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Patient-centered, wired—and with windows

Research-backed design trends are changing the face of healthcare

PAGE 10

A PHYSICIAN and CHES PAGE 6

A PHARMACIST on the CARE TEAM PAGE 8

Principles of MEDICAL EDUCATION PAGE 28

My one moment of DRAMA PAGE 48



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CONTENTS

Mar/Apr 2018 | VOLUME 101 | ISSUE 2

FEATURES

ON THE COVER

10 Design in medicine

The architectural focus for new and remodeled facilities is to make spaces that are not only more efficient but pleasant, to encourage healing.

BY ANDY STEINER

FEATURES

18 'Magical' space

The expansion of University of Minnesota's Masonic Children's Hospital created a place that is both playful and functional.

BY ANDY STEINER

22 The power of a medical specialty society

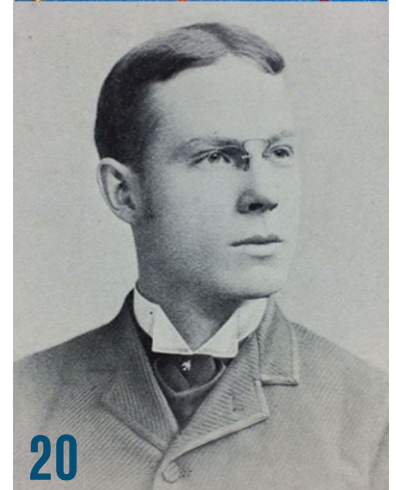
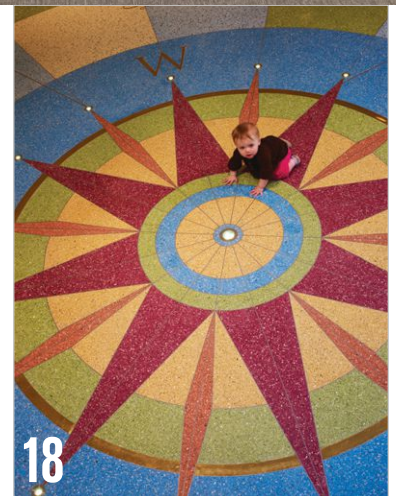
The Minnesota Academy of Otolaryngology-Head and Neck Surgery played a key role in helping physicians uphold values and standards.

BY THOMAS CHRISTIANSEN, MD, AND KENT S. WILSON, MD

Clinical AND Health Affairs

41 Negative pressure pulmonary edema-stress-induced cardiomyopathy

BY YOUNGHOON KWON, MD; RYAN J. KOENE, MD; SULA MAZIMBA, MD, MPH; JIAN-MING LI, MD, PHD



DEPARTMENTS

4 EDITOR'S NOTE

6 DOWNTIME

Scott Riester, MD, PhD, includes chess in his busy life as a resident because he loves the game.

BY CARMEN PEOTA

8 GOOD PRACTICE

Adding a pharmacist to the care team made for better communication with patients—and team members.

BY LINDA PICONE

34 THE PHYSICIAN ADVOCATE

Pharmacy Benefit Managers 101; MMA news briefs; Q&A with CEO Janet Silversmith; health equity.

45 EMPLOYMENT OPPORTUNITIES

COMMENTARY

25 Post-operative prescription of pain medication

The amount of hydrocodone prescribed for several orthopedic surgeries exceeds average usage.

BY BRADLEY KUZEL, MD, AND ZACHARY EDGERTON

28 Ten principles for effective clinical teaching

Most physicians will teach at some point; tips for doing it effectively.

BY CLAUDIO VIOLATO, PHD

31 A closer look at the pamphlet approach

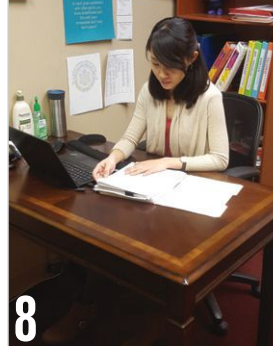
Community-based outreach is needed to address social determinants of health.

