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University of Colorado School of Medicine

CU MEDICINE Today

Living Longer

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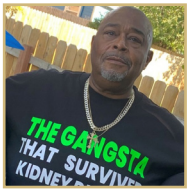

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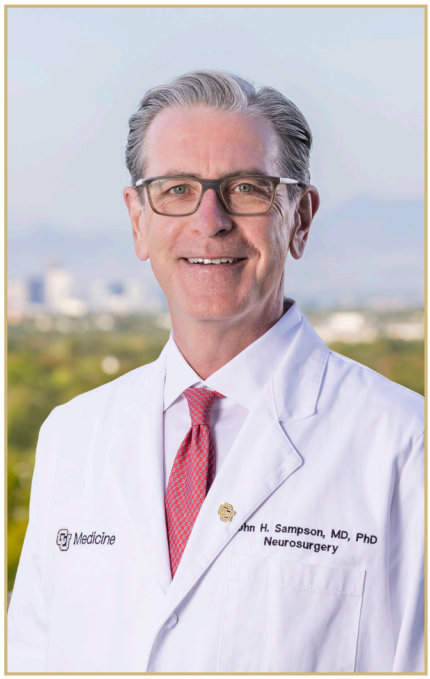


In late January, I had the pleasure of delivering my first State of the School address where I outlined my plan for our school to be Top 10 in 10 years.

Our remarkable Anschutz Medical Campus offers us a strong start. We have dedicated faculty and staff, we have strong clinical and philanthropic partners, and we have a laser focus on providing quality care. We will achieve our goal by working together to build programs of excellence in clinical care, research, and education.

During my address, I featured several examples of ambition, courage, compassion, and innovation that distinguish us from other institutions.

Kia Washington, MD, Professor of Surgery, is leading a national research team studying how to perform whole eye transplants to restore vision. Her work on this project is featured in this issue of the magazine.

CU Cancer Center members **Dan Pollyea, MD, MS, Christine McMahon, MD,** and **Jonathan Gutman, MD,** treated college football coach Matt Lubick, for acute myeloid leukemia. Their care matched with Lubick's determination – he literally walked a marathon in the hallways of UCHealth University of Colorado Hospital on his first day of chemotherapy – were featured in a Fox Sports report last fall.

Prem Subramanian, MD, Professor of Ophthalmology, is collaborating with **Allie Hayman, PhD,** from CU Boulder's Aerospace Engineering program, to research the impact of space flight on the eyes of astronauts.

In another cross-campus collaboration, **Michael Zuscik, PhD,** and **Karin Payne, PhD**, both from Orthopedics, have joined with **Stephanie Bryant, PhD,** a materials scientist from CU Boulder, on a government-funded effort to develop bioengineered therapies for osteoarthritis.

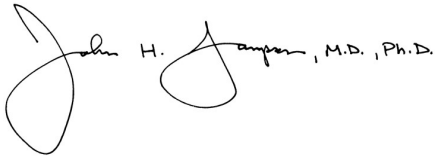
The address was a momentous occasion to celebrate these and many other outstanding successes. It is also an important time to focus on how we can build from them. To achieve our goal of being Top 10 in 10 years, I have established nine new committees, led by department chairs, to help us with several major initiatives that are key to our future success.

The assignments cover all aspects of our operations. We will be reviewing our clinical work, ensuring that we are smart in how we manage our funding and that we are sustainably implementing our growth plans.

We are also putting a focus on setting and adopting data standards that help all of us better monitor the progress we are making in achieving our goals.

It is critically important that we reward our teams for their attention to every detail, so we've also established committees focused on building a collaborative culture, overseeing strategic hiring processes, and raising the voice of the talented advanced practice professionals on our team.

I am very excited to lead the high-performing teams making these changes to our school. We have significant work to do, but I am confident that working together we will achieve our ambitious goals and ensure that Anschutz Medical Campus remains a place where dreams come true.



John Sampson, MD, PhD, MBA
Richard D. Krugman Endowed Chair
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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.

Laura Scherer, PhD, associate professor of medicine, was quoted by The New York Times in January discussing how oncologists communicate with patients when they have certain early cancers that aren't at risk of spreading. "'Cancer' is just this panic word," she said. Patients compare hearing the term to "getting hit by a truck, like they can't process anything that comes after," she said.

Eric G. Campbell, PhD, professor of medicine and director of research at the CU Center for Bioethics and Humanities, was quoted in February in a Washington Post article about research of electric toothbrushes and whether the funding source of the research influences research outcomes. "The research that I and most of my colleagues have done at this point is largely settled," he said. "Studies that are funded by companies, if published, are significantly more likely to have results that favor both the safety and the efficacy of the company's product."

Joseph Schacht, PhD, associate professor of psychiatry, commented in a New York Times article about Dry January. "I always encourage people to really check in with their bodies after any period of abstinence or reduced drinking," he said. "Does your body feel better when you don't do this? If it does, that's a really important signal you should listen to."

Sean O'Leary, MD, professor of pediatrics, was quoted by The New York Times in a January article about Tamiflu. Given the choice between Tamiflu when you get sick, or a flu shot to prevent sickness in the first place, "I would take the influenza vaccine 100 times out of 100," he said.

Lia Gore, MD

Lia Gore, MD, professor of pediatrics, in December discussed with the Denver Post a new treatment protocol for the most common form of pediatric leukemia. "This happens once in several generations," said Gore, who was one of the co-authors of a paper published in The New England Journal of Medicine in December describing the effects of the treatment. "We've now moved this outcome so that the vast majority of children with this type of leukemia will have a 96% cure rate."

Michelle Barron, MD, professor of medicine, was quoted by Colorado Public Radio in a January report about hospitalizations due to respiratory diseases. "Quite a few people are hospitalized now that we were not seeing in December," she said. "Nobody remembers, but this is actually a typical flu year, and I don't know that we think of anything as typical anymore, but usually around the holidays is when we'll start to see slight upticks. And then usually right after the holidays is when we'll start to really see numbers."

Ian Stanley, PhD, assistant research professor of emergency medicine, discussed mental health concerns for survivors of the California wildfires. He told ABC News in January that untreated PTSD can put a strain on relationships including familial relationships, romantic relationships and friendships. "It can really begin to eat away at, not just the person's well-being, but also the social environment in which they live," he said.

Cecilia Low Wang, MD

Cecilia Low Wang, MD, professor of medicine, was quoted in a December report about GLP-1 weight-loss drugs posted on the NBC Today show website: "On average, people lose a significant amount of weight. And along with that, other elements of their health then often get better, too. Keeping in mind that obesity is at the core of many of these diseases, treating obesity can truly have a cascade effect of clinical benefits. These are life-changing medications."

Elizabeth Kovacs, PhD, professor of surgery, told NBC News in January that a study finding that young adults under age 35 are drinking less than that group did decades ago may be because they prefer other substances. "Some are drinking less, and that might be because vaping and edibles are more available," she said.

Robert Eckel, MD, professor emeritus of physiology and biophysics, was quoted in the New York Post in January discussing the work of a global commission on the definition and diagnostic criteria of clinical obesity. "Relying on BMI alone to diagnose obesity is problematic," said Eckel, who was on the commission, "as some people tend to store excess fat at the waist or in and around their organs, such as the liver, the heart or the muscles, and this is associated with a higher health risk compared to when excess fat is stored just beneath the skin in the arms, legs or in other body areas."

Joshua Gowin, PhD

Matthew Wynia, MD, MPH

Joshua Gowin, PhD, assistant professor of radiology, described his study of the impact of cannabis use on 1,000 people between ages 22 and 36 in a report in January on CNN. He found that frequent use of marijuana damages the brain's working memory. "Working memory is the ability to retain information for a short period of time and use it," he said. "An example is checking your blind spot when driving down the road. When you look back in front of you, you need to remember what you saw in the blind spot before you can make a good decision if you want to change lanes or not."

Jason Persoff, MD, associate professor of medicine, discussed his hobby of photographing snowflakes in a December report on Colorado Public Radio. "You can see they're incredibly fragile. They're microscopic glass, essentially. And actually, glass would be even more solid than these snowflakes," he said, while snapping images on his back porch.

Amy Feldman, MD, PhD, associate professor of pediatrics, was interviewed in November by the CBS affiliate in Denver, about the living donor program at Children's Hospital Colorado. "We have the shortest waitlist times in the entire country, and we're really proud of that," she said. "On average, our children only have to wait about 50 days for a liver transplant," she said. "The national average is about 8 months."

Matthew Wynia, MD, MPH, professor of medicine and director of the CU Center for Bioethics and Humanities, was interviewed in December by the Colorado Sun after the assassination of the UnitedHealthcare CEO on a New York street. "You don't have to think very far ahead to realize that assassinating the CEO of a health insurance company is not going to accomplish anything good. They're not going to change the way they manage and process claims. They're not going to change their coverage criteria. They're not going to change their relationships with employers, who largely set the coverage criteria, which they then implement. There's no conceivable way in which murdering an executive at a health insurance company is going to make the health care system work better."

Cathy Bradley, PhD, dean of the Colorado School of Public Health and deputy director of the CU Cancer Center, discussed the impact of proposed cuts to federal support for research funding in a February report by Rocky Mountain PBS. "If we're not out there preventing cancer, then people get cancer and they get it at a late stage, and it costs a ton of money and they die," she said. "That's just it."

Joshua Williams, MD, associate professor of pediatrics, discussed childhood vaccination rates in February with the CBS affiliate in Denver in a report about a measles outbreak in Texas. "Denver's doing pretty well. We're still below what we like to see, especially for measles vaccinations -- 95% is where we want to be to prevent outbreaks of measles in our communities and in our schools," he said, "but overall, compared to how the rest of the state looks, we're doing pretty well."

Robert Freedman, MD, visiting clinical professor and former chair of psychiatry, explained the effects of ketamine in an article published in October by the Washington Post. "People who take a large amount of ketamine have problems with paranoia, delusions and hallucinations," he said.

Daniel Pastula, MD, MHS, professor of neurology, was the subject matter expert quoted by Colorado Public Radio in an October report about an e. coli outbreak connected to McDonald's Quarter Pounders that resulted in more than a dozen illnesses and one death in Western Colorado. "However, there are certain strains of e. coli that are particularly pathogenic or likely to cause disease. And so that's what we're seeing here with this outbreak at McDonald's," he said. "This one has proven in the past to be pathogenic or causing disease."

Sarah Rowan, MD, associate professor of medicine, discussed the increase in HIV cases in Colorado in a December report on the NBC affiliate in Denver. "We've definitely seen more people HIV diagnosed in the past year and a lot of that is that increase in cases of people getting tested after the pandemic," she said. "We saw a decrease during the pandemic and now we're seeing people who might have put off getting tested, get tests now."

CRUNCHING THE NUMBERS

Health care providers need to catch up with the data

By Greg Glasgow

Between wearable devices, genomic information, and electronic health records, an explosion of health data is now available to providers and the general public.

But what does all that data mean? Does it help us manage our health better, or is it just a lot of digital noise? And how safe is it? What happens if our data falls into the wrong hands?

For answers, we turned to David Kao, MD, associate professor of cardiology in the Department of Medicine. Kao also is medical director of UCHealth's CARE Innovation Center, which works with industry and start-up partners in the digital health space to implement new tools.

WHAT HAVE YOU SEEN CHANGE IN THE AMOUNT AND RANGE OF HEALTH DATA OVER THE PAST 10 YEARS? IS IT MAKING YOUR JOB EASIER?

