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UNIVERSITY OF COLORADO SCHOOL OF MEDICINE

CU MEDICINE Today

Achieving Our Mission

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CONTENTS

On the Cover

Lotte Dyrbye, MD, MHPE, joined CU School of Medicine in 2022 to oversee faculty affairs and diversity, equity, and inclusion efforts, and to lead initiatives reducing physician, resident, and medical student burnout.

Photos by Justin LeVett

Mentoring success, page 17

Aiding Ukraine, page 22

Doctors in space, page 23

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CONTINUING TO GROW

In 2022, our School of Medicine community continued to have a robust track record of accomplishments despite the many challenges we've faced through the pandemic.

Our faculty's clinical work at our partner hospitals on the Anschutz Medical Campus continues to provide care that sets the standard for other providers in our region. Our faculty and partner hospitals are investing in new technology and skills, adding services, and meeting the needs of our community. UCHealth University of Colorado Hospital and Children's Hospital Colorado again ranked as best in the state, and for many specialty programs among the best in the nation.

The research portfolio of our faculty continues to grow. Our School of Medicine moved up in the overall amount of funding we receive from National Institutes of Health and other funders. In NIH funding, we ranked number 22 in the country, according to the most recent tally by the Blue Ridge Institute for Medical Research. Among public medical schools on that list, we are in the top 10.

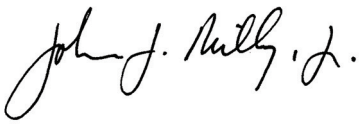
In education, we continue to attract some of the best students in the country. For the 184 seats in each year's class, we routinely start with more than 10,000 applicants. Last year was no different. The quality of our education is recognized by our peers and by popular measures. In the most recent rankings by U.S. News and World Report of medical schools, our School of Medicine was number 6 for primary care and number 27 in research. Our pediatrics program ranked number 7, family medicine was number 10, and surgery ranked number 23.

Our benefactors continue to offer outstanding support. In May, for example, the Anschutz Medical Campus announced a $200 million investment over the next five years in the Gates Institute. The investment is a match between our campus and the Gates Frontiers Fund, a longtime supporter of our Gates Center for Regenerative Medicine and the Gates Biomanufacturing Facility.

Our ability to serve the community continues to grow as well. In collaboration with our partners in the State of Colorado, we are reaching across the state with new and expanded programming that provides primary and specialty care. We are also investing in a clinic that will serve those in greatest need in the neighborhoods surrounding our campus.

By all measures, our School of Medicine has become stronger and served more people. We are able to achieve so much because of the commitment of our faculty, staff, and supporters to serving our community and improving the health and quality of life of others. Thank you for all you do for our School of Medicine.

With warm regards,



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Reporters locally and nationally turn to the School of Medicine for expertise and research news. Here are some examples from near and far.

Megan Adams, MD, assistant professor of surgery, in August was quoted by the Denver Fox affiliate discussing the liver transplant surgery, made possible by an adult living donor, to save the life of a two-year-old child. "Especially for a small child or a baby, we only need to take probably 10 to 15% of the adult's liver, and in both the donor and the recipient, that liver will be regenerated to the size it needs to be within six weeks," she said.

Omer Mei-Dan, MD, professor of orthopedics, was quoted in June in a Colorado Sun article about treating extreme-sprots athletes. "God knows I had so many surgeries on myself," said Mei-Dan, who participates in wingsuit flying, rock and ice climbing, downhill mountain biking, kayaking, and BASE jumping. "These are not the type of people who get hurt and then you tell them, 'Now you should not get back into climbing.' That won't work. I did feel that as an athlete. Sometimes I was…I don't know if 'judged' is the right word…but I was looked at through a certain lens."

Stacey Martiniano, MD, associate professor of pediatrics, discussed her specialty, cystic fibrosis, in May on the Denver ABC affiliate. "We start treatment very early with pancreatic enzymes that help babies digest their food, absorb the nutrients and grow," she said. "We also then start treatments to help protect lungs. And then most recently, in just the last few years, we have these really great, new disease modifying drugs that really have improved the outlook for children with cystic fibrosis."

Mario Santiago, PhD, associate professor of medicine, and Eric Poeschla, MD, head of the Division of Infectious Diseases, were quoted by The Atlantic in August describing the role of interferons in fighting COVID-19. Santiago said strong, punchy interferon responses are essential to early viral control, acting as a "first line of defense" that comes online within minutes or hours.

Evalina Burger, MD, chair of orthopedics, discussed the rates of breast cancer among female orthopedic surgeons. She said trainees should be learning about radiation exposure during surgery in addition to practicing using drills and scalpels. "Would it have changed my decision to be an orthopedic surgeon?" she said in an article published by Mother Jones in August. "No. Would I have taken better precautions? Maybe."

Sean O'Leary, MD, professor of pediatrics, told U.S. News and World Report in July that COVID-19 is now the No. 4 cause of death among children, behind accidents, cancer, and suicides. "If we had a simple, safe, effective intervention to get rid of any one of those single things, we would jump at it." With COVID-19, "we have that and, unfortunately, a lot of parents aren't taking it," he said.

Eric Lavonas, MD, professor of emergency medicine, described seeing patients injured in electric scooter crashes in a report on the Denver ABC affiliate. "I'm working 3:00 PM to midnight tonight, and if I get to midnight without seeing somebody injured in a scooter crash I'll be really surprised," he said in July.

Emmy Betz, MD, MPH, professor of emergency medicine, told the Denver CBS affiliate in July that the new 988 national suicide prevention will help save lives. "Maybe it was one good thing to come out of COVID is that we all started talking about mental health a lot more. Life is a bumpy rollercoaster, and I think it's important we all talk about that because there's treatment," she said.

Rebecca Cohen MD, MPH, associate professor of obstetrics and gynecology, told the Denver Post in July that abortion bans in nearby states are causing some patients to travel to Colorado. "A year ago, we rarely saw patients who needed to travel to Colorado for necessary medical care, whereas now up to a third of our patients are traveling from out of state — this means that each patient faces more anxiety and stress in navigating unfamiliar systems," she said.

Megan Adams, MD

Paula Riggs, MD, professor of psychiatry, described to the New York Times the goal of a treatment program for adolescents with co-occurring mental health and substance abuse disorders as recognizing addiction as a chronic condition rather than an acute crisis. "Nobody graduates from a diabetes clinic," she said an article published in June. "You just keep taking care of your health, and then if you need to intensify treatment because something is out of whack, you come back in until you've got it under control."

Jay Lemery, MD, professor of emergency medicine specialist and co-founder of the CU Climate & Health Program, told the Colorado Sun in August that tracking heat-related deaths is difficult: "I would consider heat to be a threat-multiplier, meaning it often puts other coexisting medical conditions in crisis."

Lilia Cervantes, MD, associate professor of medicine and director of immigrant health, discussed a policy change that allowed the state to cover regular dialysis for people who would otherwise have to wait until they are so sick that they land in the emergency department.

Omer Mei-Dan, MD

Stacey Martiniano, MD

Mario Santiago, PhD

"We don't have 130 patients coming through the ED needing emergency dialysis anymore," she said a June report by Kaiser Health News.

Ernest E. Moore, MD, Distinguished Professor of Surgery, described for CNN the difference between injuries caused by gun violence. "I often use the analogy that the injury to the liver [with a semi-automatic rifle] would be similar to just taking a watermelon and dropping it on the cement. It's incredible the amount of energy delivered," he said in June. "By comparison, the 9 millimeter would drill a hole through the liver. So, you'd have a sizable hole, but if you didn't hit a major blood vessel, it's a pretty tolerable injury."

Jenna Glover, PhD, associate professor of psychiatry, joined the Colorado Public Radio program "Colorado Matters" in May to answer questions parents submitted over Twitter about discussing gun violence with children. "One of the ways that some of us cope is we want to constantly consume anything and everything about this to try to understand it," she said. "But it's so important to take breaks and turn off the TV, turn off social media and just be present with your family....Some exposure is helpful; overexposure is dangerous."

Bonnie Jortberg, PhD, associate professor of family medicine, was quoted in a May report on the Denver CBS affiliate about Colorado dairy farm selling camel milk as a substitute for cow milk. "There are some potential benefits for adults or even children, not infants and young toddlers who need to be consuming formula," she said.

Sean O'Leary, MD, professor of pediatrics was interviewed on Good Morning America in May about the COVID-19 vaccine for children under 5 years old. "I think we all want to be done with this pandemic but unfortunately, it's not quite done with us," he said. "We are in a much different place than we were two years ago in terms of both the therapeutics that are available to treat the disease and the vaccines, showing a decreased spread of the disease and a decrease in hospitalizations."

Lotte Dyrbye, MD, MHPE, senior associate dean of faculty and chief well-being officer, in May discussed with UPI her study of mistreatment experienced by physicians from patients or their families. The study, which included 6,500 physicians, reported that 30% said they had been subjected to racially or ethnically offensive remarks, and a similar percentage reported having offensive sexist remarks directed at them. "Physicians who have [these] experiences are more likely to be burned out," she said. "When physicians are burned out, they are more likely to leave their practice, reduce their time taking care of patients, make medical mistakes, and deliver more costly care to patients."

Timothy Amass, MD, assistant professor of medicine, was featured in a CNN report about his study, published in JAMA Internal Medicine in April, on the stress-related disorders of family members of patients admitted to intensive care units with COVID-19. He explained that small acts of kindness, such as asking for a photo that hospital staff could hang to make the patient feel happier, can make a difference. "Even that small act of compassion from the health care team to the family can really have a really powerful impact for those family members and their risk of developing these (PTSD) symptoms," he said.

FROM DIRT TO DISCOVERY

Community college interns learn lab skills studying phages found in soil

By Rachel Sauer

This summer, the University of Colorado School of Medicine provided internships for 12 Community College of Aurora students participating in the Howard Hughes Medical Institute's SEA-PHAGES program.

SEA-PHAGES – Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science – offers a discovery-based experience to increase interest in biological sciences. The Howard Hughes Medical Institute provides the program in partnership with academic institutions around the world.

Before June 3, Hector Jaimes Godinez didn't know what a phage was. He knew about bacteria and viruses, of course, but he had no idea the journey he'd end up on with the sample of dirt he collected from his Aurora yard.

"I always wanted to do experiments like you see scientists do on TV, but this turned out to be so different from what you see on TV," Godinez says. "I think it's a lot better."

Godinez and his fellow interns were introduced to the full scope of lab work and scientific processes, studying bacteriophages, also known as phages, which are viruses that infect a host bacteria and share traits with all viruses: They require a host cell to reproduce and are specific to particular hosts.

For eight weeks this past summer, Godinez and 11 fellow interns isolated, purified, and amplified their phages, as well as extracted phage DNA.

"This program is designed for interns to immerse themselves in an exciting experiment and become lovers of science – and maybe scientists and clinicians," says Julia Promisel Cooper, PhD, professor and chair of the Department of Biochemistry and Molecular Genetics. "The students will contribute to a phage repository and be credited with their discovery. In fact, phages isolated by students in this program have been used to treat antibiotic-resistant bacterial infections in humans."

LEARNING SCIENCE STEP-BY-STEP

"One of the main goals of the program is to give students real research experience," explains Emma Sheriff, a doctoral candidate in the Department of Immunology and Microbiology. "For many students, this has been their first experience doing an experiment from start to finish."

Hector Jaimes Godinez working in the lab as a SEA-PHAGES intern.

Rahul Thadani, PhD, a research associate in biochemistry and molecular genetics, adds: "Even if a student isn't necessarily considering a career in science or research, they're still developing a love for science and learning to troubleshoot, learning the step-by-step process. Until I started at the bench, every experiment given to me had a known outcome, or if it failed, I already knew why."

Sheriff and Thadani, along with Rishi Nageshan, PhD, a research associate in biochemistry and molecular genetics, have been instructors for the eight-week program after receiving training from Viknesh Sivanathan, PhD, science program leader at the Howard Hughes Medical Institute.

Community College of Aurora students applied to the program and the 12 who were accepted represent a broad spectrum of majors and career interests.

