INVENTING THE WHEEL

Vermonters craft the "hub and spoke" — the first effective clinical approach to treating widespread opioid addiction.

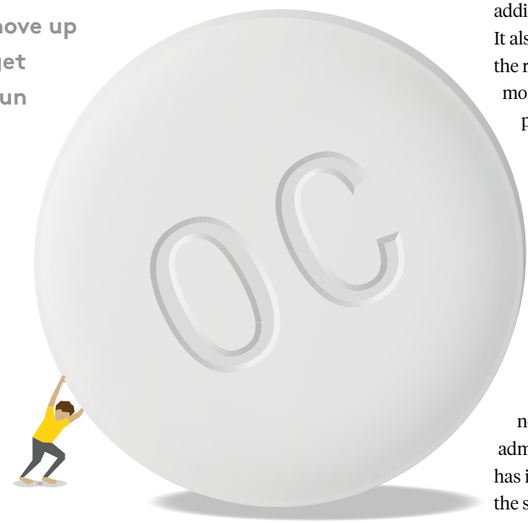
BY ERIN POST

As a family medicine physician with the Community Health Centers of Burlington, **HEATHER STEIN, M.D.,** sees patients for the full range of medical complaints, ones that Vermont primary care physicians have treated for generations: chronic conditions like diabetes and heart disease, allergy woes, stomach pain, and everything in between.

But in one crucial aspect, Stein's caseload is different than what Vermont's doctors have faced in the past. Today, about 40 of her patients also suffer from addiction to prescription painkillers or heroin. They walk in the front door of the health center just like everyone else. She treats them with a medication called buprenorphine, which blocks the effects of the drugs they had been using, reducing cravings and withdrawal symptoms. For some, this allows them to start careers, rekindle relationships with family, or simply reconnect with the self they were before addiction took hold. Stein treats their substance use but she also goes beyond this one aspect of their lives: She refers them to CHCB's Dental Center, prescribes birth control, and helps to manage high blood pressure. For her, they're patients just like any other — complicated and multifaceted, defined not by their diseases but by their potential.

"It's very rewarding work," says Stein, who is also a clinical assistant professor of family medicine at the UVM Larner College of Medicine, and medical director at CHCB. "I've seen people move up to managerial positions, get married, buy houses. It's fun to see people succeed and be part of that process."

Stein is at the vanguard of a new way of treating addiction, in a state that is a national leader in its innovative approach to a public health crisis.



Vermont has made headlines in recent years for its residents' struggles with opioids, a class of drug that includes prescription painkillers such as morphine, hyrocodone and oxycodone as well as illicit substances like heroin. From 2000 to 2014, Vermont saw a more than 770 percent increase in treatment for all opiates, indicating a rising tide of addiction. And it's a deadly epidemic: Heroin-related fatalities were non-existent in the state in 2010. Five years later, 34 Vermonters died of a heroin overdose in a single year.

For a state that prides itself on its bucolic image — think general stores with creaky wooden floors, rolling fields of dairy cows, steam rising from the maple sugar shack - the epidemic rattled many Vermonters to their core.

In 2014, then-Governor Peter Shumlin devoted almost his entire State of the State Address to what he called a health crisis that required quick and decisive action. He cited statistics as well as stories from Vermont families that painted a dire picture. Vermonters were suffering and needed help.

"What started as an OxyContin and prescription drug addiction problem in Vermont has now grown into a full-blown heroin crisis," said Shumlin.

Physicians at the front lines understood the stakes; even before the governor's address they had been seeing the steady rise in addiction rates, and knew all too well the struggles their patients had with opioids, how addiction tore families apart and ruined lives. It also killed far too many people. Faced with the ratcheting crisis and waitlists of 500 or more at some treatment centers, physicians, public health leaders, community organizers and law enforcement officials rolled up their sleeves and got to work.