Within the actual practice of medicine, there is more and more data available, but there aren't more and more ways to interpret it or use it. Even though we have this new information, it's too much for one person to process. Additionally, the way we practice medicine was not created using this type of information.

Take monitoring blood pressure, for example. We now have devices with the ability to measure it 10 times a day. It's highly variable throughout the day, so people are engaged and want to use that technology, but we don't know how to use that data. Our current practice is not designed for that, nor are our treatment guidelines. We are awash in data, but the ability to process it and the knowledge to use it correctly is not there yet.

DO PROVIDERS SOMETIMES FEEL OVERWHELMED BY ALL THE DATA?

Yes. Burnout rates continue to climb because more data is in the electronic health records, but there's less support to deal with it.

IS THERE A SOLUTION DOWN THE ROAD? IS SOMEONE GOING TO FIGURE OUT HOW TO USE ALL THIS DATA, OR IS THERE ALWAYS GOING TO BE MORE THAN WE CAN REALLY DEAL WITH?

David Kao, MD

There are a few things that need to happen. One is that the definition of sound evidence — the evidence upon which we make decisions — needs to evolve in medicine. If you're going to use any of this new data, any of these new analytics, or AI, the type of evidence sufficient to make clinical decisions must evolve. If you require using an old model, we'll never get there due to the size and complexity of the data available. AI has to be part of it. We need mass analytics to deal with this huge amount of inputs.

The third thing is that we need to get over the division between academics, health care operations, and industry. Each bring something unique to the table, and it's something the others do not have. None of them can put it all together without the others. I live in all three of these worlds, and I firmly believe that academics will need to collaborate with industry partners to build appropriate tools. And of course, the hospital system is the care delivery vehicle.

HOW DOES THAT RELATIONSHIP WORK WHEN IT COMES TO WORKING WITH DATA? IT SEEMS LIKE INDUSTRY MIGHT BE EMBRACING IT MORE, AT LEAST INITIALLY.

There's this tension, because traditional data science says that you don't need to be an expert in what you're doing. The data will speak for itself and tell you what to do if you set up your system properly. That's true in a lot of cases, but in health care, it's a little different. The liability and regulatory constraints are different. What I see industry doing is having spectacular engineering, but not vetting it in any

traditional way, because it's proprietary. You instantly lose a big chunk of physicians or providers, because you don't have any evidence of whether it works or not.

If the industry engineers were able to get to a place where they could leverage expertise in implementation science or some kind of clinical research, the product would be better, credibility would be better, and they would be less vulnerable to the mistakes that inevitably happen. But that's currently not happening. It's very hard to do in the current environment. That's a problem.

WHAT ABOUT THE SECURITY ASPECT? HOW BIG OF A WORRY IS THAT?

I think a lot of it is appearance. We can be transparent that data is shared in many ways — that's just a reality. In a way, it's a generational phenomenon. I suspect that people who came of age in the early 2000s or later have a different sense of what data privacy means or what the loss of data means compared with more recent generations. Now, there's an assumption that everybody knows everything about you, which allows you to use more technologies. Members of older generations like myself struggle much more with that exchange.

The main challenge right now is how do you use cloud computing? Especially in health care, the popular opinion is that the cloud is less secure than something on premises — something on your desk. That's not true, but that's the initial reaction by almost everybody. So, there's a lot of restraint to experiment or try to develop out capacity using cloud services.

Once people get more comfortable with that concept and the fact that it can still be secure going to and from a cloud platform, it opens up all these possibilities for the AI part of it. You can store a lot more data. You can capture a lot more data. You can integrate things like wearables. In terms of data security, I would say that's the biggest difference from 10 years ago. The idea of a security breach and inadvertent disclosure of data, or misclassification of data so that someone could get hold of it when they shouldn't — those are still issues, and we still battle them constantly.

TRACKING YOUR HEALTH

Wearable devices to track a person's health are increasingly popular. CU Associate Professor Seth Creasy, PhD, is studying the pros and cons of these fitness trackers. How effective are they? Are they helping us feel better?

See page 6 for an article about Creasy's research.

FITNESS TRACKERS

Wearable devices are collecting more data than ever

By Tayler Shaw

With the dawn of a new day, as some people prepare their coffee or check the daily news, the morning routine of others involves examining how well they slept the night before — not based on how they feel but based on data collected by a watch on their wrist.

Wearable fitness trackers like smartwatches and smart rings have become integrated into the daily lives of millions of Americans, with 21% of Americans reporting use of these devices in 2019 to the Pew Research Center. Whether it be evaluating sleep quality, assessing cardiovascular fitness, or measuring stress levels, these devices have rapidly evolved in their capabilities over the past few decades. But do they benefit people's health as much as advertised?

"I think wearable trackers can be great tools for certain things, but people have to also understand the limitations of these tools and what they're actually measuring," says Seth Creasy, PhD, director of research integration for the CU Anschutz Health and Wellness Center.

ARE THEY ACCURATE?

The variety of wearable trackers is vast, with popular devices including Fitbits, Apple Watches, Galaxy Watches, Oura Rings, and Garmin smartwatches. There are pros and cons to every wearable tracker, explains Creasy, an associate professor in the Division of Endocrinology, Metabolism, and Diabetes.

"Each device has its own strengths and limitations on what it's measuring, how it's measuring it, as well as the different apps and messaging that comes with it," he says. "I wear a Garmin smartwatch because I'm a runner and it has a useful GPS function, as well as an app to track my fitness. But others may find an Oura ring, for instance, to be more fashionable and useful in their day-to-day lives. It's a personal preference."

Although many trackers have improved in their ability to more accurately measure a person's heart rate, their steps, and the intensity of their physical activity, Creasy cautions that trackers may over-promise what they can do. For instance, tracking people's sleep behaviors can be challenging, and most devices are mainly detecting the body's movement to track sleep.

"If I lay really still in bed, then my tracker might say that I'm sleeping even if I'm not, so there are some limitations to what they can actually measure," he says.

These devices are often advertised as being useful tools to track how many calories a person burns in a day — a measurement that Creasy advises people don't rely on to determine how many calories they should consume.

"Energy expenditure measurement accuracy is still hit-and-miss because there are so many factors that influence total energy expenditure beyond what is measurable from a wearable tracker," he says. "I caution individuals from using their energy expenditure data to influence their eating behaviors."

POTENTIAL BENEFITS

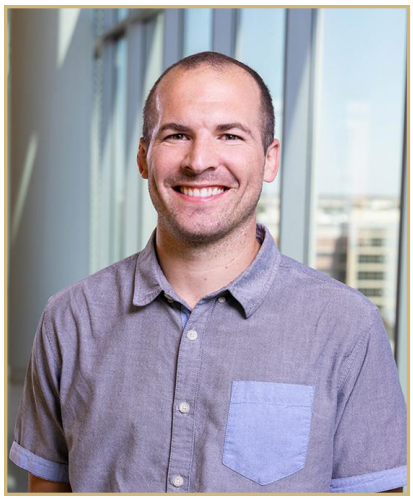
Although not all measurements may be completely accurate, wearable trackers still offer useful information, Creasy notes. That's why he uses these devices in almost every study he does.

Much of Creasy's research focuses on investigating ways to help people live healthier lives, whether it be through changing people's diet, exercise, and/or sleep behaviors. In a variety of his exercise studies, he has used wearable trackers to collect data. He has also used wearable trackers to measure body posture and time spent on different physical activity behaviors, including sedentary behavior.

"I think these devices are super helpful in helping us become more aware of our own health. I remember that while I was working from home during the COVID-19 pandemic, my watch showed me that I was only getting 1,000 or 2,000 steps a day, which is way below the recommendation. It gave me awareness of something I needed to improve," Creasy says. "These are information tools that can help us learn more about ourselves."

In this way, wearable trackers can lead people to set quantitative goals (such as hitting 10,000 steps a day), track their progress, and motivate them to achieve their goals. For example, the Apple Watch has become known for motivating people to close three daily "rings" seen on their watch — one ring represents the number of active calories a person

> *"I think wearable trackers can be great tools for certain things, but people have to also understand the limitations of these tools and what they're actually measuring."*



Seth Creasy, PhD

has burned, another represents the number of minutes they've exercised, and the third represents how many times they stood for at least one minute per each hour of the day. As people complete pre-set goals for each of these rings, the respective ring closes.

"Many of these devices also have features to create a sense of community, such as by sharing health activity with other people, being able to challenge others to achieve certain fitness goals, or having a messaging platform to encourage others," Creasy says.

TRACKERS' IMPACT

Wearable trackers are not for everyone. Trackers may potentially be harmful for some people who face mental health issues like eating disorders, as some individuals may become obsessive about tracking data such as calories burned. For others, the health information on their tracker may be discouraging.

"If someone is already having a bad day, and they look at their fitness tracker and see they only got 1,000 steps, it can set them into a negative spiral. Not everyone responds the same way, so this information may not be helpful to some," Creasy says.

A previous study that Creasy contributed to tested how valuable a wearable armband was in helping people lose weight. He and the other investigators found that there ultimately was no weight loss benefit of having the device versus not.

"Some people loved it, and others didn't like or want to wear it," he says. "I think there are ways that these devices can be helpful, but you are not going to fix everyone's health by just giving them a wearable piece of information."

MEASURING YOUR MIND

When Creasy hasn't slept well, and he is trying to console his crying five-month-old infant, his Garmin watch will sometimes send him an alert that he appears to be more stressed than usual — a sign of how trackers are beginning to assess people's mental well-being as well as physical.

"I think these devices are getting to the point where they are sensitive to certain things and can measure stress on some level. Understanding the link between your physical health and your emotional health is valuable," he says. "But these devices probably are over-promising a bit on how accurate they can measure it."

Although Creasy is skeptical of wearable trackers' ability to accurately measure people's stress and anxiety levels, he says that further developing and honing this technology is worth pursuing.

"If we don't research it, we're not going to move the needle," he says.

Research into wearable trackers' ability to measure stress has already begun. Last year, researchers at the University of Vermont published a study that suggested an Oura ring biosensor could potentially detect changes in a person's stress levels while they sleep. An investigator for the study expressed hope that wearable technology will eventually be able to identify in real-time if someone is experiencing increased stress, as that may open the door to offer helpful interventions.

"This field is ever evolving. The devices keep getting better, and the analysis side keeps improving as well," Creasy says. "It will continue evolving over time, and we'll keep getting to learn more about ourselves, our bodies, what works, and what doesn't."

LIVING LONGER WITH HIV

CU physicians help older people with HIV face health challenges

By Mark Harden

David Lent

Thirty years ago, at age 27, Jerry Johnson noticed a rash on his upper body. He was openly gay, and so his mother, who worked at a state health agency, would bring him information about the human immunodeficiency virus – HIV. "I knew from the literature she had shared with me that this was probably HIV, and so I went to a clinic," he says.

It took two weeks for the test results to come back. "I knew what the answer was going to be, but I was also hopeful that no, this isn't HIV. But it was. I was completely and utterly devastated. This was pretty much a death sentence back then. So much stuff was going through my mind, and the first thing was: Who's going to love me?"

Thirty-seven years ago, at age 33, David Lent learned he was HIV positive. "I was afraid to find out," he says. "I was freaked out. I had friends with AIDS who were dying. My doctor, who knew as much about HIV as anyone at the time, said, 'We don't know what we're doing. We're throwing anything we can at people to see what sticks.'"