Kat Campbell applied to SEA-PHAGES because she hopes to study nursing in the CU College of Nursing and wanted to learn more about lab-based science. Kevin Ruiz, an economics and philosophy major, applied to the program to grow his critical thinking skills and better understand the research process, while Jason Ta wanted to learn whether research is something he enjoys.

"I've thought I'd like to be in the medical field and helping people," Ta says. "So, I wanted to see if I like the research aspect of it and so far, I really do."

Rahul Thadani, PhD, teaching SEA-PHAGES interns. The eight-week program is a partnership with the Howard Hughes Medical Institute.

HANDS-ON EXPERIENCE

The SEA-PHAGES internship program takes students step-by-step through the scientific process, beginning with lab safety and guidelines for working with bacteria, through the fundamentals of bacteriophages.

Students were asked to collect a soil sample – Hung Thang got his from the dog park – and bring it on their first day of the program. They learned about bacterial hosts, and then how to isolate phages in the samples they'd collected.

This work was followed by a process of learning to purify the phages, amplify them, and view phage particles through transmission electron microscopy. Students then extracted phage DNA and characterized the phage by analyzing its genome.

"You can learn so much from a hands-on process like this," Thadani says. "Some of the students had samples that got contaminated, so they had to work back through the process and troubleshoot, then re-do it, and that's valuable experience. That's something that happens in the lab."

For Ramon Melendez Silva, who had one of the contaminated samples, the experience has taught him the persistence and patience necessary for science.

"I really like science and I really like math, but before I think it was more the idea of science, it wasn't the real thing like we're doing here," Melendez says. "It's a lot more interesting when you don't know how things are going to turn out. It's a real experiment."

LESSONS BEYOND THE LAB

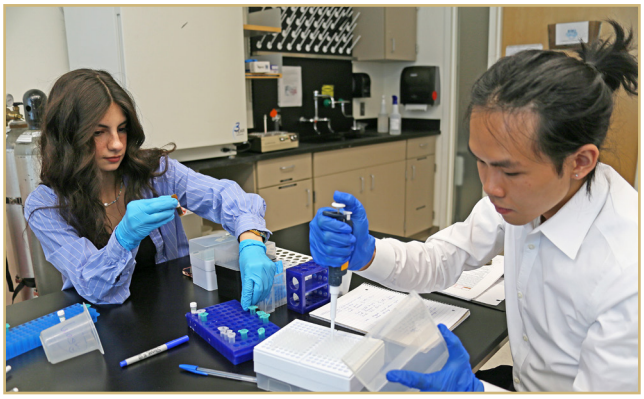
Biology major Nabaa Waleed Al Adeli says her time in the lab has helped her gain a better understanding of the science that would be involved in a research-focused versus a health care-focused career.

"I'd like to be a surgeon or a researcher, and now I think I have a better idea about what both of those paths would look like," Waleed Al Adeli says. "Medical school and PhD programs are a long commitment, and they're really hard, so it helps to have a better idea of what I'm looking at. Plus, we're discovering new phages and that's really cool."

If the program inspires students to pursue careers in medicine or research "then that's wonderful," Sheriff says. "Even if they don't, we want them to come away from this understanding how science works. When they hear something in the media, for example, we want them to be able to critically evaluate it and to really just go out and be ambassadors for science."

Karen Alvarez Sandoval, who is studying translation and interpretation, says her experience in SEA-PHAGES has taught her lessons that extend beyond science.

"Will we mess up? For sure," Alvarez Sandoval says. "But you see in the lab that it's OK to fail. How else do you learn? You just have to think it through, step by step, and try again."



SEA-PHAGES interns Nabaa Waleed Al Adeli (left) and Jason Ta collaborate on labwork.

CARING FOR CAREGIVERS

Lotte Dyrbye, MD, MHPE, named first chief well-being officer

By Rachel Sauer

Before "wellness" was a commonly discussed concept, before health care as a profession widely recognized that clinician well-being can correlate with patient well-being, Lotte Dyrbye, MD, MHPE, took a gap year between her undergraduate studies and medical school.

"I had been working so hard for so long and I knew I needed a break," she recalls. "That time helped me grow a little bit as an adult and gave me breathing room to get ready for the next challenge."

During that year she worked in the lab at a small biotech company, focusing on World Health Organization-funded research on technology designed to help scientists in Africa detect malaria strains. She also frequently borrowed her father's bike, with its hard leather seat, and rode for many, many miles.

At a point when her medical career was just beginning, she recognized that "if I'm going to keep up this level of stamina and academic rigor, I need to engage in a little bit of self-care."

This experience, among many others, laid the foundation for building a career in which she has become a pre-eminent national leader and researcher in clinician well-being and burnout.

In early 2022, Dyrbye was named chief well-being officer for the University of Colorado School of Medicine. In this new position, and also as senior associate dean of faculty, she is focused on strengthening partnerships with stakeholders throughout the school and leading initiatives to reduce physician, resident, and medical student burnout. She is also overseeing faculty affairs, faculty and leadership development programs, and diversity, equity, and inclusion efforts.

"A large body of research delineates that burnout is associated with suboptimal patient care and with delivering more costly care," Dyrbye says. "The mission of our clinical partners and the mission of the school are all dependent on the well-being of the health care workforce. Without greater attention to our people, we can't achieve any of our missions."

TIME PLUS EFFORT EQUALS OUTCOME

Before she was at the forefront of clinician well-being research and innovation, however, Dyrbye was a 5-year-old who loved the TV show "Emergency!"

Her family had newly moved to Maryland from their home country of Denmark so her father, a mechanical engineer, could pursue a significant career opportunity. As a kindergartener, Dyrbye was intrigued not just by the weekly small-screen drama, but by the medicine itself, "so from a very young age I thought that would be my career path," she recalls.

Her family returned to Denmark when she was 10, and returned to the United States when she was 12 for another career opportunity for her father, this time in Wisconsin. Through middle school and high school, she really enjoyed her STEM classes and studied biology at St. Olaf College in Minnesota.

While pushing through organic chemistry with flash cards and late nights, she learned the vital lesson that time plus effort equals outcome. Because St. Olaf's student body was small, she got a personalized education from excellent, involved professors and graduated at the top of her class.

Yet, she ruefully admits to bombing the MCAT. "I don't have a great excuse," she says. "I didn't have a migraine, I hadn't experienced a traumatic event, I'd tried to study as I was going through college. But it was a huge shock to my ego regardless."

With meaningful support from her professors, who expressed complete confidence in her, "I was able to pick myself up and I just figured I didn't have anything to lose, I'd apply to medical school anyway even with bottom-of-the-barrel MCAT scores," she remembers.

She applied and was accepted to the University of Wisconsin School of Medicine and Public Health in Madison, and began classes the summer after the gap year when she learned the value and necessity of self-care.

CHOOSING CONTINUITY OF CARE

Through her medical studies and rotations through various specialties, Dyrbye gravitated to general internal medicine for multiple reasons, including the opportunities it offered to provide continuity of care.

"I enjoyed differential diagnosis, for example not knowing whether a patient's shortness of breath was caused by deconditioning or blood clots in the lungs, and then investigating down to the cause," Dyrbye says. "It's a specialty that requires you to be comfortable with a certain degree of uncertainty and learn to trust your instincts, trust your experience, and trust that the patient is going to call you back if it gets worse."

Through a rigorous residency that included several hospitals in Seattle, during the time before work hour restrictions, some of her rotations were at county hospitals with consistent high volumes of extremely acute

Lotte Dyrbye, MD, MHPE

patients, including people dealing with issues associated with heroin addiction or overdose.

"I remember coming home from call and my husband putting food in front of my face, then just falling asleep," she recalls. "It wasn't uncommon to be on call every third or fourth night. We'd get four days off a month, and every so often there'd be a golden weekend with two days off in a row so my husband and I could pack up our backpacks and go somewhere wonderful."

The challenges during and after residency were intense, and included the birth of twin daughters after she entered private practice, but they also broadened Dyrbye's perspective on the then-nascent field of clinician well-being. Following residency, she went into private practice for several years near Seattle, "which was a really good opportunity to learn the business of medicine while seeing patients full-time," she says.

However, when she saw an ad for a general internal medicine position at the Mayo Clinic in the back of the Journal of the American Medical Association, she applied on a whim. Her roommate from her first year of medical school was a faculty member there and put in a good word, but

Continued on page 9.

SUPPORTING PHYSICIANS

Study finds "staggering" level of discrimination by patients and families

By Rachel Sauer

In a recent survey of more than 6,500 physicians from across the United States representing a broad spectrum of racial and ethnic diversity, nearly 30% of respondents reported experiencing discrimination and mistreatment from patients or patients' family members or visitors.

Further, close to 20% of responding physicians had experiences in which patients or their family members or visitors refused to allow the physician to care for them because of the physician's racial or ethnic attributes or gender.

"This is a staggering number," says Lotte Dyrbye, MD, MHPE, senior associate dean of faculty and chief well-being officer at the University of Colorado School of Medicine. "Simply having patients or family members say, 'No, you can't provide care because of the way you look' – not because of competency – is really heartbreaking."

In research published in May, Dyrbye and her co-researchers surveyed more than 6,500 physicians nationwide about their experiences with mistreatment and discrimination in the course of doing their jobs. The research was conducted in collaboration with the American Medical Association (AMA).

"We wanted to understand how often it was happening, who it was happening to, and what are some of the intersections between race, ethnicity, and gender and physician mistreatment," Dyrbye explains. "We were interested in exploring the relationship between having negative interactions with patients, visitors, and family members and physicians' likelihood of being burned out."

DISCRIMINATION LEADS TO BURNOUT

Throughout her career, Dyrbye, who joined CU this spring, has conducted extensive research on clinician burnout. She co-authored "Taking Action Against Clinician Burnout: A Systems Approach to Professional Well-Being," a consensus study for the National Academy of Medicine, and co-developed the Well-Being Index, a validated online self-assessment tool for clinicians.

Her research has focused on the stressors associated with working in health care, including aspects of the work environment that can lead to physician burnout. Among those stressors are racially or ethnically offensive remarks, unwanted sexual advances, and gender-based discrimination that can be a significant factor in physician burnout.

Continued on page 8.

Dyrbye and her co-researchers have partnered with the AMA on large national surveys tracking trends in physician burnout for more than a decade. The first survey was in 2011, followed by 2014, 2017, and 2020.

After creating a survey that could be completed online or on paper, Dyrbye and her co-researchers launched the study more than six months into the COVID-19 pandemic, a time when clinicians were not only dealing with intense pressure at work, but public sentiment that could swing between honoring them as heroes to science-doubting harassment.

More than 6,500 clinicians completed the survey, "and the first thing that really struck us was how often these experiences of mistreatment and discrimination happen," Dyrbye says. "It's more common for women, and more common for racially and ethnically diverse physicians relative to white physicians, but the frequency of these experiences is what really stood out."

For example, 40% of Black male physicians and 40% of Indigenous female physicians reported having such experiences. And almost 25% of respondents reported experiencing unwanted sexual advances from patients or patients' family members or visitors.

CONSEQUENCES OF BURNOUT

The shocking prevalence of mistreatment of and discrimination against physicians by patients and their family members or visitors is a serious concern for the U.S. health care system. This study demonstrated that physicians who experience mistreatment and discrimination are more likely to have burnout, and previous research has demonstrated physician burnout is a factor in physician turnover and poor patient outcomes.

"It's a ripple effect," Dyrbye explains. "Burnout can lead to physicians cutting back on clinical time, which costs U.S. health care tons of money and magnifies workforce shortages, reducing access to care. Also, if physicians are burned out, they're more likely to have substance use issues, more likely to have thoughts of suicide. It's not only horrible by itself that these things are happening, but it's horrible because burnout has adverse consequences for patients and for society."

The research data add to existing evidence that there is a need for a multi-faceted approach to improving the crisis of physician burnout. Part of the response must happen in the work environment, Dyrbye says. "Some organizations are implementing policies and procedures for patients who have repeated episodes of discriminating against physicians and other members of the health care team," she says. "There also are opportunities for chief wellness officers to partner with chief diversity officers to promote a culture of diversity, equity, and belonging within an organization."