Over the past five years, Vermont has emerged as a national leader in treatment for opioid use disorder. The new system — called the hub and spoke — incorporates addiction treatment into primary care in a comprehensive way not seen anywhere else in the country. A support network for community physicians administering medication assisted treatment has increased capacity at what are known as the spokes, while centers of excellence called

hubs bring addiction specialists and wrap-around services together to provide more intensive treatment for patients who need a higher level of support. Research on new treatments for addiction — long an area of excellence at UVM — benefits from a model that incorporates opioid use disorder as a chronic condition, fostering innovative thinking about ways to deliver that care.

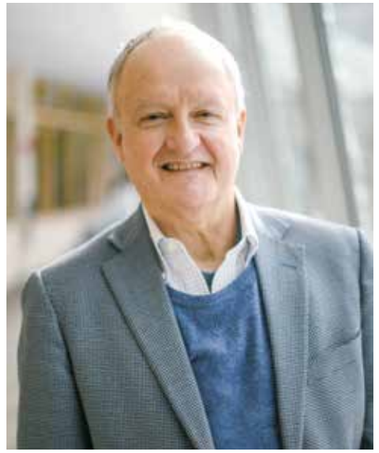
UVM Professor of Psychiatry **Richard Rawson '70, Ph.D.'74,** a native Vermonter who returned to the state in 2015 after a storied career in addiction treatment research at UCLA, characterizes Vermont as the leader of a paradigm shift. In December of 2017 he completed a federally funded assessment of the hub and spoke system, conducting interviews with providers and patients over the course of one year.

"I was surprised and inspired by the treatment going on in primary care settings," he says. "I think this new treatment paradigm will change the course of opioid addiction and recovery."

In creating this new system, Vermont physicians and health policy leaders have altered public perception of addiction. Instead of shunting patients labeled as "addicts" into a category separate from other disease sufferers, they're welcomed into an environment that supports them on the journey to recovery. Although challenges remain, the hub and spoke system represents a huge step forward in how opioid use disorder is treated and understood, and stands alone as a national model.

"HEY, YOU GUYS, I'VE GOT THIS IDEA"

UVM Clinical Assistant Professor of Family Medicine **John Brooklyn, M.D.,** had his first 'aha' moment related to addiction as a second-year medical student at Brown University. When a faculty member there gave a lecture about his own struggles with addiction, Brooklyn realized for the first time that the disorder doesn't discriminate, and



UVM Professor of Psychiatry Richard Rawson '70, Ph.D.'74

"I WAS SURPRISED AND INSPIRED BY THE TREATMENT GOING ON IN PRIMARY CARE SETTINGS. "I THINK THIS NEW TREATMENT PARADIGM WILL CHANGE THE COURSE OF OPIOID ADDICTION AND RECOVERY."

— RICHARD RAWSON '70, PH.D.'74

that "you can treat it just like anything else." Although a career in the field "wasn't anything he aspired to," this early exposure stayed with him. He matched into Family Medicine in 1989 and came to Vermont for a residency at what is now UVM Medical Center. For him it was a homecoming of sorts — although he's a Rhode Island native he attended UVM as an undergraduate, receiving his degree in elementary education in 1979.

After residency, he started working at UVM's Human Behavioral Pharmacology Lab, directed at the time by a trio of renowned UVM researchers: Stephen Higgins, Ph.D., now director of the Vermont Center on Behavior and Health; John Hughes, M.D., a leader in nicotine research; and Warren Bickel, Ph.D., now co-director of the Addiction Recovery Research Center at Virginia Tech. The lab was conducting studies of what was at the time a fairly new treatment for opioid addiction: buprenorphine. It showed promise as an alternative to methadone, an effective treatment backed by decades of research, although the medication is itself addictive. Buprenorphine, on the other hand, blocks the effects of opioids without the risk of addiction, allowing patients relief from cravings and withdrawal with less worry about medication diversion or overdose. UVM was one of the first institutions nationally to study buprenorphine's clinical applications.

