ANDY DUBACK

Renee Stapleton, M.D., Ph.D., keeps a treadmill desk in the corner of her office. But her colleagues, research collaborators, medical students and residents know that she hardly needs a machine to augment the effort she puts into all the dimensions of her daily work.

“People can’t really be triple threats any more—it’s just too hard,” says Polly Parsons, M.D., E.L. Amidon Professor and Chair of Medicine. To Parsons, who is also the current president of the American Thoracic Society (ATS), a “triple threat” is someone who is simultaneously at the top of their field as clinician, teacher, and researcher. “It would seem impossible to be truly exceptional in all three areas. But Renee is.”

Marc Moss, M.D., Roger S. Mitchell Professor of Medicine at the University of Colorado School of Medicine and immediate past president of the ATS, goes one notch further. “Renee Stapleton is a quadruple threat. She’s a great clinician, teacher, researcher—and a great person. You would want Renee to care for your relative, teach the person who will be your future doctor, and perform studies that are funded with precious research dollars,” Moss says.

There are plenty of accolades in support of that praise. Stapleton—a pulmonologist and critical care physician at UVM Medical Center and associate professor in the Department of Medicine—won the 2014 Jo Rae Wright Award for Outstanding Science from the ATS, which recognizes a rising star in academic pulmonary and critical care medicine. She was also presented with the 2018 Lerner College of Medicine Faculty Award in Research Mentorship. She has been named vice-chair of the ATS’s scientific advisory committee and chair-elect of its critical care assembly, the largest among its 13 assemblies. Outgoing assembly chair John Kress, M.D., professor of medicine, University of Chicago Medicine, says Stapleton’s track record was a significant factor in her selection: “She is already one of the leaders in

the field of respiratory failure and Acute Respiratory Distress Syndrome (ARDS), and I think she’s just getting started.”

Although the division of her work favors research, Stapleton, who is certified in both pulmonary medicine and critical care medicine, dedicates roughly 15-20 percent of her time to seeing patients in the pulmonary clinic and the medical intensive care unit. She also puts in time on the pulmonary consult service and as an attending physician.

Her teaching duties are twofold: in addition to bedside instruction in the context of clinical rotations, Stapleton created and directs a special research emphasis for doctor of medicine and doctor of nursing practice students. It’s made up of a longitudinal series of seminars and workshops, and arose during Stapleton’s time as head of the resident and fellow research committee for the Department of Medicine.

“When I took that role, I very quickly started getting asked a lot of questions from medical students who weren’t formally in the department of medicine. They wanted to know how they could find a research mentor, what kind of projects were available—soup to nuts—and it became obvious there was a gap in those kinds of opportunities and organization for students,” she says. She brought her concern to medical education leaders; they agreed that having a point person for research activities would be beneficial. Stapleton also suggested more formal research education was needed and, partnering with Amy O’Meara, D.N.P., applied for and received a 2016 Frymoyer Scholar Award that allowed them to design and implement a research education project.

The research emphasis has proven popular as it has evolved over the last two years from a monthly in-person seminar, to a prerecorded online model, to take into

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account the many demands on the students’ time. Eventually, Stapleton says, incoming students may have the option to choose one or more tracks, such as rural or global health or a self-designed focus that will include an independent mentored research project, and will receive a certificate of completion.

Presently, Stapleton oversees students’ summer research training, helping them find mentors, and submit applications and reports. That program has also grown significantly—when Stapleton became involved four years ago, 15 students had summer projects; this year, 31 did.

“She’s committed to nurturing medical students, residents, and fellows, and is actively involved in the education of those groups,” says Parsons. That commitment

extended in a unique way to a special short-term course Stapleton and Parsons developed, an elective for fourth-year students called “How the Hospital Works.” It offers experiential learning in all aspects of a hospital’s functioning—administration, nutrition, pharmacy, central supply, and social work. “Renee saw an area of need, and put together an opportunity. She just looks for novel ways, and people benefit at multiple levels,” says Parsons. “At the same time, she is approachable and compassionate, totally down-to-earth. In unlimited ways, she gives back. She’s an incredible role model, just by being here.”