She says there are steps that a clinician can take in the moment with a patient or their family members or visitor who makes an inappropriate comment. These include stepping in and saying something when a behavior does not align with organizational values, addressing the behavior with the patient or their family or visitor, setting expectations and boundaries, and if needed, reporting the behavior to leaders so that steps can be taken to terminate health care relationships with patients.

"You certainly can't abandon patients and you're going to tolerate behavior more from patients who are delirious, demented, or not competent," Dyrbye says. "But for the rest of the world, we can have higher expectations."

The responsibility to create an environment where every health care worker can thrive applies at every level of an organization, from policies and procedures to mitigate harassment and bias from patients, families, and visitors, to ensuring that all clinicians feel supported. It also requires providing training on unconscious bias and stereotyping, and supporting clinicians in practicing self-care and crafting jobs that offers them meaning and purpose.

"It's also important for the general public to understand how burnout can impact them," Dyrbye says. "Why should they care that doctors are burned out? They should care because physician turnover and cutting back on hours directly attributable to burnout costs the U.S. health care system $4.8 billion every year. Burned out physicians reduce clinical time, they're twice as likely to leave practice, so then you're having to find a new doctor. Burned out physicians may also deliver more expensive and lower-quality care. If we want high-quality, affordable health care, we must support physicians."

> "Medical school is already so stressful and we're putting people at the very edge of what they can handle."

she didn't tell any extended family when she went to interview, including her husband's mother, who was a nurse at the Mayo Clinic. She didn't want to get anyone's hopes up.

She was offered the position, and in 2001 began working at Mayo Clinic in the Department of Medicine and Division of Community Internal Medicine.

RESEARCHING CLINICIAN WELL-BEING

Many factors continued shaping and guiding her interest in burnout and clinician well-being, including beginning to teach at the Mayo Clinic College of Medicine and Science and embarking on research related to burnout and well-being. She also reflected on her own experience as a medical student and resident, as well as a parent of three daughters – the twins were followed by another daughter three years later.

"The first research I did was looking at the prevalence of burnout in medical students and its association with personal life events," Dyrbye says. "Medical school is already so stressful and we're putting people at the very edge of what they can handle. So, when they have a negative personal life event, that can be it. We began looking at the relationship between personal life events, burnout, and alcohol use disorder, at a time when people would not believe there was such a thing as burnout."

Dyrbye and her colleagues at the Mayo Clinic expanded their research to many facets of clinician burnout, becoming leaders at the forefront of the burgeoning field. Their research comprises more than 10% of the citations in the seminal National Academies of Sciences text "Taking Action Against Clinician Burnout."

Dyrbye co-developed the Well-Being Index, an online self-assessment tool for clinicians that is used nationally and internationally. She also led multi-institutional research initiatives, including groundbreaking national research published in May 2022 that found, through a cross-sectional study of more than 6,500 U.S. physicians, that more than 30% of respondents had experienced discrimination or mistreatment from patients or patients' family members or visitors.

PURSUING NEW OPPORTUNITIES

As Dyrbye's research established her as a national leader in clinician well-being and burnout, she received emails weekly from schools and hospitals trying to recruit her. She didn't pay much attention to them until an email from Shanta Zimmer, MD, senior associate dean for education and a professor of medicine, a professor of medicine in the division of infectious diseases in the CU School of Medicine.

"I was serving on the search committee for the chief well-being officer position and decided to take my own advice and 'play to win,'" Zimmer says. "Dr. Dyrbye is an internationally recognized leader in faculty development, research, and mentorship around physician well-being and the learning environment. When I arrived to the CU School of Medicine in June 2016, she was a visiting professor on our campus and I remembered the depth with which she responded to questions from the audience, including mine, about differences in well-being and resilience measures around the experiences of Black physicians and residents."

Zimmer composed her email on a Sunday afternoon "as a way of taking a chance that we could recruit a star like her to our campus," she says.

Dyrbye didn't read the email right away, but didn't delete it either. She thought about it, discussed it with her husband – their daughters were grown and off to college, but the Mayo Clinic had been her clinical and research home for 20 years. Finally, Dyrbye decided to throw her hat in the ring for the new position that synthesizes much of her previous experience and research.

BUILDING RELATIONSHIPS

In her roles as both chief well-being officer and senior associate dean of faculty, she partners with stakeholders to address well-being and burnout not just at an individual level, but at an institutional one. Factors such as equity policies, faculty hiring and retention, career development, organizational structure, and many others can affect wellness outcomes.

"My initial goal really is listening and building relationships, taking inventory of all the wonderful things happening here, and engaging with the extremely talented workforce," Dyrbye says. "I have ideas and I have vision, but this work depends on partnership and on stakeholders coming together."

She adds: "How can we better support clinicians engaged in educating our increasingly diverse student population? How can we develop career pathway programs that align with people's goals, whether it's toward administration or running their own labs, whatever it may be? How do we develop infrastructure to address factors that are getting in the way of faculty well-being, and through a lens of shared responsibility? It's important work and I'm excited to be doing it with fantastic partners."

"LIKE HITTING THE LOTTERY"

Liver transplant surgery less than an hour after making the donor list

By Rachel Sauer

In August 2020, Mario Carrasco got what he suspected was COVID-19 and took Tylenol to combat his high fever. When that didn't work, he took an antibiotic he had received from Mexico and eventually felt better. For several months afterward, he felt fine. He felt like he always does.

But then his stomach started hurting. He felt nauseous and couldn't keep food down. He turned yellow. During a visit to Montrose Memorial Hospital in Montrose, Colo., physicians informed him that his liver enzymes were high, indicating inflammation. He quickly got worse, and on April 28, 2021, he was flown to UCHealth University of Colorado Hospital in Aurora.

For more than a week, a terrifying downward spiral continued as his liver failed and his family scrambled for options because he was uninsured. Without insurance, he couldn't get on the transplant recipient list. With help from a multidisciplinary care team, he got insurance through a significantly expedited process and soon after was on the liver transplant list.

Less than an hour after getting onto the transplant list, he was being prepped for surgery. A compatible donor liver was on its way.

"The likelihood of getting a transplant the same day you're put on the list is extremely rare, almost unheard of," says Elizabeth Pomfret, MD, PhD, chief of transplant surgery in the School of Medicine Department of Surgery. "What makes Mario's experience so rare is the fact that we were able to get not only his insurance fast-tracked, but his approval for the transplant list, which usually takes many days to do."

QUICK DECLINE

For most of his life, Carrasco, 54, has enjoyed good health. Since coming to the United States from Chihuahua, Mexico, in 1992 and settling with his family in Delta, Colo., he built a career in construction – working hard and then coming home to his wife, Maria, and children, Carlos, Ivan, and Jennifer, all now adults.

He figured he would be fine after rebounding from what he thought was COVID-19 in August 2020. But then he started feeling poorly and things just kept getting worse. A blood draw indicated his liver enzymes were elevated, and by the time his wife and daughter took him to Montrose Memorial Hospital, they were even higher.

"They told us he had the option of going to Grand Junction or Denver, but the liver specialist was in Denver, so they flew him out to Denver," explains Jennifer Carrasco. "Even then, he didn't think it was anything serious."

Carrasco was in the hospital for less than two weeks "when everything started to go down," he recalls. He had an internal normalized ratio (INR) test, which shows how quickly the blood clots, indicating how well the liver is working by producing enough proteins. A normal INR is 1.0; Carrasco's was 4.0, an alarming number indicating extremely slow blood clotting and poor liver function.

Perhaps even worse, during this time his father-in-law died, so his health worries were compounded by grief. Then he had a seizure.

"We had talked with him the night he had the seizure and he seemed fine," recalls Carlos Carrasco. "But then he was unconscious for almost two weeks, they call it a hepatic encephalopathy coma." Hepatic encephalopathy happens when a damaged liver is unable to remove toxins from the blood, which can impact brain function.

TRANSPLANT NEEDED

"My mom was the one who asked if his liver could be salvaged, but they said it was pretty bad and more than likely he was going to need a transplant," Jennifer Carrasco says. "The damage was too advanced."

However, Carrasco at first couldn't be added to the liver transplant registry because he lacked medical insurance. Carlos and Jennifer Carrasco started a GoFundMe campaign that ultimately raised more than $18,000, "but we researched it and it said that transplants can cost $250,000 to $500,000, something like that, plus after a transplant you need insurance for anti-rejection medicine the rest of your life, which is really expensive, and follow-up checkups," Carlos Carrasco says. "Some of our family members were going to see if they could borrow whatever it would cost, but it was just too much money. Our hopes were low, and then they said they were going to put him in hospice."

"What makes Mario's experience so rare is the fact that we were able to get not only his insurance fast-tracked, but his approval for the transplant list, which usually takes many days to do."

This is the point, though, when Pomfret, who is chief of transplant surgery at UCHealth, thought about a lecture that Monica Grafals, MD, associate professor of clinical practice in the CU School of Medicine and kidney transplant specialist with UCHealth, gave to the CU transplant surgery team about the Hispanic Transplant Clinic.

Grafals and her Spanish-speaking colleagues, with support from Pomfret and the Division of Transplant Surgery, started the clinic in October 2018 in response to significant need in traditionally underrepresented Hispanic communities. Between October 2018 and October 2021, clinic faculty saw a 300% increase in Hispanic patients accessing clinic services.

"When Dr. Grafals came and spoke to the transplant team, she was focusing on kidney patients, but I was thinking this would be applicable for patients with liver failure," Pomfret says. "That's when the head of transplant hepatology said, 'We've got a guy who's been sitting in the hospital here for the past two weeks, he has acute liver failure, but he seems fine from all other perspectives.'"

MULTIDISCIPLINARY APPROACH

Pomfret credits a multidisciplinary approach to patient care for the next steps in Carrasco's journey. She asked Grafals whether Carrasco could enroll in the Denver Health Medical Plan's Elevate Exchange, a local, nonprofit health insurance company that is part of the Colorado health insurance marketplace. "This is why integrated, multidisciplinary programs are so vital for the best patient care," Pomfret says.

Working closely with Grafals and other team members from the Hispanic Transplant Clinic, Carrasco's family dove into the paperwork with a fervor fueled by the seriousness of his situation. Grafals even contacted state legislators to ask whether there was any reason his insurance application couldn't be expedited.

"He's a wonderful man with a very special and loving family," Grafals says. "We wanted to do absolutely everything we could do help him because his situation was desperate. He was in acute liver failure."

The definition of acute liver failure "is you have a 90% chance of death very soon, sometimes within days," Pomfret explains. "That's where he was at. I never thought we'd get a deceased liver in time, so we were looking into whether there was somebody from the family who could donate."

But thanks to expedited paperwork, Carrasco was able to access Elevate Exchange coverage and get onto the liver transplant recipient list. Within 45 minutes of getting on the list, as Carlos Carrasco was filling out some final paperwork, "I heard about this liver," Pomfret says.

It was a deceased donor liver, and it was already in Denver but the initial intended recipient either wasn't healthy enough for transplant or had died before receiving it. It was a match for Carrasco.

"It was like hitting the lottery," Pomfret says. "It's a case of one in a billion odds, the stars aligning, and everything falling into place: the fact that the insurance was fast-tracked when often that process can take weeks, the expedited process for getting him onto the transplant list, and then how fast he matched with a donor liver. He was almost out of time when I got the call about this liver. I said, 'Great, we'll take it' and within an hour of him getting on the list, we were heading into surgery."

Mario Carrasco enjoys spending time with his family in the mountains near his Delta, Colorado, home.

BACK TO NORMAL AND FEELING GRATEFUL

Carrasco's recovery was occasionally painful, and he spent the month following his surgery at a family friend's Denver apartment, but "he's been an absolutely wonderful patient," Pomfret says. "He's very aware of the significance of this donation."

Clinicians trace Carrasco's acute liver failure to the antibiotics he took, which is an unusual outcome, Pomfret says, "but happens a few times a year, and it's not because the antibiotics he took were from Mexico. It happens with FDA-approved antibiotics, too."