Vermont was also an early leader in providing care to pregnant women suffering from opioid addiction. The Children and Recovering Mothers Collaborative (CHARM) began providing access to methadone in the late 1990s, well before the state offered it more broadly. CHARM, which includes social service agencies as well as obstetricians and neonatal specialists, has served as an example for other states. It also helped to break the political logjam around Vermont establishing a methadone clinic, which came online just as the opioid epidemic began to take shape.

When Vermont's first methadone clinic — called the Chittenden Clinic — opened in 2002 with Brooklyn as medical director, the waiting list quickly ballooned. In 2003, Vermont introduced buprenorphine as an office-based treatment, which in theory should have expanded treatment capacity. But concerns about managing complex patients without adequate support, the lack of social and mental health services for patients, and the possibility for medication diversion meant many primary care physicians only saw a handful of patients or less. So despite Vermont boasting a high number of office-based treatment providers per capita, many still lacked care. The wait list at the Chittenden Clinic extended to two years.

Brooklyn, who was also treating patients at the Community Health Centers of Burlington, saw the struggling primary care physicians, the at-capacity clinic, and the growing number of patients who desperately needed treatment, and he proposed a plan to Vermont Department of Health officials with the executive director of the Howard Center:

"One day I marched into the Department of Health with Bob Bick from the Howard Center and I said 'Hey, you guys, I've got this idea.' And I sat down and I sketched it out where we would have these centralized centers of excellence that we would call hubs, and we'd have these docs in the community we'd call spokes, and there would be a connection. We'd set up the same kind of referral network that existed with everything else in medicine."

The idea had traction with the group, and from this initial conversation plans were set in motion for a state-wide roll-out of the Care Alliance for Opioid Addictions Initiative, also known as the hub and spoke. It required buy-in from many groups across the state — including health care providers, elected officials, and government agency leaders — as well as funding. The Vermont Blueprint for Health — the state-led initiative to improve the overall health of the population while reducing costs — designated opioid use disorder as a chronic condition, paving the way for expanding treatment.

The first hub opened in January of 2013 at the Chittenden Clinic in Burlington, and other hubs across Vermont soon followed. Spoke providers were recruited from the ranks of family medicine physicians, obstetricians and pediatricians at all types of practices, from group and solo practices to federally qualified health centers. These doctors received training that granted them a "waiver" to prescribe buprenorphine, giving patients access to medication assisted treatment in a medical home, a place where treatment is coordinated and delivered in a way that puts the patient first. The key to making it all work, says Brooklyn, is communication and support.

Providers from across the region gather at the UVM Medical Center Community Health Improvement office for a Medication Assisted Treatment integration meeting. The meetings foster communication and collaboration among different agencies and service providers.

"Docs in the community need to know that we have their back," says Brooklyn. "Because if you're going to take on prescribing for people who are fairly complex, you need to know that there's a regional expert you can call at any time."

In addition to being able to consult their hub, spoke providers also have a team to call on to help manage patients. Called a Medication Assisted Treatment team, or MAT team, they include one registered nurse and behavioral health provider per 100 Medicaid patients receiving office-based treatment. Funded through the Affordable Care Act and the Centers for Medicare and Medicaid, MAT teams handle scheduling, triage, and social service support. Brooklyn credits the MAT teams and another innovation called the Learning Collaborative, which brings providers together for sessions on evidence-based best practices, with providing the support physicians need to feel comfortable joining the system and taking on more patients.

"There are six or eight sessions over course of the year," he says. "These folks are now getting additional training and education."

CONTINUITY OF CARE

As the MAT teams and Learning Collaborative took shape, the focus became recruiting spoke providers to join the system. **Patricia Fisher, M.D.,** understood the stakes all too well after ten years at the Community Health Centers of Burlington, where she served as a staff physician and medical director. She had treated patients who abused or depended on opioids, and had witnessed the toll it took on families. A UVM assistant professor of family medicine and the medical center's medical director for Case Management and Medical Staff Affairs (until becoming chief medical officer at Central Vermont Medical Center in April of 2018), she remembers conversations involving the governor, UVM Medical Center leaders, public policy makers, and clinicians about how to bring more spoke providers into the new system. Concerns about treating addiction in a primary care setting

John Brooklyn '79, M.D.