BY LUCAS ZELLMER

END NOTE

48 My one moment of drama

BY BENJAMIN MARSH, MD



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PHOTO BY SCOTT WALKER

Charles R. Meyer, MD, Editor in Chief

Today's medical facility architecture acknowledges that environments that invite rather than interfere can contribute to the healing process.

Design matters

Today's medical spaces welcome patients, rather than intimidating them.

My first medical office sat in a building erected on columns with parking underneath and long, narrow windows that let a modicum of light into the four exam rooms our six doctors shared. The waiting room was narrow and windowless, with benches and cement walls—hardly an inviting atmosphere for people coming in to be healed. Many years later, my group moved to a nearby building, also from the “stilt school” of office buildings. (I jokingly told patients that I chose that design because I was afraid of snakes.) An improvement on the previous office, this one boasted a larger waiting area and many windowed exam rooms. But the building suffered from an apparently congenital hypothalamic-like temperature regulation problem. It was cold in the winter, necessitating space heaters in the rooms, and stifling in the summer when its archaic air conditioning chose which rooms to grace with cooled air. Cold sweats and shaking chills were common patient complaints. Our third office improved on all of these deficiencies. I can't prove it, but I think our patients fared better in this last office. The ambience and design of medical facilities does make a difference to doctors and to patients.

For years, medical offices and hospitals were starkly utilitarian. Uncomfortable chairs, tile floors and neutral colors proclaimed that a facility was “all business”—and that business probably wasn't pleasant. Hospital rooms were small, making routine navigation around beds treacherous and a resuscitation attempt nearly impossible. Exam tables clearly were designed by a young, male designer. The step up to the table required Olympic talents to scale and the fixed stirrups demanded a torturous yoga maneuver from female patients. The

layout of medical facilities worked poorly for patients as their tense trip to the doctor got tenser with the first step into the office or hospital.

Indeed, the layout seemed to be mostly for the benefit of the doctor. “Give me a blood pressure cuff within reach and show me where the gloves and the tongue blades are and that's all I need,” intoned the average practitioner bent on getting on with his work. Office desks frequently separated doctor and patient and chair placement discouraged sight lines that might enhance eye contact. Patients entered an alien environment overseen by a distant, unapproachable physician.

The medical community has realized that its facilities don't have to look like that to get the job done. In fact, the job gets done better when those facilities welcome patients. Open, even luxurious, spaces have replaced cramped waiting rooms. Artwork and designer furniture have replaced plain walls and dull, functional chairs and benches. Windows and natural light bring the outside in. And electric tables now descend to meet the elderly and stirrups extend to accommodate the inflexible. Today's medical facility architecture acknowledges that environments that invite rather interfere can contribute to the healing process.

On the ground floor of the Gonda Building at the Mayo Clinic sits a grand piano. Frequently during the day, some talented pianist is playing old favorites, sometimes joined by a soloist belting out the lyrics. Patients en route to a blood draw, doctor appointment or x-ray pause and listen and suddenly the worry of their medical problems seems a little farther away as their environment starts the healing process. **MM**