While Carrasco has made changes to his diet – limiting foods that don't react well with his medications – and has blood work performed every two weeks, he's returned to normal for the most part. He's back at work in construction, back to playing basketball in the evenings, and "feeling grateful to God and to my family," he says.

When he was so sick in the hospital, family members who were unable to enter due to COVID-19 restrictions waited in a hospital courtyard, sometimes as many as 20 people who love him.

"I'm very thankful for that," he says. "This whole experience has made me so grateful for all the doctors, all the staff in the hospital, who supported me and my family."

EACH DAY IS A GIFT

Expert care gives Connie Walters extra years to celebrate life

By Rachel Sauer

Ross Camidge, MD, PhD

At her lowest point, after hearing there wasn't much more that medicine or science could do for her, Connie Walters asked her best friend and ex-husband, Abel, to stay with her overnight. She wasn't sure she would wake up, and she didn't want to die alone.

A part of her was ashamed she had lung cancer and embarrassed to admit her diagnosis to anyone because "a lot of times people want to say something negative or ask what you did to get it. If you smoked, there's this sense that you deserve it.

"I smoked for 40 years, and even though I quit the day I got diagnosed, there were times I'd think I brought this on myself. People would say, 'Don't be like Connie,' and that made me feel really ashamed."

After three rounds of chemotherapy beginning in June 2012, Walter had reached a point of resignation. She was coming close to accepting what felt like the inevitable end of her life.

However, in one final attempt to help, her oncologist referred her to University of Colorado Cancer Center member Ross Camidge, MD, PhD, professor of medical oncology.

Camidge and the multidisciplinary team that accepted Walters as a patient decided to perform another biopsy to get a bigger sample of the dominant mass in her right lung. Markers of specific mutations or other genetic changes driving some lung cancers have transitioned the care of advanced lung cancer in recent years. However, most of these tend to occur among non-smokers who get lung cancer.

Testing on Walters' previous biopsy had not shown any of these specific markers, but the sample they tested had been very small. "We wondered if something had been missed, so we thought it was worth another look," Camidge says. Results from the new biopsy showed that Walters' cancer was ALK positive. Her cancer cells had acquired a break in the anaplastic lymphoma kinase gene. She had not been born with it, but this new change in some of her cells would turn out to be the ringleader of her particular cancer.

ALK positivity is rare in lung cancer in general — it is seen in one of every 20 cases — but it is even less common in someone with a significant smoking history.

"When ALK was first discovered in the late 2000s, some big cancer centers advocated to only test for it in people with lung cancer who had never smoked. We ignored that approach from the start," Camidge explains. "It's important that we treat every patient without judgment. With Connie, we did not want to judge a book by its cover. We just said, 'Let's give her the benefit of the doubt.' The fact that she tested positive for the ALK change is one of the reasons why we shouldn't let prejudices interfere with who we do tests on."

DIAGNOSED WITH LUNG CANCER

For a long time, Walters didn't have time to slow down and think about how it was getting harder and harder to catch her breath. For decades she was the lady at Denver International Airport who wore many hats, from working in accounts for the companies that operated the airport's restaurants and bars to repairing cash registers and leading training in customer service.

She was raising a son and a daughter — Brandon and Autumn, both now adults — and setting up her own cash register repair business while being on 24-hour call for repairs at the airport. She was one of just a few women in Colorado who repaired cash registers. It was busy and high-stress, but she enjoyed the work and the financial independence it allowed her and her family.

Through the first months of 2012, though, she noticed it was getting more and more difficult to walk the airport's long hallways and concourses. It got to the point that she was having to pause every so often and pant for air, so she scheduled an appointment with her doctor.

She tried not to think about it, but in the back of her mind was a constant reminder that her sister, Debbie, had died at age 47 of lung cancer that migrated to her bones and brain, and that her mother was also battling cancer. Walters had always been a positive thinker, so she tried to keep her mind from going to negative places.

But the first biopsy revealed the news she didn't want: She had lung cancer. "I was in shock, despite my family history," she says. "My whole world kind of stopped. I forgot about the airport, I forgot about fixing registers, I forgot about accounting and data input, my phone ringing nonstop. I gave notice at work because I knew I had to focus on me and on getting better, but part of me thought my life was over."

Connie Walters

Between June 2012 and July 2013, she had three rounds of chemotherapy that exhausted her, caused her to gain a lot of weight, and left her feeling bruised and broken. She felt miles away from the woman who had done every workout with Richard Simmons during her 2003 Caribbean cruise vacation with her mother.

She ended up feeling as though the physical and emotional toll had been for nothing, because the chemotherapy couldn't kill all the cancer. Her previous oncologist, who also treated her mother, had taken treatment as far as he could, but he gave Camidge's card to Walters as one of the last things he could do to help her.

TESTING FOR ALK

"When you first meet Connie, what you notice right away is that she's the most positive person," Camidge says. "One of the things I really like about working with people with cancer is when they're first diagnosed, the relationship is more one-way, more about what we're going to do for them. But over time there's a shift in that, and it becomes more two-way. I get an enormous amount out of interacting with Connie. She makes my day better, she makes all my staff happy, she gives as much to us as we have to her."

The ALK-positive marker in Walters' cancer had only been described in lung cancer a few years previously. Fortunately, the CU team had been involved in the trials that led to the first targeted drugs for treating this subtype of the disease. Because of that involvement, testing for ALK positivity had been part of the cancer center's routine practice for its patients since 2009. Walters started on Crizotinib, the first licensed ALK inhibitor, which had only been approved by the Food and Drug Administration in 2011.

"I knew that this was kind of a 'magic pill,' but they might have hesitated to give it to me because they thought I was on death's door," Connie recalls. "I tried my best not to be on death's door, I tried to sit up straight and have some energy, but I was so sick.

"Dr. Camidge knew I was very ill, but he gave me this pill anyway — they call it a miracle pill — and it brings people back to life who are dying of lung cancer. It brought me back to life, and I was like, 'Oh, my God, I'm alive again, I can function again.' I was so happy and so thankful to Dr. Camidge for that."

A few years later, however, one of the problems with Crizotinib emerged: It couldn't stop the cancer from getting into Walters' brain. Even though the rest of her body was responding to the drug, she developed about 10 sites in her brain that required focused radiation in June 2015.

Three months later, she joined a clinical trial for another, now-approved ALK inhibitor drug called Lorlatonib and has taken it ever since with occasional adjustments to the dose.

A REASON TO BE HAPPY

"The ideal goals of treatment for lung cancer are to achieve perfect control of cancer and perfect quality of life," Camidge says. "It doesn't matter whether we achieve it or not, that's what we're aiming for. So it's not always 'no pain, no gain.' Our approach is to understand both you and your cancer. If we are controlling it, our job is also to manage all the other health issues in your life so you can be a friend and a mother and a companion. We want to give people the opportunity to grow older."

Walters, now 62, laughs that she's gained years she thought she wouldn't have, and with them the various maladies of growing older. She developed diabetes and is working to manage it, as well as other conditions that have limited her mobility if not her positive attitude.

"Each day is a gift," she says. "I have Autumn and my (6-year-old) grandson here with me, and Abel visits every day. I feel blessed that I have my home and I get to be with the people I love. There was a point when I thought I wouldn't get any of this, when they told me it was hopeless, but I'm still here. There's always a reason to be happy."

‘WELL, I GOT IT. LET’S GET RID OF IT.’

Neurosurgery at UCHealth for college student with a rare brain tumor

By Mary Gay Broderick

Jack O’Donnell allowed himself a sliver of cake and the luxury of opening a few gifts on his birthday in February. But he forfeited the typical rites of passage that many of his peers enjoy upon turning 21.

The next morning, Jack would head to the hospital for brain surgery, where doctors would operate to remove a fist-sized tumor that had been discovered just weeks before.

For the Centennial resident and 2019 Eaglecrest High School graduate, the journey from thriving, healthy college junior to thriving, healthy brain cancer survivor has taken him down a path few his age could imagine.

“I never really had any medical problems. I haven’t even had my wisdom teeth out,” Jack said. “Then I went to having to tell my parents: ‘I’ve got an issue – they found a mass in my brain.’”

That mass was oligodendroglioma: a rare, incurable, but operable brain cancer that makes up only 4% of all brain tumors and typically strikes men ages 40 to 60.

“This is a type of brain cancer, but this is a treatable type of brain cancer. We can’t give him a cure, but we can put him into remission,” said Colin Catel, PA-C, a UCHealth physician assistant, who has been treating Jack along with Kevin Lillehei, MD, the neurosurgeon who performed Jack’s surgery at UCHealth University of Colorado Hospital.

LIVING WITH OLIGODENDROGLIOMA

But just as he had the bad luck to be staring down a daunting trial as a college junior, Jack also had the good fortune to have a loving family — his parents and three older sisters who have been at his side — along with highly skilled and caring doctors and staff to treat him.

“We were very fortunate that his tumor was diagnosed quickly and that he received such great medical care,” said Jack’s mother, Maria O’Donnell, a recently retired teacher.

It’s also helped that Jack has looked at cancer as more of a test than a tragedy, a disruption instead of a disaster, a complication not a catastrophe.

“I wasn’t going to let it get to me. When I first learned I had the tumor I was a little like, ‘Why me?’ But then I thought, ‘Well, I got it. Let’s get rid of it,’” he said.

A COMPETITOR’S TREATMENT PLAN

A huge sports fan, especially his beloved Cowboys at Oklahoma State University, where he attends school, Jack understands the components of a good game plan: patience, perseverance and purpose, all of which he possesses in spades.

“I’m just really proud and impressed that he hasn’t cursed his fate or defined himself as a victim,” said his father Casey O’Donnell, an industrial engineer. “He faced it and felt the fear, but then said, ‘OK, what do we need to do about it?’ He’s really grown up in a short amount of time and has handled the whole situation with a lot of courage and maturity.”

Jack is not one to be easily disappointed or dissuaded, more annoyed at the inconvenience and disruption the tumor has brought to his life.

“Everything was totally normal before this happened. I was happy and ready to start out on my own.”

STRANGE SYMPTOMS

Jack is used to upheaval these past few years. In the fall of 2019, he packed up his 2008 red Mustang and headed east on I-70 toward Oklahoma State, where he would pursue a three-year degree in engineering graphics and design drafting. His favorite class in high school had been architecture, and he was always good with his hands, whether it was throwing out a runner when he played third base or working on his computer Photoshop program.

He flourished at OSU, but by spring, the COVID-19 pandemic cut short his time on campus, and like his peers throughout the country, he came home to finish freshman year online.

A summer job at FedEx lasted through the fall as he stayed home and continued school online. He was able to get back to campus to complete

The family dog, Toto, has been a comfort to Jack O’Donnell as he recovered from surgery and radiation just after he turned 21. Jack has learned to live with oligodendroglioma, a rare form of brain cancer. Photo by Sonya Doctorian, UCHealth.

Jack O'Donnell was driving to his college internship in Oklahoma City when pressure from a brain tumor affected the vision in his right eye. An MRI revealed oligodendroglioma. Photo by Sonya Doctorian, UCHealth.

his sophomore year, and after another summer stint at FedEx, he was eager to start his third and last year in August 2021.

When Jack came home for Christmas, all was well. His Cowboys were on a football winning streak, "tearing it up" as he remembers. "It was awesome."

"It was probably the best semester I'd had. School was good. Everything was good."

Not perfect though. He was experiencing strange symptoms: An occasional numbness in his left foot was easy to downplay since it came and went. A strange sensation in his right ear – a "whooshing" sound that was like when he was a child and put a seashell to his ear – was harder to dismiss.

"I could hear the ocean all day, every day."

A trip to the doctor, a diagnosis of plugged sinuses, and a prescription for nasal allergy spray put that worry on the back burner.

But a blind spot in his right eye caused concern for him and his parents. The family thought it might be a sign of migraines, which his mom experiences, or perhaps eye strain and the need for glasses. When it went away the following day, so did their unease.

Plus, there was a lot to be grateful for: a New Year's Day trip to the Fiesta Bowl in Phoenix, where Oklahoma State beat Notre Dame; an upcoming internship at an engineering firm in Oklahoma City; a spring graduation and his diploma.