David Seaver

"DOCS IN THE COMMUNITY NEED TO KNOW THAT WE HAVE THEIR BACK. BECAUSE IF YOU'RE GOING TO TAKE ON PRESCRIBING FOR PEOPLE WHO ARE FAIRLY COMPLEX, YOU NEED TO KNOW THAT THERE'S A REGIONAL EXPERT YOU CAN CALL AT ANY TIME."

— JOHN BROOKLYN, M.D.

Voices of Recovery

Patient quotes from the Vermont Department of Health study: "Hub and Spoke Model of Care for Opioid Use Disorders: An Evaluation." The full study is available on healthvermont.gov.

"He's [my MD] probably been the most helpful and beneficial person to me in my recovery, honestly. Even if it's just calling him up and needing someone to talk to. He's always been there, and he's always had good advice."

"It's 50% of the success. What I mean is the [buprenorphine] stops the cravings and allows me to live a stable life. The other 50% comes with a relationship with my doctor, and the trust, and respect, allowing me to be able to do what I need to do and know that he is going to be there for me. It just wouldn't work without both parts working together. People gotta have a good doctor."

"I have had a couple of times where I've slipped up. Instead of threatening, we're gonna kick you off the program, [my doctor] said, 'You know what? We're gonna move you to twice a week for the next couple of weeks.' He's like, 'I just really wanna support you and work through this with you.'"

CONTROLLING THE SOURCE

UVM Associate Dean for Primary Care Charles MacLean, M.D.

When it comes to stemming the tide of opioid addiction, tightening rules around prescribing these powerful painkillers is an important part of the solution. In this, Vermont is also breaking new ground, much like the hub and spoke system is leading the way in treatment.

UVM Associate Dean for Primary Care **Charles MacLean, M.D.,** has been a key proponent of evidence-based prescribing rules that meet the needs of patients while ensuring the supply of opioids is tightly controlled.

His state-level public policy work has informed prescribing rules for chronic pain that were instituted in 2015, and rules for acute pain that took effect in July of 2017. Although 23 states have some type of prescribing rules on the books, MacLean says Vermont's are among the most comprehensive. They are consistent with the Centers for Disease Control guidelines and emphasize using alternatives to opioids when possible, using the lowest effective dose possible, and monitoring carefully for side effects or problems. They provide specific scenarios for when to check the Vermont Prescription Monitoring System, and when to reevaluate patients using opioids for chronic pain. Guidelines for prescribing according to pain severity level and common surgical procedures are suggested, and increasingly these recommendations are being integrated into electronic health record systems, making it easier for physicians to access information on best practices.

In addition to MacLean's and other faculty's work, medical students and alums have played key roles in fine tuning and evaluating the rules.

For their public health project, seven medical students in the Class of 2020 surveyed over 400 Vermont prescribers to assess their attitudes regarding the 2017 rules. Working with UVM's Area Health Education Centers, the students found that although 75 percent of providers thought the new rules were necessary, and 74 percent thought they would have a positive effect on prescribing, only 48 percent were in favor of them as they were rolled out. This feedback — and more specific comments individual physicians provided — could lead to improvements as Vermont policy makers adjust what's on the books, says Dan Wigmore '20.

It may also inform how other states introduce prescribing rules, as Vermont is one of the first states to implement such rules, and their group was one of the first to evaluate their effectiveness, says Zara Bowden '20. The group has submitted their poster for presentation at the 2018 American Public Health Association annual conference.