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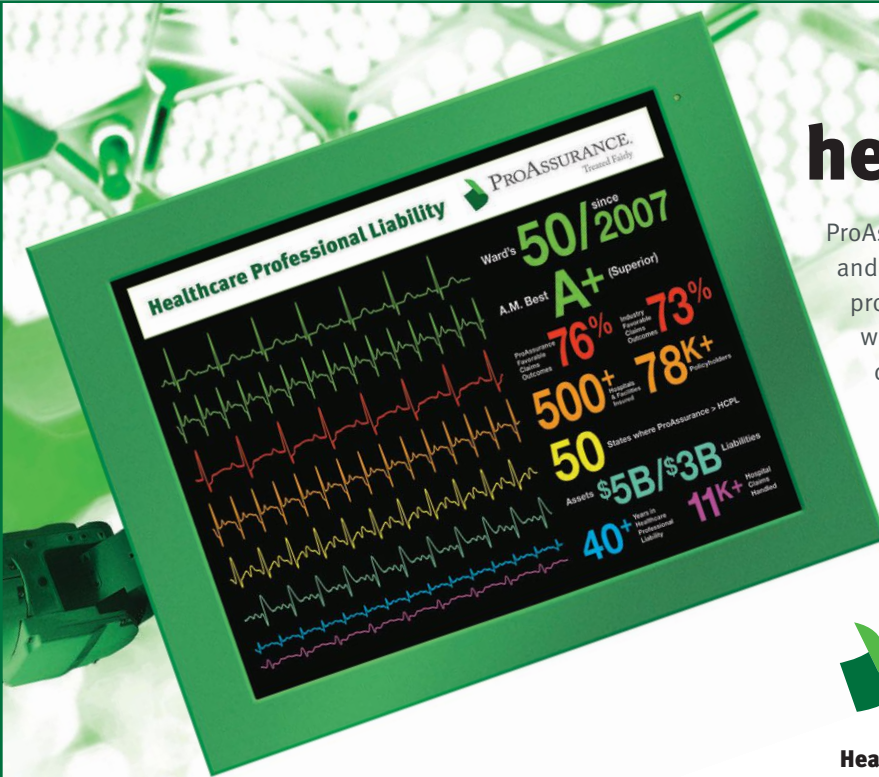
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Chess master

BY CARMEN PEOTA

Although few in Minnesota can beat him, Scott Riester, MD, PhD, plays chess because he simply loves the game.

“Actually, there’s a more interesting story,” says Riester, when I ask him to tell me about his interest in chess.

The occupational medicine resident is a national master with a 2,200-plus score and one of the highest rated chess players in Minnesota. He’s just earned a PhD in clinical and translational science from Mayo Clinic, where he did a residency in orthopedic surgery, and I’m curious how the pieces all fit together.

He proceeds to tell me the “more interesting” story. Three years ago, while doing his daily 6-mile run on the treadmill at the Mayo Clinic gym, he had a cardiac arrest. He survived, thanks to the quick actions of emergency medicine and intensive care physicians who happened to be working out nearby. “Basically, I was in the right place at the right time,” he says.

A cause of the cardiac arrest was never identified and the 32-year-old found himself with a newly implanted pacemaker and a spate of questions about his health and career, which he took to an occupational medicine physician. As they interacted, Riester became intrigued with the

PHOTO BY KATHRYN FORSS

Scott Riester, MD, PhD, a nationally ranked chess player, says playing is an escape for him. Although he’s intense about his game, he says it relieves stress.

specialty. “And that’s how I ended up going into occupational medicine,” he concludes.

Chess lessons

As Riester sees things, his career was not derailed by the cardiac arrest; it simply changed direction. That ability to view events with equanimity is, in part, something he’s learned from chess. “One thing with chess, it teaches you to be very disciplined with your thinking,” he says. He explains that players need to take multiple factors into account and to not only have their own game plan, but also the ability to adapt when the unexpected presents itself. “You need to be aware of everything going on around you and take all of the factors into account. That applies to everything in life.”

Riester has his grandmother to thank for introducing him to chess. They started playing together when he was 4 years old and growing up in Buffalo, New York. “She let me win most of the time.”

It wasn’t until he joined his school’s chess club around age 12 that he realized he might have a knack for it. “I pretty much beat everybody in the school,” he admits. Six months later, he found himself in his first tournament, which happened to be the national grade school championship. His 10th-place finish surprised nearly everyone, including himself. “I had this hidden talent,” he says.

Riester worked to develop that talent over the years, finding that he loved studying the game as much as playing it. “When you do something like that and you do well with it and you enjoy it, you just keep doing it,” he says. By the time he was an undergraduate at Cornell University, he was a formidable player. In 2001 and 2003, he took top honors at the World Open Tournament (the largest open tournament in the United States). He used his win-

PHOTO BY KATHRIN FORSS



Riester recently played a match against Okechukwu Iwu, MD, an internal medicine physician at Essentia Health Duluth.

nings to pay for a significant portion of his college tuition.