In mid-January he again packed up his Mustang and headed east on I-70, this time with an air mattress and a lawn chair that comprised the bulk of his apartment furniture. He was excited to head to Oklahoma City for his internship.

"I'm pulling out of my driveway and saying goodbye, which is hard, and it's just when everything started to go haywire."

TROUBLING NEWS

By the time he got to Kansas to stay with a cousin for the night, his right eye "went crazy" and he was seeing multiple images out of it. He finally made it to his destination safely by driving slowly and covering his right eye with his hand, relying only on his left eye. Jack was experiencing a visual seizure.

"It was most frightening drive of my life. It was terrifying."

Still, when he woke the next day to clear vision, he continued his journey to Oklahoma City, settled into his apartment, and began his internship. His first day went well, but on the drive home, he experienced the same strange phenomenon in his right eye.

Then began a series of visits to a local optometrist, an ophthalmologist, a diagnosis of acute optic neuropathy, and a referral for an MRI. That's when he was told he had a large and aggressive mass on the premotor cortex on the front-left side of his brain.

> **"He faced it and felt the fear, but then said, 'OK, what do we need to do about it?' He's really grown up in a short amount of time and has handled the whole situation with a lot of courage and maturity."**

Together with his family, Jack decided to head back to Colorado and the Anschutz Medical Campus, where the reputation of UCHealth and Lillehei, who is chair of the Department of Neurosurgery for the CU School of Medicine, led them for treatment options.

Jack had a "functional MRI," during which a letter was flashed on a screen and Jack would think of as many words as possible that began with that letter. The screen also would flash phrases and he was told to think of the answer. These tests helped neurosurgery providers determine how far they could take the surgery into the tumor without affecting the portion of his brain that controls language.

Jack O'Donnell cruises through his Centennial neighborhood in his 2008 Mustang. At only 21, Jack is learning how to live with oligodendroglioma, a form of brain cancer that can be managed but not cured. Photo by Sonya Doctorian, UCHealth.

Each hemisphere of the brain controls functions on the opposite side of the body, which is why the pressure from a tumor on Jack's left side was affecting his vision in his right eye and his hearing in his right ear. Strangely, Jack never had the usual indicators of a brain tumor: headaches and seizures.

His team was hopeful because the tumor was not touching parts of his brain that regulate core functions, missing the portion controlling language by a hair's breadth.

"Of all types of primary brain tumors, Jack's is one of the most favorable types that is amenable to treatment with a good prognosis," said Catel, who is an assistant professor of neurosurgery at CU School of Medicine.

Waiting was tough on the family. Maria relied on faith, family, and friends and was grateful for Caring Bridge which provided updates on Jack to others. Casey said getting support, educating himself, and connecting with other parents through Oligo Nation were comforting.

For Jack, the countdown was rough: "I was almost numb that whole week. I was just waiting for it to happen. My 21st birthday was brain surgery. Not the most fun birthday I've ever had."

OPERATION AND RECOVERY

During the surgery, Lillehei used images from an MRI done beforehand, along with 3-D images and software that precisely mapped Jack on the operating table, similar to the way a GPS system helps with directions. Using cameras pointed at Jack's face and skull while he was locked into place, this image-guided surgery allowed Lillehei to track Jack's brain on monitors in the operating room in real time.

The surgical team also used sodium fluorescein, a dye that causes cancer cells to glow much more than in normal tissue under a blue light projected from a microscope, which was injected into Jack's brain, Catel said. This procedure makes the tumor tissue visible and distinguishes it from the healthy portion of the brain, so Lillehei could better target cancer cells during surgery.

After a four-hour procedure, Jack woke up and said, "We did it mom, we did it."

Ever the sports fanatic, Jack's goal was to be out of the hospital and in his family's living room to watch the Super Bowl. And two days later, that's where he was.

After recuperating through late March, he began daily five-minute radiation treatments through early May, wearing a custom-made "Darth Vader" mask to protect his face, while joking with the nurses that the machines they used were similar to the CAD ones he uses for his coursework. Simultaneously, he completed a daily oral chemotherapy.

While he has a large, curved scar from his left ear to his forehead and lost his hair temporarily from the radiation, neither is noticeable when he wears his sports cap – along with his huge grin.

BACK TO THE FUTURE

During the next year, Jack will get four MRIs and complete a week of oral chemotherapy each month. In the coming years, he will continue with routine MRIs and similar treatment if needed as his providers monitor his progress. Catel said that could include more surgery, radiation, and chemotherapy.

"He's an amazing young man and he's overcome quite a few challenges," he said.

As Jack has recovered and gained strength back, he was able to hike nine miles at the Aurora Reservoir with his mom on Mother's Day and play pickleball with his dad. His parents are proud of their son for the strength he's shown during the entire ordeal. As for Jack, he's ready to get on with a life that was disrupted — but only temporarily.

And after a trip to Yellowstone National Park to kick off the summer, he again packed up his Mustang and headed to Oklahoma City to begin his internship, along with a postponed graduation and a job once he has his diploma in hand.

Jack said he would love to design an athletic stadium that would stand as his legacy, something future generations of sports fans like himself would enjoy.

"You've just got to have confidence in yourself and put trust in your doctor and have the belief that you will come out just as good as ever on the other side."

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MENTORSHIP FOR THE WIN

Sanjana Bukkapatnam's path to become a physician-scientist

By Greg Glasgow

Sanjana Bukkapatnam scored a victory in April when her paper on glioblastoma research took first place in the National Poster Competition at the American College of Physicians Conference in Chicago.

The win was the culmination of six years of research and mentorship by Sana Karam, MD, PhD, a CU Cancer Center member and associate professor of radiation oncology, that began when Bukkapatnam was an undergraduate at CU Denver.

Bukkapatnam initially started working with Karam as part of the CU Cancer Center's summer fellowship program for undergraduates. The relationship continued while Bukkapatnam earned her medical degree from the CU School of Medicine.

"I frequently refer to her as my second mother, because she really took me under her wing when I joined her lab," Bukkapatnam says. "I was just this undergrad who had really big dreams but didn't know where to go. She challenged me in ways that I needed to be challenged, and in ways that promoted my own self-growth."

WORKING IN THE LAB

Working in Karam's lab, Bukkapatnam began to study a receptor tyrosine kinase family involved in numerous malignancies. She became particularly interested in the role of the ligand ephrinB2 in glioblastoma. One prominent study had demonstrated that it was a tumor suppressor, while another showed that it was an oncogene.

Karam and Bukkapatnam worked on research that showed how ephrinB2 works with its receptor ephB4 to mediate downstream effects on invasion and proliferation in glioblastoma. Depending on the direction of signaling initiated, invasion and proliferation was either promoted or inhibited.

The research, which could contribute to future drug design, won Bukkapatnam first prize in the poster contest. Karam says the award is the result of Bukkapatnam's work ethic and strong interest in research.

"It's also a matter of the persistence that she showed, coming in during winter break, during any school break, holidays, weekends," Karam says. "She did a lot of the research as an undergrad for credit and nonpaid. She has such an incredible dedication to research. This young woman is going to go places; she's going to go on to move needles for our patients."

FROM BENCH TO BEDSIDE

Bukkapatnam became interested in medicine when she had a surgery at 8 years old and realized that "doctors are the people who take the pain away." She was accepted to the CU School of Medicine, and she continued research she started as an undergraduate in Karam's lab.

"She introduced me to the world of cancer biology and how to be a physician and do research simultaneously to provide the best outcomes for your patients," Bukkapatnam says. "In medical school, as I was working with different oncologists during my rotations, it really solidified that this was where I needed to be, and this is the field that I wanted to pursue."

Bukkapatnam graduated in May and is now an internal medicine resident at the University of Texas Health Science Center at Tyler, to be followed by a three-year oncology fellowship. She wants a career like Karam's.

"I definitely want to practice clinical oncology," Bukkapatnam says. "I absolutely adore the patients. I want a very strong clinical practice, but I also want to be involved in conducting cancer research as well. For me, it's like two arms of the same thing. I couldn't just do the clinical aspect, and I couldn't just do the research — I would want to do them together in order to provide the best care for my future patients. Sana has really shown me how you can do that in a very synergistic, beautiful, and seamless manner."

Sana Karam, MD, PhD, and Sanjana Bukkapatnam, MD. Bukkapatnam was a college student when began conducting research in Karam's lab. Last spring, under Karam's mentorship, Bukkapatnam, in her final year of medical school, won first place at the National Poster Competition at the American College of Physicians Conference.

CONNECTING THE DATA

Biomedical informatics will advance patient care through data-driven discovery

By Rachel Wittel

Connecting basic science and medicine with clinical and translational scientists, the University of Colorado School of Medicine introduced the Department of Biomedical Informatics (DBMI) to enhance clinical care through integrated computational technology, laboratory investigations, and artificial intelligence (AI).

The department's faculty examine complex systems in biomedicine using big data to improve patient outcomes on the CU Anschutz Medical Campus. Focused on addressing heath disparities and improving quality in health care, the DBMI is committed to training the next generation of biological and clinical informaticists.

"I like to say we're in the serendipity business. We need to put the right information in front of the right person at the right time to make the best possible decision," says Casey Greene, PhD, founding chair of the DBMI and professor of biomedical informatics at the CU School of Medicine. "There's a lot of opportunity for this on the Anschutz Medical Campus. What we see in the clinic and in basic science research can be connected using informatics technologies to learn from data and make a real, meaningful difference in the world."

Greene was recruited to the CU School of Medicine in 2020 to lead the Center for Health AI, which will remain a pillar of the new department. Leveraging AI and Colorado's diverse population, he and department faculty will have the ability to develop widespread solutions to serve people across the state and beyond.

"If we're going to make a difference, we need scalable, data-driven technology," he says. "Being in Colorado allows us the unique opportunity to work with a variety of clinical settings, from populations living in urban areas to populations living in rural areas. The partnerships that our faculty support with UCHealth and Children's Hospital Colorado broaden our scope to build solutions that serve all Coloradans."

The Department of Biomedical Informatics is the first new department established by the School of Medicine since 2008 when the Department of Emergency Medicine was created.

WHERE TECHNOLOGY MEETS PATIENT CARE

Collaboration with campus partners, hospital affiliates, and departments are integral to DBMI's mission to improve patient care, which has led to the success of numerous projects on the CU Anschutz Medical Campus.

Casey Greene, PhD

Tell Bennett, MD, MS, vice chair of clinical informatics for the new department, received a National Institutes of Health (NIH) R01 Award to develop novel criteria to modernize pediatric sepsis diagnoses and build clinical decision tools to support and improve patient outcomes.

Bennett, also a pediatric ICU physician at Children's Colorado and director of informatics for the Colorado Clinical and Translational Sciences Institute (CCTSI), has also developed a COVID-19 dashboard that uses real-time electronic health records to predict decisions around the need for crisis care. He says the dashboard has been used by federal policymakers to make decisions about the pediatric COVID-19 response.

"One thing I have worked really hard to establish as part of the culture in this area of work is that we are folks who get things done to completion so they can translate to patients," Bennett says. "We have the patient in mind, and we build tools focused on their needs, as opposed to stopping short of deployment, which is quite common."

Bennett and Greene hope the momentum behind these initiatives translates to the expansion of their team.

"I see us as a bridging unit," Greene says. "The nature of our discipline is inherently about finding these undiscovered connections, and I think we're better when we establish strong links. It's in our ethos as to how we recruit and build our faculty as well."

"We're going to be a unified academic home for people who work in biomedical informatics and across a few different silos," Bennett adds. "We'll come together with the infusion of new people, allowing us to grow the department's breadth of expertise and our potential for impact on health care systems."

“We hope the department itself will position us for national leadership in the years ahead and become a model for academic units elsewhere.”

CLOSING GAPS IN BIOMEDICAL INNOVATION

Cultivating the next generation of biomedical informaticists from multiple areas of expertise, backgrounds, and skillsets is not only beneficial for patient outcomes, but is critical to advancing equity in the field.