Another study — published online in February of 2018 in the *Journal of the American College of Physicians* with Larner College of Medicine alum Mayo Fujii, M.D.' 13 as first author — stands to inform post-operative prescribing best practices. The research team tracked patients who had undergone surgery across multiple specialties at UVM Medical Center and were prescribed opioids for post-operative pain, checking in by phone a week after surgery to ask how much of their prescribed opioid medication they ended up using. After about seven months of follow-up, they found that the median opioid use after surgery was just 27 percent of the total prescribed. The authors suggest using data from studies like theirs to standardize post-op prescribing practices. A follow-up study is underway to see how the prescribing has changed since the rules went into effect.

Of all the opioids prescribed in Vermont, most are being prescribed in primary care settings for chronically painful conditions.

"How to best manage chronic pain — that's where we need to go next," says MacLean. "Chronic pain is so complex, and people's experiences are so different." To this end, the Office of Primary Care is offering education and support to primary care offices in Vermont using a case-based approach that was developed at the University of New Mexico, called Project ECHO. This virtual mentoring and information sharing network brings a multi-disciplinary team of experts to a cohort of primary care physicians around the state to help solve specific patient problems.

translated into hesitation. But when Fisher invited a patient of hers to meet the group, someone who had slid into addiction after being prescribed painkillers for an injury, the conversation shifted.

"He told his story and it was so powerful," she says. "It refocused people and reframed the problem. This is our community we're talking about."

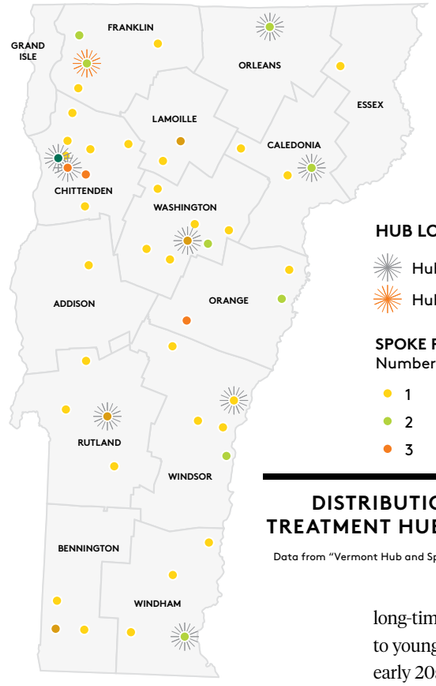
She credits her patient with helping to spur expansion of the spoke network as leaders took his story to heart and recognized the need. Those early conversations also fostered what was to become another key component of the hub-and-spoke: the Addiction Treatment Program (ATP), directed by Sanchit Maruti, M.D.'10, assistant professor of psychiatry at UVM. Conceived as a bridge between the intensive treatment in the hubs and the outpatient experience of the spokes, the program is designed to support primary care physicians and help patients move from one environment to the other.

"The goal is to have patients go to the ATP to be stabilized before going to the spoke," says Fisher. "And if they fall off the wagon, they can go back to the ATP. It's a way to manage the flow of patients."

This continuity of care is in part what makes the hub-and-spoke unique, says UVM Associate Dean for Primary Care **Charles MacLean, M.D.** Primary care doctors are embracing medication assisted treatment "like any other tool," he says, and the long-term relationships they are able to develop with patients are leading to positive outcomes.

A watershed moment came in September of 2017 when Governor Phil Scott convened a press conference to announce that the wait list for medication assisted treatment in Chittenden County had been eliminated, and that patients in all 14 Vermont counties could receive immediate treatment for opioid addiction.

Now, the state boasts six hubs and over 75 spokes across the state. Capacity for treatment of opioid use disorder in Vermont is higher than anywhere else in the United States, with 13.8 patients potentially treated per 1,000 people, according to a 2017 paper in the *Journal of Addiction Medicine.* As the first opioid treatment program in the U.S. to receive Medical Home status from the National Committee for Quality Assurance, the Chittenden Clinic leads the way for hubs. And UVM Medical Center residents in specialties including family medicine, internal medicine, obstetrics and gynecology and psychiatry are trained to prescribe buprenorphine, so that many of the state's newest physicians provide treatment from day one.