Riester continued playing chess casually while he was a medical student at the University of Toledo. But chess took a back seat for a few years when he was doing his residency in orthopedic medicine at Mayo Clinic. It might have stayed there, had he not gotten an email from a Mayo employee who had heard of his chess credentials and wanted him to join the Rochester club. When Riester learned it met in the cafeteria just down the hall from where he was then working, he knew it was time to bring chess back into his life.

New strategy

Riester has since learned that Minnesota is a chess mecca of sorts. Not only can the state boast the world’s No. 2 professional player (Wesley So), it has a large contingent of amateur players who turn out to play one another in well-organized tournaments. “It’s a great thing. People come together for friendly competition. There’s

no money on the line, no rating,” he says. “It’s a great Minnesota activity.”

Now Riester is a regular part of that activity. He continues to play for his Rochester club, although he now lives in the Twin Cities because he’s doing the HealthPartners occupational medicine residency.

Even though he admits playing in a tournament can be as taxing as taking a long, hard exam, Riester says playing chess relaxes him. “It’s a nice escape,” he says. “You become so absorbed in it when you’re playing that you forget everything else. It’s like doing a sport: it’s tiring, but it can be a great way to relieve stress.”

Mostly, though, he says chess is fun. Since his cardiac arrest, he’s realized that that is not insignificant: “It’s important to make sure you are enjoying what you are doing in the here and now. There is no reason to make yourself suffer through something to achieve a goal, because that day may never come.” **MM**

Carmen Peota is a Twin Cities freelance writer and editor.

Full integration

BY LINDA PICONE

As an experiment, with a funded residency, a pharmacist became an active and important part of the medical care team at a rural mental health clinic.

Although there are models of fully integrating a clinical pharmacist into the medical care team, it generally occurs in primary care settings in larger cities. Randall Seifert, PharmD, professor in the Department of Pharmacy Practice and Pharmaceutical Sciences and associate dean for Strategic Initiatives at the University of Minnesota on the Duluth campus, wanted to try it in a rural setting, with a mental health clinic.

Seifert had been working on issues related to rural healthcare and how pharmacists could impact health outcomes through strengthening inter-professional relationships with physicians. “The need that kept coming up was how to improve outcomes for individuals with mental illness and/or substance use disorders,” he says.

The idea is, of course, to have better outcomes for patients by developing better relationships between the pharmacist and physicians, in this case, the psychiatrist. “The goal was to provide comprehensive medication management to individuals who were patients in Assertive Community Treatment (ACT),” says Seifert. “Our overall goal was to see if we could build an integrated advanced pharmacist practice in a rural mental health center.”

Northern Pines Mental Health Center in Brainerd offered an opportunity to integrate a post-PharmD pharmacist resident into a mental health clinic practice and Laura Schwartzwald, RPh owner of Guidepoint Pharmacy in Brainerd, agreed to fund the residency and administer it through the College of Pharmacy.

ShuYing (Sharon) Ng was chosen for the one-year residency, which began July 1, 2016. Ng earlier had been a resident pharmacist at Guidepoint in her final rotation as a resident in her pursuit of her PharmD at the University of Minnesota Duluth.

Ng was included in the Assertive Community Treatment (ACT) team meeting each week, when the care team discussed the caseload and patient needs. She had a desk at the mental health center, which gave her frequent contact with psychiatrist Robert Jones, MD, medical director of the mental health center and the ACT team.

Ng began by asking to accompany the providers on their calls upon patients in their homes, because, she says, “I know how medicines work” and could share that with patients. “I often talked with patients about the importance of adherence and about side effects to expect and how they can be managed.”

She was often in the field, working alongside the ACT team providers. “My actual work day was mostly mobile,” she says. “I had desks at NPMHC, Guidepoint and ACT offices, but I was on the go most of the time.”

Seifert says Ng established herself as a provider of comprehensive medication management by accompanying providers on the ACT team on patient visits and consulting on issues related to—but not limited to—the interaction between psychotropic drugs and medications taken for primary health concerns. Her findings from examining patient charts helped discover drug therapy problems among the ACT team’s patients.

Ng and Jones built a good working relationship and Ng not only consulted and assisted in matters of medication management, but also brought new ideas to Jones for tackling thorny administrative challenges. Jones says, “The doctor of pharmacy has the potential to glue us together into a better collaborative team.”