“Deployments of AI come with a significant risk of increasing disparities,” Greene says. “Although the use of AI has spread significantly in recent years, the field lacks diversity and risks the reinforcement of harmful biases in the way data is collected, algorithms are developed, and findings are interpreted. As a department, we acknowledge the responsibility we have to change course by supporting a diverse faculty who do research in partnership with affected populations.”

To dispel these risks, DBMI leaders emphasize the importance of building trust. Ivana Yang, PhD, vice chair for faculty equity and advancement in the DBMI and professor of biomedical informatics and medicine in the CU School of Medicine, believes this begins with supporting the success of individuals within the department.

“We are launching the DBMI with a talented faculty who have diverse backgrounds and come from areas of research and education spanning the fields of biomedical informatics and personalized medicine. We will have opportunities to recruit additional talent to help us achieve our vision,” Yang says. “I have been at the University of Colorado for more than 10 years, and I’m thrilled to see this new department bring together informaticists from across our campus to work together.”

Having a comprehensive team in place lays the foundation for the department to elevate the involvement of diverse populations in its research and development of equitable solutions. Katrina Claw, PhD, an assistant professor in the DBMI and the Colorado Center for Personalized Medicine (CCPM), is already pursuing such research, studying pharmacogenomic approaches to drug metabolism in American Indian and Alaska Native People under an R35 Genomic Innovator Award. She’s utilizing an ethical, community-engaged framework to deepen research partnerships with Indigenous communities.

“Already, the DBMI has been supportive of my work with Indigenous communities in acknowledging that tribal sovereignty is an integral component to community-based participatory research and in thinking about how data is stored and used,” Claw says.

The DBMI is also partnering with the CU Anschutz Office of Diversity, Equity, Inclusion (DEI) and Community Engagement and the CU School of Medicine DEI Committee to establish policies and best practices for education and employment opportunities to succeed.

“In DBMI, we have the opportunity to build a supportive environment for faculty to do impactful research and teaching that fundamentally alter how we use data nationwide,” Greene says. “Starting a department provides a unique time to reflect on our missions as educators, clinicians, and researchers and to construct policies that advance these missions. We hope the department itself will position us for national leadership in the years ahead and become a model for academic units elsewhere.”

FROM FRIENDS TO GLOBAL PARTNERS

Rwandan heart surgeon visits CU Department of Surgery

By Rachel Sauer

Before Maurice Musoni, MD, completed his surgical training in South Africa, his home country of Rwanda had no cardiothoracic surgeon.

This was a concern for many reasons, especially with the continuing prevalence of rheumatic heart disease among Rwandans age 12 to 40. This debilitating, sometimes fatal condition is caused by untreated infections, such as strep throat or scarlet fever, that permanently damage heart valves.

In high-resource countries, these infections are commonly treated with antibiotics and rarely lead to rheumatic heart disease. But in sub-Saharan African nations, it's much more common for untreated infections to cause the disease.

So, Rwanda needed a heart surgeon, and in 2019 Musoni returned home after completing his training in South Africa. Due to the significant weight of the responsibility he carries, he has continually sought opportunities and partnerships with clinicians around the world to grow and strengthen Rwanda's capacity for treating cardiac conditions and diseases.

FROM FRIENDSHIP TO GLOBAL PARTNERSHIP

One such partnership is with the University of Colorado Department of Surgery. Yihan Lin, MD, MPH, a recently graduated cardiothoracic surgery fellow in the department, met and became friends with Musoni while completing a two-year Paul Farmer Global Surgery Research fellowship in Rwanda through Harvard Medical School.

Maurice Musoni, MD, completed training at the University of Witwatersrand in Johannesburg, South Africa.

Inspired by their collaboration in Rwanda, Lin began working with colleagues in the CU Department of Surgery to establish a two-way knowledge- and skill-sharing relationship between clinicians in Colorado and Rwanda.

Last summer, Musoni and his wife, Diane Umulisa, MD, a hematology resident, a hematology resident in Tanzania and at the Rwanda Military Hospital in Kigali, spent a week on the CU Anschutz Medical Campus with CU Department of Surgery colleagues – observing procedures, attending presentations, and meeting with program administrators.

"There's a lot to learn from programs and processes here (in Colorado)," Musoni says. "Now I'm thinking about how we build programs in Rwanda that are not a duplicate of the program here, but that adapt what works well for our context. I'm thinking about how we can do it cheaper, how we can design quality surgical programs with fewer resources."

LEARNING FROM EACH OTHER

Before Musoni decided to pursue medicine, the nearest example to the profession he had in his family was an uncle who is a veterinarian. The genocide against the Tutsi in 1994 had completely decimated the health care infrastructure and the country lost a big proportion of their human resource. Rwanda was rebuilding steadily and Musoni intended to be part of that renaissance.

Musoni decided to become a doctor, and two of his brothers followed his example. He earned his medical degree at the University of Rwanda, but opportunities to train as a cardiothoracic surgeon were not available. Therefore, he was sent to train at the University of Witwatersrand in Johannesburg, South Africa. While completing his fellowship, he also began establishing his role as a clinician in Rwanda, which is how he met Lin.

Lin lived in Rwanda for two years while completing her global health fellowship, and there she saw the need for knowledge- and skill-sharing between clinicians from high-resource countries and medium- and low-resource countries.

"I think the world is becoming smaller," Lin explains. "There are so many things we can learn from our colleagues working in lower-resource settings. So often, they're much more adaptable and resourceful in working within their means, and I think there are lessons we can learn from each other from multiple standpoints."

IMPROVING EVERY LIFE

Several years ago, Lin and about 65 colleagues from the CU Department of Surgery ran a marathon to establish a fund that would support Rwandan clinicians visiting Colorado.

"We previously had residents from CU go to Rwanda for rotation, but it's important that this isn't a one-way relationship with just us going there," Lin says. "Because travel from Rwanda to the U.S. can be very expensive, we wanted to establish a fund to support clinicians coming here."

Richard Schulick, MD, MBA, chair of the Department of Surgery, adds,

Maurice Musoni, MD, and Diane Umulisa, MD

"Our health care system in the U.S. is far from perfect, but we certainly have the ability and responsibility to collaborate with other countries to assist in establishing their health care structures, increase their capabilities, and train their future caregivers. This is totally consistent with our vision to 'Improve Every Life.'"

For Musoni, an international approach to surgical practice has been an important facet of his career. He serves as a clinical team coordinator for Team Heart, a Boston-based nonprofit organization established after the Rwanda Ministry of Health asked in 2007 for the international medical community to assist in addressing the growing issues of non-communicable disease.

Through Team Heart, medical groups from around the world come to Rwanda to work on-site with Rwandan medical colleagues in addressing medical issues stemming from limited access to health care. Team Heart volunteers work with Rwandan colleagues on issues related to rheumatic heart disease.

Musoni says collaborations with colleagues from around the world have helped him and other clinicians on the vanguard of Rwandan health care see examples of programs they can adapt to the needs of Rwandans and modify to the country's available resources. While Musoni's surgical practice is based at King Faisal Hospital Kigali, he is working with colleagues to set up an anti-coagulation clinic, as well as to expand access to surgery that replaces damaged heart valves with artificial ones.

CREATING SUSTAINABLE PROGRAMS

"Cardiac surgery is extremely expensive, but expense can't be the ultimate concern," Musoni explains. "Our goal is to save lives, so as our cardiac program grows, we're asking ourselves how we can be more efficient, how we can do more with the resources we have. In that way, we can serve not only Rwanda, but the area around us."

In his role as Rwanda's only cardiothoracic surgeon, Musoni divides his time between the operating room and the seemingly endless list of administrative tasks, planning, and advocacy that attend his role in leading the establishment of cardiac programs in Rwanda.

Visiting the CU Department of Surgery is valuable not only in observing procedures and building relationships, he says, but in talking with administrators about creating sustainable frameworks for cardiac programs. He is especially passionate about building programs in Rwanda that allow medical students and surgical trainees to receive their education in-country.

"It's easy to become so focused on the daily work of being a doctor that we forget about trainees," Musoni says. "But it's absolutely essential that we are able to produce the next generations of surgeons, so now we're thinking about what it will take for us to do that."

CU DOCTOR PROVIDES CARE IN COMBAT ZONE

Dave Young, MD, helps Ukrainians displaced by war

By Greg Glasgow

After Russia's invasion of Ukraine in February, Dave Young, MD, from the University of Colorado School of Medicine, joined hundreds of medical professionals from around the world looking for ways to help displaced Ukrainians.

"I feel like I'm a pretty well-trained and capable emergency medicine provider, and I've been entrusted with a lot of the skills that I've been taught," says Young, assistant professor of emergency medicine. "This felt like a way to pay it forward for people who had believed in me and pushed me along this path. It felt right to use the skills that I've been given to be able to help."

Young connected with Team Rubicon, an American organization that arranges disaster-relief efforts, and in April he flew to Krakow, Poland, as part of a medical team with another doctor, three nurses, and four paramedics. Days later they were in Ukraine, providing medical care to people who had fled their homes and were living in shelters.

"We had backpacks and bins full of medicine and medical equipment, and we were delivering care on the spot," Young says. "Anybody who was more complicated, we would work with local hospitals and other resources to coordinate or care for them."

The team treated viral illnesses, sprains and bruises, chronic obstructive pulmonary disease and hypertension.

"We saw some people with very recent surgical procedures who had no follow-up because the surgeries were not related to trauma; they were related to underlying medical conditions," Young says. "They needed drains taken out of them or they had sutures in their abdomen, but they were unfortunately 1,000 miles away from their hometown or their medical providers and didn't know how to access medical care."

As they treated patients in Lviv and nearby towns, Young and the team encountered many grateful Ukrainians. To his surprise, he also talked to many who were concerned about his safety.

"A question that I got all the time from patients was, 'Why are you here? Don't you know that it's not safe?' That speaks a lot to the character of people of Ukraine," he says. "They were very surprised that the medical team that I served on would come so far to help, despite the risk."

TEACHING OTHERS TO PROVIDE CARE

Another surprise was that Young spent nearly as much time teaching as practicing medicine. His experience was in demand with local medical universities, hospitals, and paramedic training schools. Students he trained were preparing to go directly to the battlefield. In addition to trauma and resuscitation care, he addressed chemical warfare and blast injuries.

"I'm an educator at the University of Colorado School of Medicine, so I feel comfortable talking and presenting, but these were not topics I would say that I'm an expert in," Young says. "I did a lot of work while I was there — tons of reading, lots of research — but it was a little nerve-racking to talk about a subject matter I don't feel terribly expert in, and also to speak about it in Ukrainian. I had an interpreter with me, and I would say a few lines, and then he would interpret what I was saying."

In addition to providing medical care to Ukrainians displaced from their homes last April, Dave Young, MD, assistant professor of emergency medicine, conducted research to teach care practices to local medical professionals.

Young spent three weeks in Ukraine, and he says that when he returned to Colorado, he had a new perspective on his role.

"A lot of times when you work in the same place, and you have your nose to the ground as you work shift after shift after shift, you can lose a little compassion," he says. "This experience really reminded me what I love about medicine and what a gift it is to be able to treat people and help them through a medical issue. You could really see the gratitude of some of the Ukrainians that we treated, and I came back feeling reenergized and grateful for the skills I have."

PHYSICIANS IN SPACE

Program with CU Boulder to give medical students training for spaceflight

By Greg Glasgow

Space needs doctors, and a new joint MD-MS degree program between the University of Colorado School of Medicine and the Department of Aerospace Engineering Sciences at CU Boulder is aimed at giving medical students the skills they need to advance human spaceflight.

"The aerospace field is growing massively, especially in Colorado," says Allie Anderson, PhD, assistant professor of aerospace engineering at CU Boulder. "The demand is definitely outpacing the supply. There are other engineering programs out there that include bioastronautics, but this new joint program puts a particular emphasis on creating a physician who's equipped with a medical degree as well as engineering knowledge."

Anderson and Ben Easter, MD, designed the new MD-MS program, based on Easter's experiences as an assistant professor of emergency medicine. The new program expects to start accepting applications this fall and launch officially in fall 2023.