DISTRIBUTION OF VERMONT OPIOID TREATMENT HUBS AND SPOKES — JULY 2017*

Data from "Vermont Hub and Spoke Model of Care for Opioid Use Disorders: An Evaluation"

It's a model worthy of export, says Brooklyn. Over the past two years he has been to California, Colorado, and even Vietnam to consult on how to set up similar systems. At a presentation at the annual meeting of the Association of American Medical Colleges in November 2017, Brooklyn was asked, "So how long are your wait times for treatment in Vermont?" When he replied that there were no wait times, an audible gasp was heard from the audience.

"We're breaking down silos and putting a lot of emphasis on primary care homes," he says. "Financially, it's a viable model. A lot of people are saying 'wow you are treating everybody, and saving money, and your overdose rate is low.' How often in medicine do you get pretty good evidence that something is working like that?"

FRONT LINES OF RESEARCH

As director of the Chittenden Clinic since 2004, **Stacey Sigmon, Ph.D.,** has been at the front lines of the opioid epidemic. She's seen the population seeking treatment shift, from long-time, IV heroin users in their 40s or 50s, to young people, many in their late teens or early 20s, some of whom started using heroin after first getting hooked on prescription drugs from friends, or their parents' medicine cabinet. As the crisis worsened, the clinic kept pace. The staff has expanded by a factor of four since Sigmon's arrival, and they now treat 1,000 patients with both methadone and buprenorphine, up from 50 when she first took the helm.

Sigmon's work in the clinic informs her research as an associate professor of psychiatry at UVM: She has built a national reputation for developing and testing innovative treatment options. One technological solution, called the Med-O-Wheel, shows promise. The small computerized device dispenses buprenorphine at set intervals, lessening the chance for medication diversion while increasing access. In one study published in the *New England Journal of Medicine* in 2016, use of the Med-O-Wheel combined with daily monitoring calls via an interactive voice response phone system had positive results for patients on a waitlist. At the 12-week mark, 68 percent of subjects screened negative for illicit opioids, compared to zero for a control group who received no treatment.

"There's no reason to think this wouldn't be effective beyond patients on a waitlist," says Sigmon, pointing to its potential usefulness in areas with few providers, or for patients who lack regular transportation.

UVM Associate Professor of Psychiatry Stacey Sigmon, Ph.D.

UVM has also been at the frontlines of testing long-lasting formulations of buprenorphine, including an implant that delivers the drug for up to six months. The device, approved by the FDA two years ago, has "huge potential for rural areas," says Sigmon.

The goal is to get treatment to patients who need it, in a way that's appropriate for their needs.

In this, Vermont has set the stage for more innovation to come.

After gathering data from patients and providers across Vermont, Richard Rawson, Ph.D., says there's no doubt the hub and spoke system is changing lives, even as the state continues to work on improvements like the integration of mental health care and additional support for family. The data tell one part of the story: Patients in both hub-and-spoke settings reported a 96 percent decrease in opioid use, including a 92 percent drop in injection drug use. Patients' lived experiences tell the rest of the story.

"The dynamic for many of these patients is about their relationship with their doctor," says Rawson. "Everything else is nice. Even the medicine gets rated as less important than the relationship they have with their physician. That's different. We've never seen that before."

Treating patients at the Community Health Centers of Burlington, Heather Stein, M.D., understands the value of those relationships. Not only is she helping patients, she is introducing medical students entering their family medicine clerkship to this new way of treating opioid addiction as part of primary care. In this, she sees their leadership potential as they go on to practice medicine across the country.

"They have this incredible ability to be ambassadors," she says. "Like Dr. Brooklyn here, they may go on to other places and start a fire." VM

LCOM Creative Services; wTraci Arney Photography