When HIV first emerged in the early 1980s, there were no treatments and no cure. The infection advanced to acquired immunodeficiency syndrome, or AIDS, ravaging the immune system and letting rare diseases run wild. Death came in months or a few years.

Between 1981 and 1987, 96% of people diagnosed with AIDS died. The epidemic's toll grew year by year in the United States, peaking at about 50,000 deaths in 1995, when HIV was the leading cause of death for Americans ages 25-44. Worldwide, deaths from AIDS-related illness peaked at about 2.1 million in 2004, and the epidemic has claimed between 36 million and 51 million lives to date.

While those dying from the disease and their loved ones experienced suffering and sorrow, people with HIV in those early years faced enormous fear and stigma. Many experienced shaming and derision because of the disease's association with gay sex and intravenous drug use. Many were shunned by their families, friends, and co-workers. For many, it was difficult to attend school, travel freely, or keep their jobs.

It's been 44 years since the first official reports of what came to be called AIDS in the United States, 42 years since the major routes of transmission were identified, and 41 years since the retrovirus that causes AIDS (later named HIV) was identified. The virus is still with us, and there still is no cure.

Still, much has changed. For most people with the virus in the U.S., it has become possible to live a long life with HIV.

LIVING LONGER

"At this point, we expect that people diagnosed with HIV likely will have a near normal lifespan," says Kristine Erlandson, MD, professor of medicine in the Division of Infectious Diseases who cares for people with HIV.

Says Jacob Walker, MD, an assistant professor in the Division of Geriatric Medicine who runs a clinic for older people with HIV: "Most people haven't even thought of living longer with HIV. Someone this morning said, 'Is it still a death sentence?' I said, 'No, absolutely not. Life expectancy is about the same as someone without HIV.'"

In 1987, the average age of death from HIV-related disease was 38 for men and 35 for women. Now, with effective treatments, more than half of people with HIV are age 50 and over.

Today, Jerry Johnson is 57 and David Lent is 70. Both men have been living with HIV for most of their adult lives. They both have struggled at times, but both say they are feeling good today and looking forward to the years ahead. And both were enrollees in a recent study led by Erlandson into the health benefits of various levels of exercise for people with HIV.

MANAGING HEALTH

For many people with HIV, living a long life requires successfully managing health challenges that can accompany the virus, some of which can occur at a younger age than for those without HIV, as well as navigating emotional stresses.

"It's a kind of accelerated aging," Erlandson says. "People with HIV are experiencing what the general population experiences with aging, only at an earlier age: Increased risks of cardiovascular disease, diabetes, frailty, falls and fractures, dementia, and so on."

Helping people face those challenges is the focus of extensive research and care programs led by Erlandson, Walker, and others in the CU Department of Medicine and across the CU Anschutz Medical Campus.

"You hear this over and over again" from older people with HIV, Walker says. "It's not the HIV; it's everything else. They're encountering

conditions common to aging that they never thought they would have to deal with. And they're thinking about things like planning financially for their future, having a medical power of attorney, needing caregivers, needing nursing home care. All of those are things they didn't even consider in their 30s and 40s because they didn't think they'd live that long."

BETTER THERAPIES

After years without effective treatments for HIV, a revolution in new treatments has led to longer, healthier lives with the virus.

"The first antiretroviral therapies were rolled out in the late '80s, starting with AZT," Erlandson says. "Initially, most of the antiretroviral therapies were used alone, or maybe a combination of two drugs. But they were very toxic and people developed resistance to those therapies pretty quickly."

By the late 1990s, she says, "the concept arose of using three different medications that would target the virus in different ways. The combination got their virus suppressed for a much longer period of time."

Later, says Erlandson, treatment evolved "from people taking handfuls of medications into taking a single tablet once day, and then, more recently, into a longer lasting, injectable therapy. A good portion of the patients in our clinic come in every eight weeks for an injection medication. And newer studies in the field are moving toward an injection that lasts six months or longer."

Antiretroviral therapies (known as ART) don't cure HIV. But over time, if a person diligently stays on ART as prescribed, the amount of the virus in their blood can be reduced below a level that a test can detect – known as an undetectable viral load. When that happens, a person with HIV essentially is incapable of transmitting the virus to a sex partner.

For people who don't have HIV but who feel at risk of infection, the use of condoms has long been advised to protect against the virus and other sexually transmitted infections (STIs). And now there are also highly effective preventive medications.

In 2012, the first pre-exposure prophylaxis – known as PrEP – was approved, and today it's available as a daily pill or an injection every other month. Taken as prescribed, PrEP reduces the risk of HIV infection by about 99% from sex and by about 74% from shared injection needles. And in emergency situations after possible exposure to HIV, such as if a condom breaks, post-exposure prophylaxis – PEP – can greatly reduce the risk of infection. While HIV PrEP and PEP do not protect against other STIs, newer guidelines include recommendations for "Doxy PEP" to provide additional STI protection.

Despite these advances, HIV has not gone away, and there still is no widely available cure, short of a type of stem cell transplant for people with cancer. An estimated 1.2 million people in the U.S. have HIV, and it's believed about 13% don't know it because they haven't been tested for the virus. About 38,000 people in the United States were diagnosed with HIV in 2022 alone.

JERRY JOHNSON'S STORY

Jerry Johnson, originally from the Baltimore area, has worked in the airline industry for years, most recently as a Denver-based airline manager.

When he was diagnosed with HIV 30 years ago, he reluctantly told his family, but not others. "I just didn't have the tools, the resources, to be able to understand or figure out how to move on, how to go on with life. So, I kind of hid it. I didn't own the disease. But as time went on, I started to develop a spirituality, and I changed how I viewed myself. And that led me to be able to speak out about it."

In 1999, a few years after his diagnosis, Johnson started losing weight. He learned his viral load was very high, so he went on antiretroviral medication, which pushed his viral load down to undetectable. He has been on one kind of medication or another ever since. He now gets a shot every two months of Cabenuva, an injectable drug approved in 2021.

Johnson has been a patient of Erlandson's for several years. "We have a really awesome relationship where we can talk and share just about anything. We have great conversations about health and life in general. I really enjoy that."

Johnson says it "boggles my mind" why so many new cases of HIV infection occur each year with PrEP and other preventative measures available. "I've actually had to say to friends who aren't on PrEP, 'Go get on it. Do yourself a favor. And don't take the word of someone who says they don't have HIV without any proof.' It's very bizarre."

Jerry Johnson

Jacob Walker, MD

He says that when he was dating, he would indicate his HIV status as "undetectable" in his dating profile. "People put their health in another person's hands when they don't share information, and I refuse to do that."

Today, at 57, Johnson is married and has a positive outlook. "My health is good, the future is bright, I go to weekly counseling sessions for my mental health, and I'm looking forward to what's coming next. I'm so thankful because I stand on the shoulders of people before me who were on AZT and those other early medications for me to be here today, healthy and living strong. It's hard to believe it's been 30 years."

He adds: "I would never want anybody to go through what I went through. But because of this thing happening to me, I have a whole different outlook on life. I had a really good friend who got diagnosed about the same time I did, became a recluse, and died a year later. But I think there's a reason I'm still here and still healthy. I'm living life the way life should be lived, never taking any day for granted."

'GIVING BACK TO MY FOREBEARS'

Walker is director of the Positive Aging Clinic, which opened at the UCHealth Anschutz Outpatient Pavilion in 2022. It's one of only a few nationwide that offers geriatric and HIV care at one site.

When he started his training, Walker was interested in infectious diseases, "but during medical school I fell in love with geriatrics and all of the creative ways they try to help patients. But I didn't want to lose that infectious-diseases interest entirely, and so during residency here at CU Anschutz I did additional HIV training to mix both worlds together. And I am also a gay man, so a bit of this is giving back to my forebears."

His clinic's focus is to help older people with HIV address their varied and often complex health concerns, which often include cardiovascular disease, osteoporosis, cognitive impairment, and functional decline. "For every patient, there's usually a set of problems," he says.

The core idea, Walker says, "is eliminating the need to go to another clinic by putting me in the HIV clinic. Because I'm both a geriatrician and an HIV specialist, I can serve as their HIV primary care doctor for everything, or I'm a consultant for folks who have a great relationship with their HIV doctor but would love to check in on aging concerns. They can do all of that in an environment where they feel safe and they already know the staff."

GOOD LIFE

David Lent grew up in the Midwest in a large family and supported himself while attending college. He came to Denver, where he came out as gay and took part in one of the city's earliest pride parades. "I saw my community here for the first time," he says. "It made me feel at home."

It's been 37 years since Lent learned he was HIV positive, in 1987, while living in Denver. His diagnosis came at about the same time as he was launching a career in information technology, "so I had solid insurance and a good income." But in that period, he lacked treatment options.

Lent talks of being estranged from his parents because he was gay. "I was disowned, basically, so my folks never found out about my HIV status," he says, choking back tears. "My folks wrote me a letter condemning my life. That took a toll on me." He did not see his father again until just before his death of cancer.

Lent didn't go on medication until much later, "but I was taking care of myself as best I could." He moved to Silicon Valley in California. He found a measure of comfort in HIV support groups, in gay square dancing, and in long drives up the California coast. "Exploring nature was always my protected environment," he says.

At one point, Lent was diagnosed with AIDS because the virus had pushed down his immune T cell count, leaving him vulnerable to disease. "But I ignored that and kept on with life. Stigma was fairly big in those days – and it definitely still exists today."

In 2001, Lent was diagnosed with cancer – large cell B cell non-Hodgkin lymphoma. After six rounds of chemotherapy, "the treatment failed," he says, but he was eligible for a clinical study for people with HIV and cancer involving a type of autologous stem-cell therapy.

> ***"I was disowned, basically, so my folks never found out about my HIV status."***

Fourteen months and two 30-day hospital stays later, Lent emerged a cancer survivor and has not had a recurrence. It took him a long time to regain his stamina, but two years later he felt strong enough to climb California's 14,505-foot Mount Whitney with friends. By then he also was on HIV antiretroviral therapy and has stayed on it ever since. He does not believe his cancer was related to his HIV.

After living in Minnesota for 13 years, Lent retired from his IT career at age 63 and moved back to Denver. When the COVID-19 pandemic hit, "it was an emotional drain, the isolation of it. It reminded me very much of the early days of HIV – fear versus knowledge."

There have been other challenges over the years, including two cases of sepsis, the loss of his teeth, and discovering he had a lifelong septal defect, a hole between chambers of his heart. But Lent says that, overall, "I've had a damn good life, even though I've gone through many things. I've been extremely fortunate. I've gone through emotional turmoil and self-esteem issues, but physically, I'm fine."

Lent, now 70, has been a patient of Steven Johnson, MD, a CU infectious disease professor and director of its HIV/AIDS Clinical Program. "It's an absolutely wonderful campus," he says. "I've been so fortunate that I've had many doctors who would treat me as a person rather than just someone with a set of conditions."

MEDICAL AND SOCIAL CHALLENGES

In the late 2000s, when Erlandson was a fellow at CU Anschutz doing her HIV and infectious-diseases training, "I was struck by the conditions that I'd see in many of our patients with HIV who were ending up in the hospital – conditions that seemed like they were occurring at a much younger age than what I would have expected. We'd see patients in the hospital with heart attacks in their 30s or hip fractures in their 40s or 50s, or they were frail in a way I would have expected later in life."

That helps explain why Erlandson's research, including clinical trials, aims to help people with HIV to age successfully.