"To succeed in human spaceflight, you really need to understand both ends of the equation — to understand the engineering and the spacecraft system side, but also to understand humans and their interactions with those systems," Easter says. "We've found that people traditionally have training on one side of that, but they don't necessarily have expertise in both. This new joint degree program is focused on training students to understand and speak the language of medicine and of engineering."

UTAH TRAINING STATION

The new program has its roots in Medicine in Space and Surface Environments (MiSSE), a three-year-old course designed by Easter and his colleagues. That three-week class takes students into the Utah desert each spring to practice their skills at the Mars Desert Research Station. In an environment with some similarities to the surface of the Red Planet, students navigate rugged topography and rapid-fire event simulations, organize into teams, and solve cascading problems, all the while racing the clock to save injured and ill crewmates.

"The idea is that you live as a crew in a remote environment that is analogous to Mars," says Easter, who also is the deputy element scientist in NASA's Exploration Medical Capability, part of the space agency's Human Research Program. "You close the hatch, and then for the next two weeks, the only time you go outside is under the simulated conditions as if you were actually on the surface of Mars."

MiSSE will be one of the courses in the new joint-degree program, a five-year curriculum that enhances the traditional four years of medical school with one additional year on the Boulder campus, where students earn a master's degree in aerospace engineering, with a focus in bioastronautics, the study and support of life in space.

Faculty at CU School of Medicine and CU Boulder are developing a program that will give medical students a chance to earn an MS degree in aerospace engineering from CU Boulder. The program builds on a three-week course that takes students to the Utah desert to simulate providing care on Mars.

"They'll do the first few years in medical school, take a one-year break to go to Boulder and complete the aerospace engineering side, then come back to finish their medical education," Easter says. "We also will support them doing electives at government agencies or commercial spaceflight companies."

CU NEXT AWARD

Easter and Anderson received a CU Next Award, a grant that helps faculty members working on an intercampus collaboration to purchase technology.

The award will help them to improve the technology and equipment at the desert research station and to create two new tech-focused courses around medicine and human spaceflight.

One course is a graduate-level engineering project tasking students with designing a simulated sick bay in the Utah desert; the other is an elective for first-year medical students introducing the challenges of medical care in extreme environments, including human spaceflight.

"It will be about changes in physiology in extreme environments, and understanding how to provide medical care in an operational setting," Easter says. "It also will teach the students a lot about their interactions with technology as clinicians, and how that interacts with telemedicine. If you're a clinician who's caring for patients millions of miles away, that's a very different experience of providing care than it is at the bedside."

ALUMNI CORNER

CONGRATULATIONS TO THE CLASS OF 2022

The University of Colorado School of Medicine Hooding & Oath Ceremony was held on Friday, May 27, 2022, at Boettcher Commons. The 181 graduates and their families celebrated at a ceremony held on the Anschutz Medical Campus. The Class of 2022 was tested during the pandemic, and they persevered and remained resilient. The CU Medical Alumni Association and CU Alumni Relations Office expresses gratitude to graduating student representatives on the CU Medical Alumni Association Board of Directors: Emily Wolverton, MD '22, and Casey Weinstein, MD '22. Wolverton is a resident physician at Oregon Health & Science University in obstetrics and gynecology. Weinstein is a resident physician in anesthesiology at the University of Arizona.

Emily Wolverton, MD

Casey Weinstein, MD

Taylor Triolo, MD '13

EVENING AT THE BALLET

The CU Medical Alumni Association hosted "An Evening at the Ballet," which was attended by more than 115 alumni, students, residents, faculty, staff, and guests. The evening included a reception and performance of the Wizard of Oz, presented by the Colorado Ballet. Taylor Triolo, MD '13, president of the Medical Alumni Association Board of Directors and an assistant professor of pediatrics at the CU School of Medicine, welcomed guests. Medical student Caitlin Ritz thanked alumni supporters. The Medical Alumni Association has hosted an annual cultural event for more than five years and offers its thanks to the subcommittee chaired by Jan Kief, MD '82, for helping choose this year's cultural event.

WAYS TO GET INVOLVED

There are many ways for alumni to get involved with the school, current medical students, and housestaff.

- Join the CU Medical Alumni Association Board of Directors.
- Participate in committees, including engagement and activities, fundraising, and awards and nominations.
- Mentor a medical student and help with community projects through the Innovations in Medical Education initiative.
- Becoming a FirstUp mentor for a medical student
- HOST – Help Our Students Travel – Open your home to a fourth-year medical student during residency interviews, or set up a virtual meeting to talk with the student about the residency program or area..
- Volunteer as an admissions interviewer of prospective medical students.
- Speak to medical students about your specialty and practice setting.
- Become a preceptor to encourage problem-solving and reasoning skills.

These are just a few ways to get involved with the CU Medical Alumni Association. For more information or to get involved, please contact Director of Alumni Relations and Advancement Vanessa Duran at Vanessa.Duran@cuanschutz.edu.

BOARD OF DIRECTORS

The CU Alumni Relations Office and Office of Advancement thanks the CU Medical Alumni Association Board of Directors. The board advances the interest of our alma mater, supporting current medical students, and providing opportunities and programming for alumni to connect. The board welcomes Michael Piel, MD '69, and thanks Tristan Dear, MD '18, for her service.

Dennis Battock, 1964, MD
John Bell, 1965, MD
Laurence Chan, MD
Audrey Corson, 1982, MD
Donald Crino, 1991, MD
Mark Goncalves, 1982, MD
Srinivas Iyengar, 2001, MD
Denis Keleher, 1964, MD
Jan Kief, 1982, MD
Diana Lujan, 1985, MD
William Maniatis, 1965, MD
Sarah Milliken-Glab, 2008, MD
Nia Mitchell, 2010, MD, MPH
Theodore Ning, 1975, MD
Gina Nelson, 1994, MD, PHD
Jessica Parr, 2016, MD
Robert Rigg, 1982, MD
Matthew Rustici, 2008, MD
John Sharp, 1967, MD
Jessica Smith, 2020, MD
Taylor Triolo, 2013, MD
Linda Williams, 1984, MD

Housestaff and Medical Student Board Representatives:

Alexzandra Adler, PGY3
Cate Alder, MS1
George Burnet, MS2
Kylene Desmith, MS1
Elena Gandara, PGY4
Ashlyn Richie, MS2
Caitlin Ritz, MS3
Shilpa Tummala, MS3

White Coat and Matriculation Ceremony

The University of Colorado School of Medicine welcomed 184 medical students at the matriculation ceremony on July 29, 2022. CU School of Medicine alumni joined in the event, distributing new stethoscopes to the medical students. The gifts were made possible thanks to donations by more than 140 alumni. Thanks to our generous alumni who support these gifts. If would like to donate to the stethoscope fund, please contact Director of Alumni Relations and Advancement Vanessa Duran at Vanessa.Duran@cuanschutz.edu.

CU Medical Alumni Association Awards

Congratulations to the following alumni on being selected for the 2022 CU Medical Alumni Association Awards:

- **Silver and Gold:** Michael Carius, MD '73
- **Richard Krugman Distinguished Service Award:** Jan Kief, MD '82
- **Distinguished Achievement:** Hajar Al Binali MD '73
- **Humanitarian:** Eugene Pflum MD '69
- **Recent Graduate Achievement Award:** Anireddy Reddy, MD '16
- **Recent Graduate Humanitarian Award:** Lesley Brooks, MD '08

These awardees will be recognized at the Silver & Gold Alumni Banquet in October.

Lisa Neal-Graves to Lead Aurora Wellness Community

Lisa Neal-Graves has been named CEO of the Aurora Wellness Community (AWC), a partnership between the CU Anschutz Medical Campus and the Aurora community that aims to improve access to primary care for underserved populations in Aurora. The center also will offer services to promote physical, mental, and financial well-being within the community, with a particular focus on housing, food security, generational care, community building, and connection.

Neal-Graves has served as chief innovation officer for the Colorado state Attorney General's office, director of technology insights for Intel Corp., and vice president of the Cloud Strategic Product Group at Zayo Group in Boulder. Neal-Graves, who grew up in Denver, has a BS from Hampton University in Virginia, master's degrees from Michigan State University and the University of Colorado, and a JD from the University of Colorado School of Law.

Lisa Neal-Graves

"The vision for the AWC is to build health, wealth, and well-being in Aurora," Neal-Graves says. "It's about providing services for the whole person, including health, wealth-building, and an infrastructure to support community navigation to services needed for general well-being. To enable new residents, when they come into the community, to know where they can go to find a primary care provider, and if needed, a job and other useful services.

"If we do this right," she adds, "we will create a model that can be used nationally for areas that are similarly situated."

Students and faculty members from across CU Anschutz, including the CU School of Medicine, will provide care at the AWC. The center also will have a focus on wealth-building in the community through co-ops, small business accelerators, and other local entrepreneurship and ownership opportunities that foster community wealth.

In addition to its immediate impact on the Aurora community, AWC leaders say the project will benefit future health care professionals by giving them an introduction to community-based medicine.

"We want to provide a training environment that gets learners excited about potentially practicing in that setting," says Anne Fuhlbrigge, MD, senior associate dean for clinical affairs. "Having a training site, as well as a clinical site, is a way to foster interest in health care careers."

CU Researchers Awarded Grant for Musculoskeletal Research Training Program

Researchers from the University of Colorado School of Medicine have been awarded a federal grant to run an interdisciplinary training program in musculoskeletal research. The award provides $1.58 million in funding to support four predoctoral students and two postdoctoral trainees over the next five years.

The program directors are Michael Zuscik, PhD, and Karin Payne, PhD, who are researchers in the Department of Orthopedics on the CU Anschutz Medical Campus. The program will include 29 faculty members from 18 departments, divisions, and centers on the four campuses in the CU system.

"This grant will help us build on the cutting-edge research we're doing, with a common goal of supporting education," says Zuscik, who is the Mack Clayton Professor of Orthopedics, the department's vice chair of research, and the director of the Colorado Program for Musculoskeletal Research. "We hope to eliminate barriers and make stronger connections between faculty members. Creating new research happens when faculty have interactions in ways that might not otherwise happen."

The new training program, funded by the National Institutes of Health's National Institute of Arthritis and Musculoskeletal and Skin Diseases, will be the only such program in the Rocky Mountain region. It will provide formal educational components, including a musculoskeletal science curriculum, a visiting scientist seminar series, work-in-progress meetings, and an annual symposium. The programming will pair trainees with mentors providing training from bench to bedside.

New Diploma Program Trains Clinicians in Climate Medicine

A new diploma program in the University of Colorado School of Medicine Climate & Health Program will train clinicians to advocate for climate-resilient policies, address environmental justice issues, and lead health care systems in decarbonization and resiliency.

The Diploma in Climate Medicine welcomed its first cohort at the end of September, training clinician participants over a two-year, five-certificate diploma course in sustainable hospital systems, disaster response and recovery, community resilience, foundations in climate medicine, and global challenges.

The diploma program, which is open to physicians, nurses, pharmacists, and other clinicians, was developed over many years and with input from partners of the Climate & Health Program.

In the first unit, they will work with scientists at the National Center for Atmospheric Research (NCAR) in Boulder "which will give them a 360-degree perspective on where the science comes from, how we translate earth science into our understanding of weather, and from

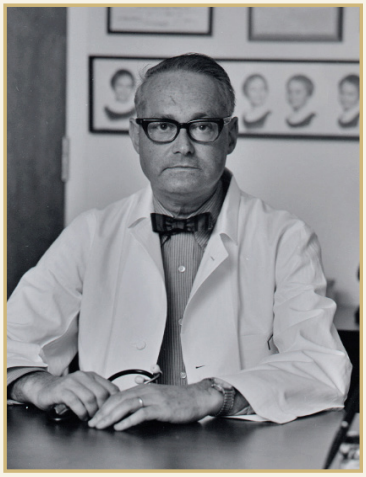
that we begin to talk about the impacts of extreme weather events on human health," says Jay Lemery, MD, co-director of the CU Climate & Health Program and a professor of emergency medicine in the CU School of Medicine.

That same week, participants will spend two days at Rocky Mountain National Park to meet with a ranger who will discuss climate degradation on otherwise pristine ecosystems.