Although Stapleton has mentored both men and women, she keeps a special eye out for the latter. A 2013 paper she co-authored

with Stanford University’s Ann Weinacker, M.D., titled “Still a Man’s World, But Why?” and published in *Critical Care*, stated, “[W]omen who have achieved promotion and leadership roles must take active and inclusive roles as role-models, mentors, and advocates for junior women in academic medicine. Women early in their careers need proof that there is light at the end of the academic tunnel.”

“She’s a fantastic mentor,” says Jacqueline O’Toole, D.O., now a pulmonary and critical care fellow at Johns Hopkins University, who joined Stapleton in a study on the presence of attendings in the medical ICU overnight, and how that influences the perceived educational value of overnight shifts for medical residents and fellows, as well as how the nursing staff view their presence. Stapleton’s guidance was

Above: Renee Stapleton, M.D., Ph.D., is researching how a cycle ergometer may help reduce inflammation in patients in the ICU.

invaluable to O’Toole.

“It takes a lot of patience when you’re working with a novice researcher, and she was always wonderful—I never felt like I was wasting her time, and I know she has a lot of demands on it,” says O’Toole. The paper was published in the *Medical Science Educator* in 2018.

Radhika Parikh, M.B.B.S., M.D., chose Stapleton to be her mentor throughout the three years of her fellowship at UVM in part to focus on her medical literature writing skills.

“She is really a meticulous and wonderful person to work with,” says Parikh (now a

THE STAPLETON FILE

EDUCATION

- » Doctor of Medicine, with honors, University of Washington School of Medicine, Seattle, Wash., 1998. Elected to Alpha Omega Alpha in junior year.
- » Doctor of Philosophy, University of Washington Department of Epidemiology, 2010.

AWARDS AND HONORS

- » Master of Science, University of Washington Department of Epidemiology, 2005.
- » Bachelor of Arts, magna cum laude, Rice University, Houston, Texas, 1994. Majors: Biochemistry and Biology. Elected to Phi Beta Kappa, 1994.

AWARDS AND HONORS

- » Teacher of the Year, Division of Pulmonary and Critical Care Medicine, University of Vermont Lerner College of Medicine, 2009
- » E.L. Amidon Award for Teaching Excellence, Department of Medicine, University of Vermont Lerner College of

AWARDS AND HONORS

- » Recipient of travel grant to attend the National Institute of Aging (NIA) Bedside to Bench Conference “Inflammation and nutrient Metabolism,” Bethesda, Md., September 2009
- » University of Vermont Medical Group Junior Researcher of the Year, 2012

AWARDS AND HONORS

- » 2014 American Thoracic Society Jo Rae Wright Award for Outstanding Science. This award recognizes demonstrated potential for significant scientific achievement and contributions and is aimed at the rising generation of individuals who will be tomorrow’s leaders in science.

AWARDS AND HONORS

- » 2016 Department of Medicine Resident and Fellow Research Mentor of the Year
- » Selected to attend the American Association of Medical Colleges (AAMC) Mid-Career Women Faculty Leadership Development Seminar in Scottsdale, Ariz., in December 2017.

AWARDS AND HONORS

- » Recipient of the Research Mentor Award at the 2018 Annual UVM Lerner College of Medicine Dean’s Excellence in Research Award Ceremony

CLINICAL INTERESTS

- » Acute Lung Injury
- » Chronic Obstructive Pulmonary Disease
- » Sepsis
- » Survivors of Critical Illness