"A lot of research in more recent years has been focused towards finding a cure for HIV," she says, "and some people living with HIV feel like there hasn't been as much of a focus on them, and how we're supposed to help them maintain a good quality of life."

Some people with HIV have higher rates of other risk factors, such as smoking, which can mean a greater risk for some cancers and cardiovascular disease than HIV infection alone, Erlandson says. And for older people with HIV, early therapies decades ago may have exposed them to toxicity that has resulted in a high prevalence of neuropathy – damage to the nerves.

Besides the possibility of medical challenges, Erlandson says that people with HIV can also experience social difficulties.

"Loneliness can factor in," she says. "Some have lost their social networks, especially as they get older. Maybe their friends have died, or their families disowned them back in the day. And they may have a difficult time finding new networks because there's still some stigma in having HIV and being older, and oftentimes in having a different sexual identity or preferences than the general population."

Says Walker: "We see a lot of depression, isolation, loneliness. People are either feeling the consequences of HIV stigma and don't feel as comfortable getting out in the world, or they have lost a lot of their social network, either because of HIV earlier in the pandemic or because they've lost familial ties due to being LGBTQ or having HIV."

EXTENSIVE RESEARCH

Years ago, some people with HIV may not have worried much about healthy living behaviors, Erlandson says. Now, with an expectation of longer lives, the dynamic has changed. Erlandson has led extensive research into the health benefits of various levels of physical activity for older people with HIV, many of whom experience poor physical function.

In a 2018 trial, for example, Erlandson found that moderate levels of exercise improved physical function among people with HIV, and high-intensity exercise provided additional strength benefits. A 2021 study showed that various levels of exercise helped decrease systemic inflammation.

In her latest trial, Erlandson and her colleagues focused on people 50 and older with HIV who experience fatigue and live a sedentary lifestyle. She's comparing the benefits of 16 weeks of high-intensity interval training three days a week – alternating short bursts of intense effort with periods of low-intensity activity – versus less intense levels of exercise. Following the exercise, trial participants received coaching on staying active, with Vincent Khuu, an exercise physiologist and Erlandson's research assistant, playing a key role. Erlandson expects to have trial results soon.

> ***"If there's less and less interest in HIV, there's a concern that some of these programs may not continue to exist."***

Both Johnson and Lent found the high-intensity workouts challenging but rewarding. "That study helped me push my boundaries," Lent says. Adds Johnson: "It was nice to see the progression of it and watch my body transform."

Erlandson has secured funding for a forthcoming study that will look at the effects of a combination of resistance exercise and Tesamorelin, a drug that can reduce excess abdominal fat in people with HIV.

Walker and Erlandson have a pilot grant through the CU Department of Medicine's Collaborative Opportunities for Advancing Research and Translational Efforts (COLLABORATE) program to measure gait speed as an additional vital sign – alongside traditional measures such as body temperature and pulse rate – to help assess which patients with HIV may need further intervention with exercise programs.

Meanwhile, work is underway to find the best models of care for older people with HIV, especially when there are shortages of primary care and infectious disease providers.

Erlandson is a consultant for the Colorado Health Network, the state's oldest support organization for people with HIV, on a grant looking at better ways to screen, manage cases, develop care plans, and steer people to HIV resources. And Walker has secured funding from the Colorado Department of Public Health and Environment to run a dementia care training program for HIV clinic workers who can expect to see more cognitive health issues as their patients age.

LEARNING CURVE

As people live longer lives with HIV, some clinicians are still coming to grips with the implications of their patients' HIV status when it comes to treating other conditions, including those associated with aging, both Erlandson and Walker say.

"A lot of older providers who trained at the peak of the epidemic see HIV as this terrible death sentence and feel they need to treat their patients like they are incredibly fragile," Walker says. "They can feel out of their element doing anything for a patient with HIV, even if the problem is not HIV related. And then we see younger trainees or clinicians who don't encounter HIV much anymore and they're not sure how to handle it. I would love for our HIV medical education to shift more towards chronic disease management, and less towards the scary opportunistic infections that we had to deal with early in the epidemic that are rare these days."

Says Erlandson: "There's a learning curve, even for HIV case managers and social workers and nurses, on how to deal with some of these aging issues," she says. "How do we train case managers to be more familiar with things like dementia care? How do we connect people to home health care agencies that are more specific to HIV? We've got our HIV care providers and our aging care providers, so now we need more cross training."

As Erlandson, Walker, and their colleagues treat patients with HIV, and as they pursue their research into successful aging, they face a new reality: In contrast to the terror that gripped the world after HIV's emergence nearly half a century ago, the virus is no longer at the forefront of the public's consciousness.

"When people don't hear about HIV, they start to forget what it means," Erlandson says.

Kristine Erlandson, MD

And it remains to be seen what the implications of that shift could mean for future government and philanthropic funding for HIV programs. "If there's less and less interest in HIV, there's a concern that some of these programs may not continue to exist," she says. "And then we go in reverse."

ADVICE TO PATIENTS

In advising her patients with HIV, says Erlandson, "we talk a lot about physical activity and good nutrition. Our newer antiretroviral therapies seem to be associated with weight gain, and so we see a pairing of HIV and obesity. People with HIV tend to lose muscle mass and physical function as they get older, and doing regular aerobic exercise and resistance exercise is incredibly important."

"Exercise really is the big one," Walker agrees. "For folks with HIV who experience slower gait speed and decreased muscle mass at an earlier age, I pull up the graphs from some studies and show them how important exercise is going to be for them for maintaining function into their 70s."

Walker says he also encourages socialization. "A lot of folks will get comfortable in their bubble throughout their 40s and 50s, and then not think about how much they need to rely on other people as they start to age."

'I DON'T GIVE UP'

While Lent is upbeat about his life, he talks of having mental health issues recently – he calls it a "two-plus-year funk" – and says that some facilities where he has sought mental health care won't accept his Medicare coverage.

"But I don't give up," Lent says. "I don't want to make it sound like your life is simple on HIV. But I've been fortunate enough to have a great life, even though I went through some hell. In the early days of HIV, we were so scared of dying right away. Now I would honestly say that, for me, there's nothing to fear. So now, the question is, what do I do at age 70 to continue life and still explore and grow?"

Asked what he would tell someone facing an HIV diagnosis, Johnson says: "Understand that your journey will be what you make it. Not everyone will accept it, but you have to find a place in your heart to accept it. Definitely mourn that your life has changed forever, but there is hope. Know that love is available and attainable, and always be true to yourself."

UNSUNG HERO FOR RURAL COLORADO

Steven Johnson treats patients at West Slope HIV clinics for 25 years

By Mark Harden

For nearly a quarter century, Steven Johnson, MD, had been hopping on planes once a month, flying across Colorado to treat people living with HIV at a pair of clinics far from the big city. He figures he's made about 200 round trips between Denver and Grand Junction and 100 journeys to Durango.

"Initially it was on turboprops," Johnson says with a smile about his many rides over the Rockies. "Over time, the quality of the planes improved."

Since 2000, the two CU-backed clinics in Grand Junction and Durango have provided the only specialized HIV clinical services for hundreds of miles. It's a project that Johnson, a professor in the Division of Infectious Diseases and director of its HIV/AIDS Clinical Program, set in motion in the late 1990s, in partnership with Amy Davis, MD, MPH, in Grand Junction.

Previously, people living with HIV on Colorado's mostly rural Western Slope often had to journey to Denver or Salt Lake City for specialized care. Starting in 2000, thanks to Johnson and his colleagues, that care was available much closer to home at clinics run through a collaboration of the CU Department of Medicine, Intermountain Health St. Mary's Regional Hospital in Grand Junction, and CommonSpirit Mercy Regional Medical Center in Durango.

"This collaboration fits the university's mission of being a statewide organization," he says. "Providing this program has been very gratifying."'

'BITTERSWEET TO STOP'

In 2024, Johnson ended his monthly trip to Colorado's Western Slope – an occasion marked by parties at the clinics where he cared for patients for 25 years. Now, he has transitioned to backing up the onsite medical staff with virtual visits.

"It was bittersweet to stop, but it was time," he says. "It's been a big part of my career, and a very rewarding part."

Edward Stenehjem, MD, MSc, executive vice chair of the CU Department of Medicine, praised Johnson for the "world class HIV" care he has delivered to far-flung communities.

"Dr. Johnson is an unsung hero in our state's response to HIV infection," Stenehjem says. "Dr. Johnson's dedication to our patients across the state and to the communities in which they live cannot be overstated. He allows his patients to receive care where they are comfortable, in their communities. Even though Dr. Johnson is an internationally recognized HIV clinician, he is one of the most humble, approachable servant leaders that I've ever met."

RESIDENCY AT FITZSIMONS

HIV, or human immunodeficiency virus, primarily attacks the CD4 lymphocyte, weakening an infected person's ability to fight off infections and cancers. If left untreated, HIV can progress to AIDS (acquired immunodeficiency syndrome), which can leave a person vulnerable to opportunistic infections, including pneumonia, candidiasis, toxoplasmosis, and tuberculosis.

An estimated 1.2 million people in the U.S. were living with HIV in 2022, and nearly 38,000 new cases were diagnosed that year, according to the U.S. Centers for Disease Control and Prevention.

When the first cases of AIDS were described in 1981, and HIV was identified as the cause in 1983, there was no treatment. A diagnosis amounted to a death sentence. The death toll climbed steadily year by year, reaching a peak of about 50,000 U.S. deaths in 1994 and again in 1995, when AIDS was the number one cause of death for people ages 25 to 44.

In 1984, after earning his MD at Northwestern University on a U.S. Army scholarship, Johnson came to what was then Fitzsimons Army Medical Center – today the CU Anschutz Medical Campus – for his residency as part of the U.S. Army Medical Corps.

"The HIV test was developed in 1984, and the Army was testing a lot of people – active duty, retirees, dependents, and other beneficiaries – who turned out to be HIV positive," Johnson says. "They were referred to the major medical centers for evaluation, and one of them was Fitzsimons, so that was a big part of my residency."

It was at Fitzsimons that Johnson encountered "a very impressive" infectious disease physician, Col. Shannon Harrison, MD, who had arrived from a posting in Kenya to set up a clinic for HIV/AIDS patients. "This was at a time when people were afraid to go into the same room as somebody with HIV. He would examine them, he would draw blood from them, and he would hug them. He was very inspirational."

LAUNCHING THE CLINICS

Treatments for HIV began to emerge in the late 1980s and became progressively more effective. There still is no cure, but with treatment, many people today live long lives with the virus, with the potential to live a normal life span.

In 1994, Johnson left the Army and joined the CU School of Medicine faculty. A few years later, planning began for the collaborative HIV clinics. "In those early days, there was a recognition that to have expert HIV clinics around the state, with a lot of different care elements present, was a good model because Colorado is geographically large and it's difficult for people to travel back and forth, especially in winter," he says.

A party in May celebrating Steven Johnson, MD's 25 years of service at the HIV collaborative clinic in Durango. From left: Carole Pope, RN; Carl Salka, MD; Jennifer Rupp, MD; and Steven Johnson, MD. Photo courtesy Steven Johnson.

Those early talks involved Johnson and his CU colleagues, the Colorado governor's AIDS council, and a local group of stakeholders in Grand Junction, including Davis. "With our help, they put together a Part C grant under the Ryan White HIV/AIDS Program that led to establishment of the clinics in Grand Junction and Durango," he says. More recently, additional funds for HIV care came from the Telluride AIDS Benefit, a fundraising nonprofit.