In other units, participants will visit Disaster City at Texas A&M University, a manmade environment that can be used to simulate disaster scenarios and how extreme weather events cause or exacerbate them. They also will partner with the organization Health Care Without Harm for a deep dive into hospital system sustainability and resiliency.

Participants who represent a broad spectrum of health care will contribute an important diversity of perspectives to the diploma program, "which is important because it's addressing one of the most important health care crises of the next century," says Lemery. "It's vital that we scale up the health care workforce who are credible leaders in our communities, our organizations, in our society."

Kempe Center Marks 50 Years of Protecting Children



C. Henry Kempe, MD

Since it was established in 1972, the Kempe Center for the Prevention and Treatment of Child Abuse and Neglect has been providing research, training, education, and innovative program development to address child abuse, neglect, and trauma.

Originally known as the National Center for the Prevention and Treatment of Child Abuse and Neglect, the center was founded by C. Henry Kempe, MD, with his wife, Ruth Kempe, MD. In 1962, Henry Kempe and colleagues published a groundbreaking study, "The Battered-Child Syndrome," that called on physicians to recognize cases of abuse and to always act to protect the child.

Kempe had fled to the United States from Germany during the rise of the Nazi Party in the 1930s, and after earning his medical degree he became the youngest chair of the Department of Pediatrics. Kempe's work led to the passage of the 1972 Colorado law requiring legal counsel for the child in all cases of suspected abuse.

"The Kempe Center helped to change the culture of children's rights in our country and worldwide," said Annie Kempe, one of Kempe's daughters and a retired occupational therapist in Santa Barbara, Calif.

Her father felt a personal responsibility to all children and encouraged all citizens to share in that responsibility, Annie Kempe said. "He would say, 'They are all our children.'"

Simulation Training to Address Health Care Inequities

For residents training in specialties such as internal medicine, pediatrics, and emergency medicine, hands-on training is vital when it comes to practicing skills like stabilizing an airway or taking a patient's medical history. When it comes to diversity, equity, and inclusion, however, training often occurs in a classroom or online, rather than with real-world experience.

To address that training gap, Jacqueline Ward-Gaines, MD, assistant professor of emergency medicine, in collaboration with the Center for Advancing Professional Excellence (CAPE), created an immersive simulation to teach emergency medicine residents the basics of health equity, from microaggressions and implicit bias to language barriers and mistrust of doctors.

In the program, residents are confronted with situations they are likely to face in the real world — treating a transgender patient using the correct pronouns, using a translator to communicate with a patient who only speaks Spanish — receiving feedback from instructors and peers on their performance directly after the simulation.

"We wanted to develop a curriculum on all of the things that were traditionally missed in health care, and as part of that curriculum, we wanted to give the residents an opportunity to actually exercise those skills that they've learned," Ward-Gaines says. "We tell people how to upstand and how to battle microaggressions, but they never get a chance to practice that. In any true curriculum, you have to have the ability to practice skills."

The curriculum Ward-Gaines developed is expanding further within the CU School of Medicine with a $20,000 grant from the Alliance for Academic Internal Medicine, the American Board of Internal Medicine (ABIM), the ABIM Foundation, the American College of Physicians, and the Josiah Macy Jr. Foundation.

"We're going to pilot this with a larger group of residents and inter-professional students. Our big goal is to create something for the entire CU Anschutz Medical Campus," says Julie Venci, MD, associate professor of medicine who oversees the grant. "We're trying to figure out how to get not only residents involved, but medical students, nursing students, physician-assistant students — all the people who are actually patient-facing providers."

RARE SURGERY HELPS CU FACULTY MEMBER

Moksha Patel, MD, sought deep brain stimulation to help escape OCD

By Kelsea Pieters

Moksha Patel, MD

Moksha Patel, MD, is a busy man.

He recently finished a fellowship in the Division of Hospital Medicine at the University of Colorado School of Medicine where he is now a senior instructor.

He's also been appointed lead physician informaticist for the Institute for Healthcare Quality, Safety, and Efficiency at CU Anschutz and is working toward an MBA at CU Denver.

Patel is thriving professionally and personally, with lots of friends and a full life.

He's also making up for lost time. Time when he was a prisoner of his own mind, shackled by severe obsessive-compulsive disorder (OCD), a brain condition in which unwanted, intrusive, and repetitive thoughts cause significant distress and obsessive behavior.

Persons with OCD attempt to alleviate the anxiety, fear, or disgust brought on by these obsessions by performing compulsive mental or physical rituals.

For Patel, who has had the disorder since he was a child, the obsessions remain. But after undergoing rare deep brain stimulation surgery for OCD at UCHealth University of Colorado Hospital on the Anschutz Medical Campus, a procedure most often used to treat Parkinson's disease, his symptoms have lessened significantly.

And he is slowly taking back his life.

"It's not gone, but it's so much better under control," Patel says. "I almost felt like I was suffocating in my own thoughts and then compulsions would take over. They still come but they're quieter and less frequent."

His disorder manifests in germaphobia and fear of contamination, mostly from public restrooms. He would take long showers and scrub his skin raw, sometimes using harsh chemicals to feel clean. These rituals consumed most of his waking hours when he was not working.

"The physical toll of my cleaning rituals was unbearable," he says. "It would burn my skin and takes hours out of my day, every day."

And then there are the emotional, social, and mental tolls. Patel hasn't visited his grandmother in England in years. Dating has been difficult, and relationships with family members have been strained. Everything from outings with friends to his choice of college had been disrupted by his OCD. He's tried all the standard therapies and medications, but whatever small relief they provided was minimal and fleeting.

"I come off as very high-functioning, high-achieving," Patel says. "It's isolating. People don't understand me. There is discord between how I look and this true struggle every time I'm in public."

FINDING SUPPORT AND CARE

When Patel came to CU Anschutz, his supervisor noticed his struggle and connected him with Rachel Davis, MD, associate professor of psychiatry at the CU School of Medicine and medical director of the OCD Program.

Davis is also co-director, with Steven Ojemann, MD, associate professor of neurosurgery, of the OCD Surgical Program, a collaborative venture between the Departments of Psychiatry and Neurosurgery and UCHealth University of Colorado Hospital. The program is one of the few in the country to offer deep brain stimulation (DBS) as treatment for refractory OCD.

During the procedure, electrodes are implanted in the deeper structures of the brain and connected to generators in the chest that deliver small currents of electricity to the brain. When DBS is successful, the low current of ongoing stimulation reduces the intensity and frequency of obsessions and compulsions, in turn allowing previously ineffective therapies another chance to work.

Davis recognized Patel as a candidate.

"When I first met him, it wasn't clear to me how severe his symptoms were. He functioned so well at work, and he desired to present himself that way as well," says Davis. "But it soon became clear to me how disabled he was by his symptoms. He had tried numerous medications in the past that were minimally helpful, if at all. He had participated in extensive exposure and response prevention therapy, and met other criteria for DBS."

ROOTS OF A RARE PROCEDURE

DBS for OCD is rare. It was first used to control Parkinson's tremors in the late 1980s. In 1999, it was used experimentally to successfully manage OCD and received FDA approval through a Humanitarian Device Exemption in 2009. It's uncommon today partly due to stigma surrounding the use of invasive

surgical procedures for mental illness, stemming from an era of imprecise and destructive brain surgeries such as lobotomies in the 1950s and 1960s.

"There wasn't good regulatory control, oversight, or ethical guidelines then, in addition to a near absence of other effective treatments for mental illness," says Davis. "The type of brain surgery people had for mental illness was often devastating and ineffective. There are now established ethical guidelines and criteria supported by the literature and the consensus of experts, but there is still reluctance, especially when symptoms are invisible or 'mental,' such as in OCD.

"We use DBS much more often in Parkinson's patients, which is also a brain disease, but manifests physically."

Despite the stigma, DBS study results are promising. Research conducted by Davis shows the procedure often provides relief in patients with debilitating OCD, both by reducing OCD symptoms and improving overall mood.

Fewer than 300 patients around the world have had deep brain stimulation therapy for OCD. At UCHealth, Moksha Patel was patient number eight.

"His ability to tolerate surgery and recover so quickly is due in part to what he has had to endure every single day of his life – he's used to tolerating hard things and functioning anyway."

BEFORE AND AFTER THE SURGERY

Before DBS, the most serious procedure Patel endured was having his wisdom teeth out.

"I'll probably take two weeks off afterward, I have a lot to do," Patel said in the months before the procedure. He waited anxiously for a year while his claim made the insurance rounds. Due to the rarity of the procedure, the process felt like a wild goose chase.

Rejected. Appealed. Rejected. Appealed. Finally, with the support of CU Anschutz leadership and many of his peers and experts in the medical field, coverage was approved.

Patel's surgery was performed in September 2021 by Ojemann at UCHealth. Recovery was rough. The invasiveness of brain surgery and the scars that came with it caused much discomfort. Progress, too, was slow at first, but as stimulator programming ramped up with Davis and the CU Department of Psychiatry, relief began to settle in.

"At first, as I was trying to work on my stimulator settings, I would shift between giddiness and sadness. A real roller coaster," says Patel. "On the first day I was sent home on one setting and felt mild progress. In a second session later that week, I left with another setting and felt even better."

In the months following surgery, Patel continued to work with Davis and the psychiatry department, not only to program his DBS, but to also re-engage in intensive exposure therapy. Some sessions have been spent sitting on the floor of a public restroom, inching closer and closer to the toilet, while monitoring his brain waves.

Now, only three months since stimulation was turned on, he's seen noticeable improvement.

"I feel like I have more control over it, rather than it having control over me," he says.

Patel's resilience in treatment and recovery stems from the extraordinary difficulties he's faced throughout his lifetime.

"What stands out to me about Moksha is that he didn't have to take leave from work for this – no disability, didn't quit his job," Davis says. "His ability to tolerate surgery and recover so quickly is due in part to what he has had to endure every single day of his life – he's used to tolerating hard things and functioning anyway."

"But I want to let others know that there is hope, and they're not alone. Treatments and care are evolving. There is something out there that can help you."

ENGAGING IN LIFE

Patel was back to work soon after the procedure and continues to adjust to life with a quieter mind. He proactively self-referred to a physician monitoring program through Colorado Physician Health Program prior to his surgery. They had and have no concerns about his ability to practice safely.

He recently visited Disney World with his sister. Traveling is easier now, as is being away from home for hours or days at a time.

"I'm much happier and able to enjoy things," he says. "Day to day, I still need to break habits that have been building for 25 years, but it's so much less of a toll on me mentally."

He has started dating and is making an effort to be more sociable. He's also taking on more work responsibilities.

"I am more engaged in life now," he says. "Not stuck in my head."

Patel also wanted to share his story publicly to address stigma around OCD and its treatments. He wants to give hope, he says, to the millions of people just like him, struggling with something others don't understand.

"We speak openly about other diseases and their treatments. There are a lot of diseases people deal with and struggle with, but because OCD is behavioral, it seems like a choice. People are more understanding these days and are willing to open up about it," he said. "But I want to let others know that there is hope, and they're not alone. Treatments and care are evolving. There is something out there that can help you."

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Alumni like Joe Ozaki, MD, are passionate about paying it forward for future generations of health care researchers and clinicians. Through contributions like his to the Stethoscope Fund, the University of Colorado School of Medicine and the CU Medical Alumni Association provide a meaningful opportunity to connect our students with alumni through a unique tradition for our students, their families and alumni presenters. These stethoscopes are presented to students as they begin school, to honor their upcoming role as a part of the community that will lead the patient-centered care of the future.

If you would like to support medical students with the gift of a stethoscope at the University of Colorado School of Medicine, visit giving.cu.edu/fund/medical-alumni-association-stethoscope-fund or contact Vanessa Duran at vanessa.duran@cuanschutz.edu or 303.724.2517.

"A stethoscope will always be a symbol of the medical profession. I cherished the one given to me by a medical company, a practice now discontinued. I am grateful that I have the opportunity to provide stethoscopes to the next generation of physicians."

- Joe Ozaki, MD, Class of 1969