When she first started in the residency, Ng says, other professionals weren’t quite sure how she would contribute. But even when she pointed out things she felt needed to be corrected, she didn’t get negative push-back. “I felt I had a task and I worked hard to earn the trust of professionals through focus on the patient,” she says.

The idea of integrating a clinical pharmacist into a medical care team is not new,

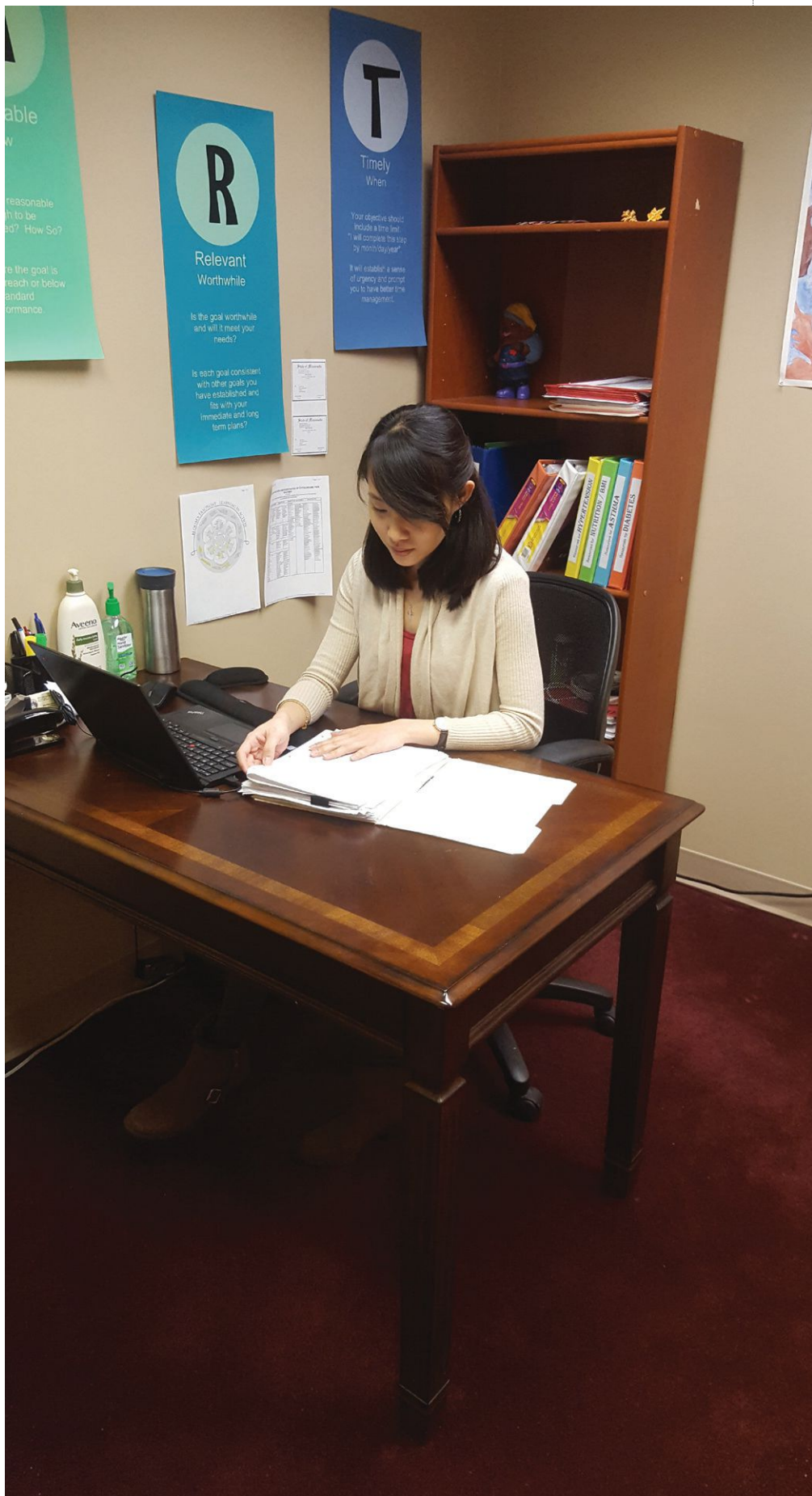
Although ShuYing (Sharon) Ng, PharmD, had offices at the Northern Pines Mental Health Center, Guidepoint Pharmacy and the ACT offices during her residency, she spent much of her time with the care team, visiting patients.