TAG-TEAM APPROACH

Davis, a family medicine physician affiliated with St. Mary's Regional Hospital, has been the Grand Junction clinic's local physician partner from the beginning, Johnson says. At the Durango clinic, he collaborated with two infectious disease-trained physicians, initially Carl Salka, MD, followed by Jennifer Rupp, MD.

"Dr. Johnson understood well the concept of capacity building such that we could then have a sustainable project to care for our patients on the Western Slope," says Davis, who serves as medical director of the Western Colorado HIV Specialty Care Clinic in Grand Junction. She praises Johnson's "desire to improve the health of this community."

At the clinics, with Johnson providing HIV care, patients can also get primary care and see mental health professionals, nurses, and case managers. Between visits, Johnson has been available remotely to lend advice involving HIV patients, including urgent care and emergencies.

Many of the patients Johnson sees at the clinics have been living with HIV for years, although sometimes they have been newly diagnosed. Often, he deals with questions about changing a patient's combination of HIV treatments.

"I typically fly down the day before, and often we have a get-together dinner to talk about who's going to be part of the clinic the next day," Johnson says. "And then it's seeing patients all day, with the local physician and me in the room together, which is a great luxury. Often, we tag-team it, so when it's about HIV and its treatment or other infectious diseases, I'll do the talking, and when it segues to primary care, the other physician will do the talking."

'YOU KNOW WHEN IT'S TIME'

Johnson says his personal visits to Grand Junction and Durango ended in part because the Ryan White grant funds that supported his involvement were meant to build capacity for treating HIV in local communities, and that goal has been achieved through teams of local providers who will keep the clinics in operation.

"We reached the 25-year point, and to me it felt right to stop," he says. "You know when it's time."

While his monthly plane flights over the Rockies have ended, Johnson remains available to provide virtual consultation with the Western Slope clinics. Johnson continues to travel regularly to HIV clinics in Fort Collins and Pueblo operated under different Ryan White-funded programs.

"His career is marked with expertise in the field but also with passion for assisting us with our growth," Davis says. "He is driven by excellence but does so with remarkable humility. I consider him a mentor, a colleague, and a friend and could not imagine a better individual with whom to walk alongside."

There are a few patients at the Western Slope clinics who Johnson has seen for the entire 25 years he's made his monthly trips.

"It was very poignant and sad to say goodbye to them," he says.

Mandy Erwin and her family. All images courtesy of Mandy Erwin.

OVERCOMING ESOPHAGEAL CANCER

Total treatment with team care and mental health support

By Greg Glasgow

Mandy Erwin had experienced heartburn before, but never like this. It was fall 2020, and Erwin had just co-hosted a family reunion with her sister and mother. As the festivities were dying down, "I was like, my gosh, I'm really bloated, and I have the worst heartburn I've ever had," Erwin recalls. "It wouldn't go away. It wasn't normal bloating. I knew something was going on."

Erwin's primary care doctor agreed and ordered a CT scan. The imaging test showed a mass in Erwin's esophagus, and she was quickly diagnosed with esophageal cancer. She was referred to a small suburban cancer center, but after a frustrating experience attempting to connect with a provider there, Erwin and her husband came to the University of Colorado Cancer Center, where they met with a multidisciplinary team led by Elizabeth David, MD, and Benedetto Mungo, MD, and coordinated by Megan Marsh, PA-C.

MULTIDISCIPLINARY ADVANTAGE

In the CU Cancer Center's multidisciplinary clinic for esophageal and gastric cancer, patients are evaluated in one day by all of the specialists who take care of that specific cancer. A multidisciplinary team may include surgical oncologists, medical oncologists, radiation oncologists, pathologists, dietitians, genetic counselors, and more. After a patient is evaluated, the entire team of specialists comes together to discuss the best treatment plan for the patient.

"Within three days, I met with five doctors," Erwin says. "I love the multidisciplinary approach for this cancer. I'd never heard of that before, and I don't know why we don't tackle all diseases that way. It makes such sense. I sat there in an office and saw a surgeon, a radiologist, an oncologist — they all talked to me, and I felt like, 'OK, I'm in the right place.'"

BEFORE, DURING, AND AFTER

The CU Cancer Center providers put Erwin on a course of chemotherapy and radiation to shrink her tumor and eradicate any remaining cancer in her bloodstream before performing an esophagectomy — a surgery to remove her esophagus.

"That surgery involves two full surgical teams — a thoracic team and an abdominal team — and it was all done minimally invasively," Erwin

says. “Afterward, nothing could pass my lips for seven days, not even water. They told me that the junction they stitch together between the stomach and the esophagus works better if you don’t drink anything. It was hard to not drink water or even swallow when I brushed my teeth, but after seven days, they did a test to make sure the junction had no leaks, then I was cleared to drink things.”

Because an esophagectomy drastically alters the digestive system — surgeons fashion a new esophagus out of part of the stomach — Erwin was also on a feeding tube for a few months so her body could adjust to the new arrangement.

“We routinely place a feeding tube at the time of surgery, because that gives patients a way to get calories and nourishment as they heal,” Mungo says. “Gradually, there is a shift, and around the four- to six-week mark, when they can take the entirety of the calories by mouth, we can remove the feeding tube. We pull it out, and the hole closes.”

BACK TO NORMAL

A cook, gardener, and self-proclaimed foodie, Erwin says the feeding tube was the toughest part of the entire treatment experience. Calling on her natural stubbornness, she pushed to get back to normal eating and her normal level of physical activity.

“I’m a paddle boarder, but you can’t go paddleboarding with a hole that goes straight to your guts,” she says. “I really rushed them, to the point of frustration sometimes, because I was like, ‘Let’s get this part over with and get this tube out. I want to be eating food again.’ Going from being able to eat anything to having to drink broth for a month, then you can have soups with some solids and applesauce and things like that — as a cook and a foodie, it was a little discouraging.”

Mungo says Erwin’s determination to get better — all with a smile on her face — helped her overall prognosis.

“As clinicians, we like to think that we make a difference, and I think we do,” he says. “But the attitude and the state of mind and the courage with which people approach their surgery, their disease, can really make it or break it. Someone who goes in with a positive attitude, wants to heal, wants to get better — it’s a huge game changer.

MENTAL HEALTH CARE

For Erwin, another difficult part of the treatment journey for her esophageal cancer was what it did to her mental health. Fortunately, she found resources to help.

“Mental health is the hardest part,” she says. “It’s not a great cancer. The statistics aren’t good. People can tell you to stay off the internet, but nobody does. I had a cancer therapist who was really helpful to talk to. Having cancer is a dark thing, especially this kind of cancer, so it was nice to have somebody to talk to about the dark, deep, dark things.”

In the end, having a vehicle for processing those dark, deep things left Erwin with a sense of gratitude for her treatment and her team, which also included Elizabeth David, MD, associate professor of cardiothoracic surgery in the CU School of Medicine,

“It all helped me come out on the other side and get through all of those things,” she says.

“With Dr. Mungo and Dr. David, I really appreciated their straightforward way of discussing things with me; no sugarcoating. I’d ask a question, and they would say, ‘Yeah, this does suck. It’s just bad luck.’ They were very straightforward, and I really appreciated that.”

More than four years after her diagnosis, Erwin is eating normally again, albeit with smaller portions. She’s back to living her life the way she wants to — something that, at one point, she wasn’t sure she would ever do again.

“I feel super psyched about it, because I didn’t know if I’d ever be myself again on the other side of the surgery,” she says. “I had no idea what was going to happen. When I consider the kind of surgery I had — my surgeons were amazing. I can live my life and be with people and eat and do things that I want to do. We go hiking and paddleboarding; we go camping a lot, and we go to a lot of concerts, and I could do all those things. I feel grateful for the condition my body is in.”

> ***“I love the multidisciplinary approach for this cancer. I’d never heard of that before, and I don’t know why we don’t tackle all diseases that way.”***

Mandy Erwin paddle boarding.

RESTORING VISION

CU team leads national project to cure blindness

By Laura Kelley

The University of Colorado Anschutz Medical Campus announced in December 2024 that it will receive up to $46 million from the Advanced Research Projects Agency for Health (ARPA-H) Transplantation of Human Eye Allografts program to advance pioneering research aimed at curing total blindness through human eye transplantation.

The award will support the work of the Total Human Eye-allotransplantation Innovation Advancement project team led by CU.

The project is led by principal investigator and surgeon-scientist Kia Washington, MD, and co-principal investigator Christene A. Huang, PhD, transplant immunologist. Both are professors at the University of Colorado School of Medicine and are nationally recognized leaders in plastic and reconstruction surgery, transplant surgery and immunology.

"Currently, there has never been a successful whole human eye transplant for the restoration of vision," Washington says. "We believe the great advancements over the last two decades in technology, transplantation surgery and regenerative medicine now make restoration of vision possible."

ARPA-H is a federal agency established to advance high-potential, high-impact biomedical and health research that cannot be readily accomplished through traditional research or commercial activity.

REATTACHING THE OPTIC NERVE

The CU Anschutz team will begin with animal models to study optic nerve regenerative strategies, immunosuppression, and post-operative care, with the goal of advancing to human trial studies. Washington will lead the overall scientific team and the surgical team.

"One of the most complex parts of the procedure is the successful reattachment of the optic nerve. Think of it as fixing a broken electrical connection so that signals from the eye can be transmitted to the brain," Washington says. "Monitoring and aftercare are equally important to make sure the brain continues to receive the correct signals and is accepting the new eye."

Huang's team will study how the immune system reacts to the new eye.

"Our goal is to make it easier for the body to accept the new eye without rejecting it. To do that, we will create practical methods to manage inflammation and prevent transplant rejection," says Huang.

The team says the work could also be translated to other parts of the body.

"The techniques and advancements we develop could be used to treat blindness while offering new solutions for other neurodegenerative disorders that impact the central nervous system," Washington said. "For example, treating conditions like spinal cord injuries or brain damage. This could also be used in progressive brain disorders like Alzheimer's and Parkinson's disease."

COLLABORATIVE EFFORT

This project will be in collaboration with several partners.

Johns Hopkins University will use a special type of molecule called a dendrimer to deliver genetic instructions to the retina and the optic nerve to help fix or modify how certain functions are working to improve vision. The team will also look for genes that regulate the nerves in the eye and use them to help them recover and regenerate more effectively.

The University of Wisconsin, Indiana University, and the National Eye Institute will work together to develop a bioengineered "nerve bridge" to connect the donor's optic nerve with the recipient.

Researchers at the University of Southern California will work to create a system that uses electrical signals to support the successful addition of nerve cells into an existing part of the eye, improving function and helping with vision. Additionally, they will use gentle electrical currents to help cells adapt to their new environment.

Investigators at Cedars Sinai Medical Center will create protocols for the surgery to make sure donors of the eye are properly checked and approved before the procedure is performed.

The Foundation Fighting Blindness will manage reporting for this complex effort.

CU Anschutz Chancellor Don Elliman and Kia Washington, MD, principal investigator at December press conference announcing the funding.

TREATING CYSTIC FIBROSIS

CU research makes a miracle drug even better

By Wendy Meyer

Twenty-five years ago, the median age of survival for someone with cystic fibrosis (CF) was about 30. Today, someone who has this rare, life-shortening genetic disease can look forward to a median survival age of 61. What has made the difference? Medical research.