RESEARCH INTERESTS

- » Critical Care Outcomes and Epidemiology
- » Nutrition and Micronutrients in Critical Care
- » Acute Lung Injury and Sepsis
- » In-hospital CPR
- » End-of-life Care

senior associate consultant in the Mayo Clinic Health System). “Whether I was doing a very small or a very important presentation, she would take time out to sit down with me a week in advance and again one day ahead to have practice sessions and not only focus on whether I would finish in time, but also on small details like spelling errors and slide formatting.” At least as important to Parikh at the time, Stapleton helped her personally. Raising her daughter solo while her husband was in Connecticut, Parikh was at times overwhelmed by her commitments. Without saying a word, Stapleton worked behind the scenes to get the date of Parikh’s scheduled presentation to the Vermont Lung Conference moved so Parikh could focus on preparing for her boards. “I don’t think I could have done all this without her,” says Parikh, adding that she’s as indebted to Stapleton for the career and research exposure as she is her parenting and life wisdom, and that she became committed to staying active by observing her mentor’s model.

Vermont is a natural fit for Montana native Stapleton. “We feel like we hit the jackpot—it’s a great place to live and work,” she says of moving to Chittenden County, “and the culture of our institution is a really nice work-life balance.” With her family, she gardens, taps trees to make maple syrup, and has in the past raised chickens and shared eggs with her colleagues. In addition to working at the treadmill desk that her husband, Jonathan, a high school physics teacher, built for her, Stapleton enjoys skiing, kayaking, canoeing, and fishing with the couple’s three children, Walker, Emerson, and Orion. Indeed, Stapleton’s role as mother comes up repeatedly, and not in a hackneyed “how does she do it?” way.

“She is actively involved in her kids’ lives, and very open about being a mom,” says Parsons, noting Stapleton serves as a model to all of her mentees and colleagues who, like Parikh, juggle full work lives and parenting.

Stapleton had her own model. “I’ve known since I was 10 that I wanted to go into medicine. That stemmed largely from my love of my childhood pediatrician. She was in her 60s when I was a kid seeing her, and I remember her telling me stories of going to medical school—everybody else in the class was a man,” she says. After earning an undergraduate degree from Rice University, Stapleton took advantage of a reciprocal program for residents of northwestern states to attend the University of Washington School of Medicine. Still convinced she was headed for a career in rural primary care,

at the very end of her intern year Stapleton spent a month in the ICU at Seattle’s Harborview Medical Center, the county hospital. It was there she “completely fell in love with critical care.” Through her work with the pulmonary and critical care faculty, she developed an interest in clinical research.

“I really enjoy clinical work, but the research piece of it is academically stimulating, and it’s what gets me out of bed in the morning,” she says. “My mentors did an excellent job of being my village, and helping me realize that this research career path met my needs for being of service and fulfilling one’s civic duty, of simultaneously being able to take care of patients, which I still love and is the root of everything that we do. But the research piece is really intellectually satisfying. Your brain is never on hold.” She decided to add on a master’s in epidemiology, and then a Ph.D., and joined the faculty in Seattle before being invited by Parsons in 2007 to come to UVM to conduct research in the ICU.

“Renee has been a superstar since she arrived at the University of Vermont in the pulmonary and critical care division,” says Parsons. “She brought her research program with her from Seattle and established a vibrant program in clinical translational research that’s been wildly successful.”

At present, that program, which occupies about 75 percent of Stapleton’s working hours—and will only increase in the spring as additional grants get going—addresses end-of-life issues and communication, novel therapies in critically ill patients including exercise and nutrition, and a new innovative restraint device. Stapleton’s most recent RO1 application scored in the sixth percentile; she collaborates with not only colleagues locally, but researchers nationwide. She is principal or co-principal investigator on three multi-center randomized trials. The just-underway NEXIS trial will look at the use of cycle ergometry and amino acid supplementation in people with acute respiratory failure who are on a ventilator. It’s a collaboration with researchers at Harborview, Johns Hopkins, and Wake Forest School of Medicine. Together with co-PIs Benjamin Suratt, M.D., and Michael Toth, Ph.D., from UVM, and Wake Forest’s Clark Files, M.D., Stapleton has also received a separate RO1 to work through the biologic mechanisms of the intervention,

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because there’s evidence exercise reduces inflammation not only at the local level, but systemically—even in the lungs. The cycling often happens passively, especially early in the participants’ ICU stays when they tend to be more sedated, on an ergometer that fits around the foot of the bed, but there have been some surprises.