"It is not lost on us how much CF [treatment] has advanced," says Tara Kent, mother of two children with CF who received treatment through clinical trials at Children's Hospital Colorado. These clinical trials led to the recent FDA approval of the drug called ALYFTREK.

In 2012, people with cystic fibrosis (CF) celebrated when the FDA approved ivacaftor, the first drug designed to target the defective protein that causes the disease. (This protein is called the cystic fibrosis transmembrane conductance regulator or CFTR.)

EXPANDING TREATMENT

"The CFTR modulator is a medication that helps the CF protein work better in people with CF," says Jordana Hoppe, MD, a pediatric pulmonologist at Children's Hospital Colorado. She has been one of the pulmonologists caring for the Kent children since they were infants and was a lead principal investigator for the pediatric ALYFTREK trials.

The Colorado Clinical and Translational Sciences Institute (CCTSI), based at the CU School of Medicine, provided the expert research nurses and the pediatric Clinical Translational Research Center where this CF trial took place. Indeed, all CF trials over the past 15 years have relied on these CCTSI resources and services.

Through research, these CFTR modulators continue to evolve to be more convenient in dosing and to be a treatment option for most children with cystic fibrosis. When ivacaftor was approved, only 4% of individuals with CF had genotypes that qualified them to receive the drug. Today, 90% of all people with CF can take a CFTR modulator.

"The new modulator will only be given once a day where all prior modulators were dosed twice a day," says Hoppe who is also Associate Professor of Pediatrics and Pulmonary Medicine at the CU School of Medicine. "There are benefits, because it is not quite as simple as just taking the pills. For it [the drug] to be absorbed, it needs to be taken with a high-fat meal and pancreatic enzymes."

She explains that with once-a-day dosing, families have more flexibility in terms of what works best for their schedule and their child's eating habits. Moreover, she says the new CFTR modulator has evolved, "The new medication is also thought to help the CF protein work a little bit better than in Trikafta [the tradename of elexacaftor-tezacaftor-ivacaftor].

Cohen Kent, age 11, has participated in two trials with Hoppe, and his little sister Harper, age 8, has participated in one. Though the Kent family moved to Texas several years ago, Kent said to Hoppe, "If ever there is a clinical trial, please always keep us in mind."

Jordana Hoppe, MD, stands with Cohen Kent, left, and Harper Kent, right.

Both children participated in the ALYFTREK trial, so every month the Kents would travel from Texas to Children's Colorado for treatment. They consider Children's Colorado, Hoppe, and the whole care team like a family.

'WE HAVE TO KEEP FIGHTING'

Now that the drug has been approved by the FDA, Kent says she feels a sense of pride, knowing that her children's participation has made a difference in the approval of the improved CFTR modulator, which will ultimately help more children with CF.

"We stay involved because 10 percent don't have a CFTR modulator. We have to keep fighting until everyone else has an option to take their miracle drug," Kent says.

Hoppe notes that unfortunately, there are some people with CF who are not eligible to take a CFTR modulator because they do not make the CF protein. She adds, "…additional clinical trials are being done in adults, looking at RNA/DNA genetic based therapies…. There could be a genotype agnostic treatment in the future."

For Kent and her family, now that ALYFTREK is approved, her children's treatment will essentially be the same as it was on the clinical trial. "We feel very, very blessed to live in the U.S., where these trials are an option and in a medical community that is so advanced."

BETTER TESTS

Cancer Center member oversees clinical trials of esophageal cancer screening device

By Greg Glasgow

Detecting and preventing esophageal cancer may soon become easier thanks to a pair of clinical trials overseen in part by University of Colorado Cancer Center member Sachin Wani, MD.

Wani, the endowed chair of the Katy O. and Paul M. Rady Esophageal and Gastric Center of Excellence and a professor of gastroenterology in the Department of Medicine, is co-investigator and site principal investigator on a five-year National Cancer Institute (NCI) grant to conduct clinical trials on a non-endoscopic method of detecting the precancerous condition known as Barrett's esophagus. In the EsoGuard test, an uninflated balloon is swallowed, then inflated by a clinician to collect cells from the lower esophagus. The cells are then DNA-tested for the presence of Barrett's.

"The unfortunate reality is that patients who are at risk for Barrett's esophagus often don't get adequately screened," Wani says. "One of the biggest limitations is the fact that the screening often requires an endoscopy, which is an invasive test that requires sedation. More than 90% of our patients with esophageal cancer have no prior diagnosis of this precancerous condition, which reflects the fact that they've never been screened. That's what we're trying to change."

EXPANDING TESTING

Currently, Wani says, people are only tested for Barrett's esophagus if they have acid reflux symptoms that have been ongoing for five years or have significant reflux on a weekly basis. The EsoGuard technology will allow wider screening of those with risk factors for the condition — including age greater than 50, obesity, tobacco use, and a family history of Barrett's or esophageal cancer — without the need for a costly and time-consuming endoscopy.

"We know that esophageal cancer can develop in these individuals as well," Wani says, "so we're going to evaluate this platform to see how well it performs in individuals who are at risk for esophageal cancer but don't necessarily have the classic reflux symptoms."

During the clinical trial, the EsoGuard test will be administered by Wani and his research team, and all participants will receive an endoscopy to determine the accuracy of the method. In the future, however, he foresees the five-minute balloon test being administered in-office by a general physician.

"It's basically a balloon that's inverted into a small capsule, which is the size of a vitamin pill, and it's attached to a string," he says. "You swallow this capsule, and once it's in the stomach, the physician uses a syringe to inflate the balloon, then pulls it through the lower part of your esophagus. Once that's done, the physician deflates the balloon, brings it back into the capsule, then removes it.

"By doing that, we selectively sample the area where you find Barrett's, which is in the lower part of the esophagus," Wani continues. "Then we check for methylation markers that are associated with the presence of Barrett's esophagus."

Patients who test positive in that scenario would then receive an endoscopy to verify the findings. But those who test negative would need no further testing, he says.

IDENTIFYING HIGH RISK PATIENTS

In addition to the EsoGuard trial, the NCI grant also supports the further development of a deep DNA sequencing and AI analysis protocol known as BAD for detecting esophageal cancer DNA. Wani and researchers at other trial sites hope to use BAD testing to identify individuals at high risk for developing esophageal cancer and to adapt the system — which currently gathers samples by using a device to brush cells from the lining of the esophagus — to work with samples gathered by the EsoGuard device.

"Not all patients with Barrett's progress to esophageal cancer, but the critical question is, 'Who with Barrett's esophagus is likely to progress, and can we intervene on those patients sooner rather than later?'" Wani says. "That's the whole concept of this study."

The EsoGuard technology will allow wider screening of those with risk factors for the without the need for a costly and time-consuming endoscopy.

EXTENDED REACH

Robotic procedure allows care for more kidney transplant patients

By Greg Glasgow

Denied a kidney transplant because of his weight, Gerald Paity dutifully showed up at a dialysis center at 5 a.m., three days a week, for more than nine years before a new robotic procedure performed by a transplant team at the University of Colorado Department of Surgery gave him a new lease on life.

"I love those guys to death," Paity says. "They're all my saviors."

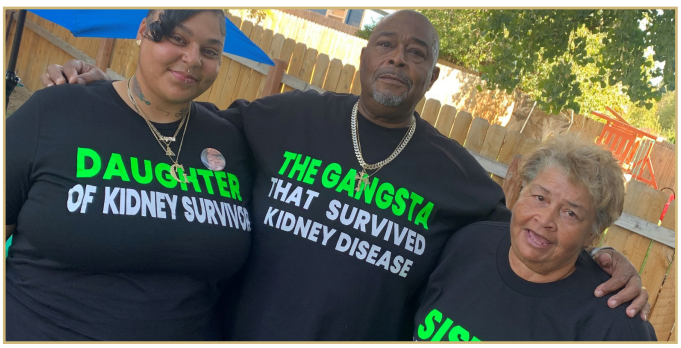
Led by Thomas Pshak, MD, associate professor of transplant surgery, the team specializes in robotic kidney transplant on patients with high body mass index (BMI), a procedure that has a higher risk of complications when performed with traditional open surgery. Because the robot allows the surgery to essentially be performed inside the body, using very small incisions, BMI is no longer a factor in who does or does not receive a kidney transplant, Pshak says.

"By operating on the inside, I can see so much better," he says. "I can do the operations so much better because I'm literally right there, versus when I'm standing outside of a patient. As the abdomen gets bigger and deeper, it's harder and harder because my hand has to go farther and farther in, and I can't see very well. With the robot, all that goes away. It doesn't matter your size or shape."

DIABETES A RISK FACTOR

Paity's journey to transplant started nine years ago, when he was diagnosed with diabetes. He began doing peritoneal dialysis at home in 2015 but had to switch to hemodialysis at a dialysis center in 2017. Between the disease and its treatment, he was unable to work and was fatigued nearly all the time.

Paity tried to get on the kidney transplant list for years, but his high BMI made him ineligible. "My doctors kept saying I was overweight," says Paity, 53. "They wanted me to get to the weight that I was in high school. I had a gastric bypass, I got on Ozempic, and I got down to 291, which was as much as I could get down to. But when I came to CU and saw Dr. Pshak, he said, 'I can do it with the robot. Give me two months, and I'll have you transplanted.' It was crazy, because it didn't even take two months. It was three weeks."



Gerald Paity with his sisters Diana Goodwin, left, and Rosemarie Paity.

Gerald Paity with, from left, transplant surgeons Trevor Nydam, MD, Philippe Abreu, MD, who performed Paity's surgery, and Thomas Pshak, MD.

HIGH-BMI TRANSPLANT PATIENTS

Pshak and the team performed Paity's transplant surgery in September 2024. After successfully lobbying for greater access to the surgical robot, he and his team are now able to perform transplants from deceased donors in obese patients.

"Previously, the high-BMI patients needed to have a live donor, because we needed to schedule the surgery," says Pshak, who has started a clinic specifically for high-BMI patients. "Now we have the access we need and the team we need, so we're trying to get everybody onto our list, even going backward in time to contact patients who were denied for transplant in the past."

LIFE-CHANGING PROCEDURE

Paity says he felt a boost in his energy levels immediately following the transplant, surprising his doctors by walking unassisted two days after his surgery took place.

Now back home and able to spend more quality time with his wife, children, and grandchildren, Paity is filled with gratitude and optimism for the future. He will take anti-rejection medicine for the rest of his life and go in for regular follow-up appointments with Pshak and his team, but it's a small price to pay for getting off dialysis and receiving an operation that changed his life.

"I concentrate more on my family, because I got saved," says Paity, who plans to write a thank-you letter to the family of the deceased donor. "I get to see them a lot longer now. At one point, I thought I was going to be on dialysis for the rest of my life. Now we get to live our life."

CRAVE CONTROL

CU researcher studying whether Ozempic can curb alcohol use

By Greg Glasgow

Joseph Schacht, PhD

A National Institutes of Health-funded study at the University of Colorado School of Medicine is examining whether GLP-1 agonist drugs can help people with alcohol use disorder reduce their cravings to drink.

Joseph Schacht, PhD, associate professor of psychiatry and co-director of the Division of Addiction Science, Prevention, and Treatment, is studying whether the pill form of Ozempic — known as semaglutide — can help curb cravings in those who have become addicted to alcohol.

"The thing that people most report when they take these drugs is that they're not hungry anymore, which is why they help you lose weight. They affect a hormone that makes you feel full," Schacht says. "When longer-acting GLP-1 drugs like Ozempic were first approved for human use in the late 2010s, there also was an off-label effect where people were reporting that they were not interested in drinking and that they were not craving alcohol."