“We have a whole algorithm we go through, and if patients cycle actively during enough of each increment, then we can ramp up the resistance and the speed,” says Stapleton. “If they do it passively, then we follow a separate part of the algorithm. It turns out that a large percentage of folks you think are not awake at all do end up cycling actively a fair number of minutes during a cycling session.” The next step may be a multinational study of four arms: usual care, amino acid supplementation, exercise, and supplementation plus exercise.

In another arena, Stapleton and colleagues at UVM, in addition to two other centers—Harborview and the Medical University of South Carolina—are looking at communication intervention in palliative care for older hospitalized patients and their families. They began recruiting participants in 2016, and are in the process of adding a

fourth site because recruiting participants is challenging.

Somewhat more offbeat for Stapleton is work she’s doing as part of an R42 grant, which supports research and development projects between small businesses and research institutions. Marie Pavini, M.D., F.C.C.P., a Rutland Regional Medical Center intensivist, approached Stapleton with a new restraint she developed for use in the ICU. Because the standard bilateral wrist restraints tend to make patients more agitated and in need of additional sedation, leading to longer ICU stays, Pavini came up with a restraint that uses an adjustable rod and a hand enclosure, so patients can move their arms but not reach their mouths or necks and put them at risk of self-removal of breathing tubes and large intravenous lines. That study has begun with a small pilot program at UVM to test the feasibility of the device; if all goes well, Stapleton, Pavini, and Johns Hopkins’s Dale Needham, M.D., Ph.D., will begin a three-center trial next spring.

Her newest project is an examination of zinc as a potential therapy in the ICU; she’s a co-investigator and is collaborating with principal investigator Rebecca Baron, M.D., at Brigham and Women’s Hospital. Known to

help reduce oxidative stress, zinc also plays a role in inflammatory cytokine production or inhibition and is a co-factor in myriad enzymatic reactions in most organisms, including pathogens. Blood levels of zinc in critically ill patients are ubiquitously low, although the reasons for this deficiency are not well-understood. Stapleton and her team recently completed a phase I dosing study of zinc in the ICU; the next step is a cohort study of some 800 people at four sites to determine which patients would most benefit from therapeutic doses. Baron has data showing that lower zinc levels lead to a higher likelihood of developing ARDS, along with ventilator-induced lung injury, but that in mouse models, supplementation with zinc has resulted in a quicker recovery and better outcomes, including less injury from the ventilator.

Though she’s so often the one in charge, Stapleton is quick to credit others. “Research like this takes a massive collaborative effort involving hard-working folks all over the campus including the IRB, the fiscal managers who help us budget our grants and manage funds correctly, the amazing research coordinators and lab staff who make

Above L to R: Members of the research team working on the ergometer. Sara Ardren, Sebastian Ventrone, Renee Stapleton, M.D., Ph.D., and Stephanie Burns.

day-to-day operations run smoothly, the fantastic ICU and ward nurses who care for our hospitalized research participants, the research pharmacy, my incredibly supportive colleagues, and so many others,” she says earnestly. “I’ve also been blessed with an outstanding group of mentors, including Dr. Parsons, which is key to success. I have a phenomenal group of people with whom I’m privileged to work. They are so amazing—they come to work every day excited about what they do and everybody works to get the job done—at other institutions with whom we collaborate, too. Our division is such a great group of people—just really fun people of the highest integrity who keep me on my toes every day. It’s a great job to have.” **VM**



TO WATCH A VIDEO OF THE DEVICE STAPLETON IS STUDYING AND READ AN ARTICLE SHE CO-AUTHORED, VISIT: MED.UVM.EDU/VTMEDICINE/WEB-EXTRAS