STUDYING CRAVINGS

As craving is one of the core components of addiction, Schacht designed a double-blind trial in which participants take a drug daily for two months and agree to be studied to see how their cravings are affected. Patients must have a body mass index of 25 or higher to account for the weight loss effects of GLP-1 drugs.

"Our primary outcome is if it reduces alcohol craving and how much people drink," he says. "We're also doing brain imaging where we present pictures of alcohol to see if semaglutide reduces activation of brain areas associated with reward. Some of the approved medications for alcohol use disorder can reduce that. We're testing whether semaglutide has that same effect. If it does, that would suggest that the mechanism is through reducing craving and reducing the brain's response to reward."

The researchers are looking at other measures of craving as well, including asking people what they drink most frequently, purchasing that alcohol, then pouring it in front of a participant, bringing it to their nose, and asking them to smell the liquid.

"We ask them to tell us how much they feel craving in that moment," Schacht says. "We measure the brain response on the MRI scanner. We're also measuring the concentration of the drug in the blood, as well as a biomarker of alcohol. We're asking people how much they drink, but we can also measure something called phosphatidyl ethanol, which is a chemical that increases in the blood if you're drinking heavily over a long period of time and decreases if you reduce your drinking or become abstinent."

EFFECTIVE TREATMENT NEEDED

Schacht says that between 10% and 15% of Americans meet the diagnostic criteria for alcohol use disorder, and that alcohol-associated deaths have significantly increased since the COVID pandemic. Alcohol is the third-leading cause of preventable death in the United States, he says, after obesity and smoking. Though there are three FDA-approved drugs for alcohol use disorder, none of them is hugely effective.

"We've been looking for a more effective drug for a long time," he says. "Our ultimate goal would be to conduct a larger phase three trial that would support an FDA indication; however, many drugs are used off label for other indications besides the ones they're approved for. If there were data suggesting that these drugs were effective in reducing alcohol craving, we hope that physicians might start to prescribe them for that indication, even before a formal approval.

"I've been working in this area for 15 years, and this is the most exciting drug we've seen in that time," he adds.

> ***"I've been working in this area for 15 years, and this is the most exciting drug we've seen in that time."***

BRAIN DRAIN

CU radiologist leads study on effect of cannabis on brain function

By Julia Milzer

Joshua Gowin, PhD

CU Anschutz Medical Campus researchers have conducted the largest study of its kind on the effects of recent and lifetime cannabis use on brain function during cognitive tasks.

The study, published in January in JAMA Network Open, is the largest of its kind ever to be completed. Researchers examined the effects of cannabis use on over 1,000 young adults aged 22 to 36 using brain imaging technology. They report that that 63% of heavy lifetime cannabis users exhibited reduced brain activity during a working memory task, while 68% of recent users also demonstrated a similar impact.

This decline in brain activity was associated with worse performance on working memory – the ability to retain and use information to perform tasks. For example, working memory allows a person to follow instructions they've just been given or to mentally visualize and manipulate information, like solving a math problem.

INFORMED DECISIONS

"As cannabis use continues to grow globally, studying its effects on human health has become increasingly important. By doing so, we can provide a well-rounded understanding of both the benefits and risks of cannabis use, empowering people to make informed decisions and fully comprehend the potential consequences," says the study's first author Joshua Gowin, PhD, assistant professor of radiology.

In the study, heavy users are considered young adults who've used cannabis more than 1,000 times over their lifetime. Whereas, using 10 to 999 times was considered a moderate user and less than 10 times was considered a nonuser.

The researchers then studied the neural response of participants during a magnetic resonance imaging (MRI) session and gave them cognitive tasks to complete, including tasks that tested working memory, reward, emotion, language, motor skills – such as tapping a finger to map brain control, and relational assessment.

IMPACT ON BRAIN

The researchers found that cannabis had a statistically significant effect on brain function during working memory tasks, meaning the observed impact is very unlikely to be due to random chance. This effect was seen in both recent and lifetime cannabis users. The impact was less significant for the other tasks.

"We applied the highest standards to our research, setting rigorous thresholds for statistical significance across all seven cognitive function tests. To minimize the risk of false positives, we employed false discovery rate (FDR) correction. While some of the other tasks indicated potential cognitive impairment, only the working memory task showed a statistically significant impact," adds Gowin.

During working memory tasks, the researchers found heavy cannabis use appeared to reduce brain activity in certain areas of the brain (dorsolateral prefrontal cortex, dorsomedial prefrontal cortex and anterior insula). These regions of the brain are involved in important cognitive functions such as decision-making, memory, attention and emotional processing.

However, Gowin mentions their research also suggests that abstaining from using cannabis before doing a cognitive task could help to improve performance. "People need to be aware of their relationship with cannabis since abstaining cold turkey could disrupt their cognition as well. For example, heavy users may need to be more cautious," Gowin says.

He adds, "There are a lot of questions we still need answers to regarding how cannabis impacts the brain. Large, long-term studies are needed next to understand whether cannabis use directly changes brain function, how long these effects last and the impact on different age groups."

Joshua Gowin, PhD, assistant professor of radiology, and Justin Juvera, senior professional research assistant and MRI manager, look at a brain scan of a participant in Gowin's current study, which follows the study on the effect of cannabis use on brain function during memory working tasks.

ALUMNI CORNER

2024 Silver & Gold Alumni Awards

The University of Colorado School of Medicine and the CU Medical Alumni Association honored five outstanding physicians for health care delivery and service to their communities and CU at the Silver & Gold Alumni Awards in December 2024. More than 100 alumni, students, faculty, and staff attended the celebration in the Elliman Conference Center.

Marianne Neifert, MD '72, - Silver & Gold Award

First awarded in 1969, the award recognizes outstanding service to the community and contributions to transform medicine.

Marianne Neifert, MD, affectionately known as "Dr. Mom," has been a trailblazer in breastfeeding medicine, parenting education, and compassionate health care for over five decades. Her enduring commitment to improving maternal and child health by promoting, supporting, and teaching breastfeeding management has helped launch the new specialty of breastfeeding and lactation medicine and inspired generations of health care providers and parents.

Neifert's career in medicine was profoundly shaped by her personal journey of marrying young, having her first child before graduating college at the age of 20, birthing two more babies during medical school and two during internship and residency training. With minimal maternity leave and without electric breast pumps nor lactation breaks, sustaining breastfeeding was a daunting challenge.

After graduating medical school and completing her pediatric residency in Colorado, Neifert joined the CU School of Medicine Pediatrics faculty, teaching for 10 years in the physician assistant program. Her recognition as "Dr. Mom" provided a national platform for media interviews, five parenting books, and parenting columns for multiple magazines.

Neifert earned a master of theological studies in midlife and has long taught in religious, life skills, and parenting programs for female inmates at her county jail.

Paul Overlie, MD '74, - Distinguished Achievement Award

The award recognizes outstanding achievements benefiting their communities, the practice of medicine, the provision of health care, the Medical Alumni Association, and the University of Colorado School of Medicine.

When Paul Overlie, MD, was 14 years old, his father was diagnosed with multiple sclerosis, and he spent many years helping with his care. He attended Colorado State University and then worked as a teacher after graduating.

His father's disability fueled an interest in health care, so he enrolled at Temple University to study physiology. While researching medicines to change blood pressure in bats, the chairman of the physiology department approached him and said that while he was doing good work, she and her colleagues thought he might be better suited to caring for humans. Overlie applied and was accepted to the University of Colorado School of Medicine.

Overlie has written many articles, abstracts, and book contributions, with a primary interest in heart stents, vascular balloons, and extracorporeal bypass machines. He has also participated in multicenter studies for heart attack and congestive heart failure trials. While conducting his research and writing, he maintained a full-time clinical cardiology practice. Overlie served as a member of several medical advisory boards, expert panels, clinical/device trials, and course directorships for continuing medical education.

Taylor Triolo, MD '13, - Richard Krugman Distinguished Service Award

The Richard Krugman Award for Distinguished Service is given to board members of the association who are MD graduates of the University of Colorado School of Medicine and who have contributed outstanding service to the Medical Alumni Association and to the University of Colorado School of Medicine.

Taylor Triolo, MD, is an assistant professor of pediatrics at the Barbara Davis Center for Diabetes, a NIH, K-funded researcher, and serves as medical staff at Children's Hospital Colorado and University of Colorado Hospital.

She has served on the board of the CU School of Medicine Medical Alumni Association for the last 15 years, initially in 2009 as her class representative and then as vice president, president, and now immediate past president. She supported the board as they developed a scholarship for medical students and innovation community grants to connect students and alumni.

Triolo's research ranges from the promising area preserving endogenous beta cell function in type 1 diabetes to her role in developing a program to bring leading-edge total pancreatectomy with islet auto transplantation to the University of Colorado. She is also an experienced educator, shaping the next generation of pediatric endocrinologists as the associate program director of the pediatric endocrinology fellowship at the University of Colorado School of Medicine.

Larry Chan, MD - Humanitarian Award

The Humanitarian Award recognizes lifelong service and honors those who have provided extraordinary service to their community, demonstrating leadership through global or local service.

Larry Chan, MD, has dedicated over 40 years to the University of Colorado School of Medicine as faculty and currently serves as a professor of medicine, the director of transplant nephrology research and development in the Division of Renal Diseases and Hypertension, and an active member of the CU Medical Alumni Association board.

Chan grew up in Hong Kong and developed a passion for serving others thanks to the influence of his mentor, Father Howard Trube of New York Maryknoll Mission, who developed schools and charity centers as a missionary.

Chan's concern about increasing rates of kidney disease led him to focus on prevention and public awareness about organ transplantation. He co-founded the American Transplant Foundation, which provides resources for those awaiting transplants and promotes organ donation legislation.

In addition to his medical work, Chan is involved with the Nathan Yip Foundation, which offers financial assistance for schools and teachers in rural Colorado. He also supports Opera Colorado as a board member.

Carlie Field, MD '15 - Recent Graduate Award

The Recent Graduate Achievement Award honors recent graduates who demonstrate outstanding achievements benefiting their communities, practice of medicine, and the provision of health care.

Carlie Field, MD, works at Clinica Family Health in Thornton, CO as an OB/GYN physician, offering full-spectrum care to low-income and other underserved groups. She also provides health care services at Planned Parenthood Great Plains in Kansas.

A love of science was fostered by Field's parents, who are both engineers, and her desire to form human connections led to her interest in medicine. She took advantage of an opportunity to shadow her pediatrician, and she also witnessed life in other parts of the world, traveling to Senegal to volunteer with a health care group and to Nicaragua to work with coffee farmers. These experiences solidified her interest in health equity.

After her residency at University of Washington in Seattle, Field completed a Health Equity Action and Leadership (HEAL) fellowship, which brought her to Navajo Nation in Chinle, AZ, and then to Neno, Malawi, of the poorest districts in the country.

Field then accepted a position at Clinica Family Health. She works to share her knowledge with nurse practitioners, family medicine physicians, and physician assistants, supporting them as they care for the more high-risk patients in our community.

Shawnecca Burke, MD - Recent Graduate Humanitarian Award

The CU Medical Alumni Association created the Recent Graduate Humanitarian Award to recognize our CU School of Medicine alumni who have graduated within the last 15 years.

Shawnecca D. Burke, MD, completed her family medicine residency in 2022 and is now an assistant professor at the University of Colorado School of Medicine and the medical director of Sloan's Lake Primary Care Clinic at Denver Health. She also is attending physician on labor delivery at Denver Health and acts as the coordinator for the first-year obstetrics rotation.

During her time in medical school, Burke completed rotations through Indian Health Services. This solidified her desire to work in primary care in a small community. One of her mentors connected her to the University of Colorado, and she applied and was accepted to the rural training track.

Burke joined the Minority & Allied Resident Council (MARC) soon after she arrived on campus as an intern. At its basis, the mission of MARC is to foster community for people on campus who may not have an immediate support system. In 2020, Burke was unanimously selected as the President of MARC and was successful in taking the organization to new levels in innovation, culture, and recruitment. Burke continues to support MARC as the faculty advisor.

2025 Alumni Award Nominations

The CU Medical Alumni Association is accepting nominations for the 2025 Alumni Awards. Submit nominations to **justin.denette@cuanschutz.edu**. Nominations are due April 30, 2025.

Stay Involved!

There are many opportunities to get involved with the CU Medical Alumni Association from mentoring first generation medical students, serving on alumni panels, joining the CU MAA Board of Directors, participating in your reunion, or attending an upcoming event. For more information, contact The School of Medicine Program Manager **justin.denette@cuanschutz.edu**.

Save the Date

The CU Medical Alumni Association will host the 2024 Alumni Reunion on September 25–27 for class years ending in 5 and 0. Festivities include class dinners, tours of campus, an update from the Dean, family activities, and more.

If you are interested in helping with the reunion, please email **healthalumni@ucdenver.edu**.

COLORADO CHEST TUBE

CU faculty develop new way to manage pain after surgery

By Carie Behounek

Jessica Rove, MD

Not long ago, cardiothoracic surgery required cracking open a patient's chest. Today, many procedures are performed robotically through incisions no larger than a credit card. Despite these advances, the procedure remains painful.

In fact, one in eight patients without a history of opioid use are still using prescription painkillers 90 days after surgery. It's a number that Jessica Rove, MD, associate professor of surgery at the University of Colorado School of Medicine, wants to see reduced.

"Our incisions are very small. We're not breaking any bones. Yet this number tells us that our patients are still experiencing a significant amount of pain," she says.

Rove recognizes the risks of prolonged opioid use, including dependence, addiction, and overdose. She looked at what's known about post-surgical pain and discovered the source: chest tubes.

"We know that opioid use increases as the duration of chest-tube use increases, and as soon as the chest tubes are removed, opioid use declines," she says.

Rove's focus on the problem – pain points along the tube – spurred a creative solution that combined the talents of a bioengineer at the University of Colorado Denver and the commercialization expertise of CU Innovations. The pain-management innovation promises less reliance on opioids as well as fewer complications and better recoveries for patients.

RELIEVING POST-SURGICAL PAIN

In cardiothoracic surgery, chest tubes are inserted to drain excess fluid, air, and blood, helping prevent infection and fluid buildup while allowing the lungs to fully expand. These tubes remain in place until drainage slows, and the health care team is confident the chest cavity is healing properly. Positioned in the pleural space outside the lung, chest tubes press against the chest wall, where nerves line the inner surface.

Although patients can't see where their chest tubes are placed, when asked they can point to their exact internal location. The pain from chest tubes is often so intense, it limits effective pulmonary toilet and mobilization. However, just 24 hours after removal, most patients feel well enough to be discharged.

"More than 95% of people caring for patients post-surgery agree that patients feel much better once their chest tubes are removed," Rove says. "Our patients don't need more opioids – they need a better way to control the pain along the tube where it's touching the chest."

When considering other options for pain control, Rove found research that suggested applying a numbing anesthetic along the side of a chest tube could ease a patient's discomfort. This approach was particularly promising because a jelly anesthetic such as lidocaine can be placed exactly where the chest tube presses against the nerves in the chest wall, directly targeting the source of pain.

"The problem was that spreading lidocaine jelly is like spreading peanut butter – wherever it falls, it falls. Chest tubes are round silicone tubes that are designed to not be adherent. So, it was an inconsistent method of applying pain control," Rove says.

But the idea was right.

PARTNERING WITH BIOENGINEERS

Rove reached out to Daewon Park, PhD, associate professor of bioengineering at CU Denver, to collaborate.

Together, they developed an innovative approach: a chest tube coated with lidocaine to gradually release the numbing treatment over time. Their goal was to create a controlled, seven-day release, which more than covers the typical duration a chest tube remains in place.

To achieve this, the coating process was refined to ensure it was both durable and reproducible. They designed each tube to deliver a precise amount of lidocaine with every application.

The result is the Colorado Chest Tube, a technology that uses nanoparticles encapsulated in a hydrogel to deliver lidocaine. This dual-purpose design provides essential drainage as well as offering targeted, non-opioid pain relief.

Considering there are 3.9 million chest tubes placed annually in the U.S., the innovation has the potential to shorten hospital stays and reduce overall costs.

> *"This is what the spirit of CU Innovations is all about. They wanted to create a culture here on campus where everybody's talking to each other and nobody's working in isolation. This project is a good example of this."*

Also, the product has been designed with implementation in mind. It's placed exactly like a standard chest tube, and it requires no additional training or changes in workflow.

Rove anticipates that by alleviating discomfort, patients can begin walking and taking deeper breaths sooner, which can lead to fewer complications and a more active recovery.

SPARK AWARD

The Colorado Chest Tube project gained momentum through a SPARK Award, which offered funding and mentorship, along with the commercialization expertise of CU Innovations.

"This is what the spirit of CU Innovations is all about," Rove said. "They wanted to create a culture here on campus where everybody's talking to each other and nobody's working in isolation. This project is a good example of this."

Rove is excited to help the more than 300,000 U.S. patients who receive cardiothoracic surgery each year.

"It's hard to see people in pain and not be able to help them, outside of the 'sledgehammer' approach of opioids. It's been amazing to see that we can target the relief. We can't wait to bring it to our patients."

The team has demonstrated the Colorado Chest Tube's effectiveness in the lab and is now moving toward clinical trials with patients.

WHAT IS SPARK COLORADO?

The mission of SPARK Colorado is to advance academic research from the lab to patient care.

SPARK Colorado advances new technologies towards the clinic by providing education, access to industry expertise, a culture of innovation, and SPARK Awards, our flagship commercialization funding mechanism.

SPARK Awards support CU Anschutz faculty and students developing therapeutics, medical devices, and diagnostics to address unmet medical needs. SPARK may fund up to five projects per year, and projects may receive up to $200,000. Budgets are developed with the SPARK team and are matched to product development milestones.

SPARK Colorado is modeled after the Stanford SPARK Program that was established in 2006 by Daria Mochly-Rosen, PhD, as a cost-effective model to advance biomedical discoveries into treatments for patients. Similarly, the SPARK Program at CU Anschutz is focused on commercialization and the major emphasis is on product development and technology transfer activities.

DISASTER PREPARATION

Health care workers add climate knowledge to their skills

By Mara Kalinoski

From the wildfires across the American West to the back-to-back hurricanes devastating the southeastern United States, it's becoming increasingly important to address how climate changes are affecting our communities.

In September 2024, 13 clinicians from across the United States became the first cohort to graduate from the University of Colorado Diploma in Climate Medicine program, a comprehensive professional development program training leaders in climate and health policy, communication, and environmental justice.

The Diploma in Climate Medicine, which launched in 2022, is a 300-hour continuing medical education program. Five certificates cover the range of content in the program: foundations in climate medicine, sustainable health care, disaster resilience and response, community resilience, and global challenges.

> ***"Planetary health is a complex system that is in crisis."***

The program exposes participants to 100 subject matter experts through guest lectures and workshops. As climate change intensifies, it places stress on ecosystems and disproportionately affects vulnerable populations. Governments, nonprofits, and health care systems are working to address these challenges, but success will depend on well-trained leaders who can bridge the complex connections between climate and health.

"Planetary health is a complex system that is in crisis," says Joanne Leovy, MD, a family physician and 2024 program graduate. "We need to understand the relationship between our health care systems and the health of the patients that we treat and what is going on in our communities."

The inaugural Climate Diplomates will bring to their communities newly expanded knowledge of climate impacts on health, clinical practice insight, tools for health system decarbonization, and policy development.

HANDS-ON EXPERIENCES

Hands-on experiences are a hallmark of the program, allowing those pursuing the diploma to become better acquainted with practical aspects of climate work. These opportunities include climate modeling with scientists at the National Center for Atmospheric Research and participation at the annual Disaster Day at TEEX (Texas A&M Engineering Extension Service).

The National Science Foundation Ice Core Facility in Lakewood, Colorado, houses a vast collection of ice samples from all over the world, offering members of the program an in-depth look at the ongoing effects of climate change.

The array of experiences offered by the diploma courses help practitioners develop skills that enrich their base of general climate health knowledge. They also provide in-depth knowledge about specific problems and more niche sectors that need attention.

"The skills and tools I got from this program on how to map climate-related disasters, such as the impact of wildfires, have been transformational," says Climate Medicine Diplomate Arien Herrmann, a paramedic and community resilience manager from Illinois.

BUILDING A COMMUNITY

The climate diploma program is open to U.S.-based health care professionals who have an advanced degree and licensure in any clinical field. Applicants range from prehospital care providers and allied health professionals to nurses and physicians.

"Critically important for the graduates is the community of practice we've built so they have a network of peers to draw on as they pursue their own initiatives," says Shana Tarter, managing director of the Diploma in Climate Medicine.

That network helps participants bridge the gap between medicine-based practice and climate policy work.

Thirteen clinicians from across the country became the first cohort to graduate with a Diploma in Climate Medicine from the University of Colorado School of Medicine's Climate & Health Program.

Kathleen Shapley-Quinn, MD, executive director of Carolina Advocates for Climate Health and Equity, describes how the program has given her the opportunity and expertise to lead conversations with a diverse set of people across fields dealing with climate issues.

"It has given me the confidence to speak to people in media, other health professionals, and policy makers," Shapley-Quinn says. "It's given me a broad base of understanding and access to people with enormous expertise in the field I can contact to enhance my knowledge so I can be confident about an upcoming conversation."

Many in the initial cohort have already taken on leadership roles at the state level and are actively championing climate smart policy. One participant, Paul Charlton, MD, MA, is now co-chair of the National Indian Health Service sustainability committee and launched the Healthy Climate New Mexico organization focused on policy and advocacy. Charlton says he wouldn't have stepped into these roles if not for the diploma.

"I see our role as health care clinicians and providers to be advocates in the climate medicine space," Herrmann adds. "We need to be advocating for our patients and our future patients."

ADDRESSING TIMELY NEEDS

Members of the graduating class are using their knowledge to address time-sensitive issues in their states.

"At my hospital we were able to start a green team working on emissions production and ways we can improve the waste stream," says Karen Glatfelter, a hospitalist in Lawrence, Mass. "It's made me enjoy my job a lot more than I used to. I am hoping to connect with other hospitals at the community level and expand our work."

Recognizing the connections between issues is another benefit that comes from the diverse viewpoints and array of topics within the courses.

"When the transportation collaborative across our state gathers to have conversations and initiatives with our Department of Transportation in North Carolina, I have noticed that there isn't language about health and equity," Shapley-Quinn says. "Now, with limited knowledge about transportation, but a good bit of knowledge about health, I can quickly jump into that conversation and say, 'this is how transportation is going to impact health', and we know we can quantitate that at some level."

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- David Schumacher, MD

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