Seifert says. “There are many medical practices where pharmacists are members of the care team, but there are not many pharmacists integrated into rural mental healthcare practices,” he says. “And the way we initiated this was what was innovative.”

The Human Development Center in Duluth and Wilder Mental Health Services and Touchstone Mental Health in St. Paul also have integrated a clinical pharmacist into the medical care team, Seifert says. The next effort will be to expand the model to Northwestern Mental Health Center in Crookston. The major challenge, Seifert says, is how to maintain a level of reimbursement that creates a stable practice. “Can we integrate these services into new payment models?”

Long-term, Seifert says, the goal is to develop a pharmacist workforce that can effectively cross over between mental health and primary care. **MM**

Linda Picone is editor of *Minnesota Medicine*.



EDITOR'S NOTE

GOOD PRACTICE is a new regular feature in *Minnesota Medicine*. If your practice—large or small—is doing something innovative, unusual or particularly effective, please share it with our readers. Contact Linda Picone, editor of *Minnesota Medicine*, at 612-362-3758 or lpicone@mnmed.org.

Patient-centered, and with windows



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wired—

Research-backed design trends are changing the face of healthcare

BY ANDY STEINER

For the five-story, 342,000-square-foot University of Minnesota Health Clinics and Surgery Center, traditional floorplans and spaces were eliminated. Instead, CannonDesign created modern spaces with maximum natural light and openness.

When many patients go to see a physician, they have this experience: They walk up to the receptionist's desk, give their name, pick up a pile of paperwork and then find a seat in a crowded, often windowless waiting room. It can take a long time for the nurse to call them in for their appointment, so they read magazines under flickering florescent lights. What follows during this visit are more windowless rooms and more waiting until they finally see the first medical professional.

Mike Puksza, healthcare practice director for the global architecture firm CannonDesign, was trying to eliminate that kind of experience when he and his team of architects and designers created the University of Minnesota's Health Clinics and Surgery Center in 2016. The 342,000-square-foot facility houses 37 medical specialties, including primary care, neurology and orthopedics. It is also home to the university's Masonic Cancer Center.

While the Health Clinics and Surgery Center is by nature a medical building, the facility that Puksza and his colleagues created bears little resemblance to traditional healthcare facilities of the past. Medicine is changing, Puszta says, mostly because patient expectations are changing. Modern healthcare consumers say they prefer a patient-centered experience and, because many are willing to shop for the best care experiences, medical providers

realize that they need to respond to the patients' preferences.

"The worst thing I've ever experienced at a doctor's office is walking up to a person behind a sliding glass window and hearing them say, 'What do you want? Write your name down here and sit down,'" Puksza says. When he and his team were working on the University of Minnesota project, they decided to do away with many cornerstones of traditional healthcare design—including waiting rooms and individual physicians' offices.

"We looked at places like the Apple store that are providing really good customer experiences," Puksza says. "We thought, 'How can we make the healthcare experience in this building work and feel more like that?'"

Apples to apples?

Are there design elements that a medical building can borrow from a computer store?

At an Apple store, Puksza explains, "when you walk in, someone in a blue shirt comes up, greets you and says, 'What can I do to help?' From there, they manage every single one the customer's needs without them having to move. After I experienced that for myself, I thought, 'Why can't we pick that approach up for a medical building? Why couldn't a patient walk in the door, be greeted by a concierge, get checked in and have the service brought to them?'"

PHOTO BY CRAIG DUGAN PHOTOGRAPHY

With such a massive footprint, the Health Clinics and Surgery Center is no Apple store, but designers managed to work around that reality, by presenting each patient with an electronic “tag” when they enter the building. (Workers also wear similar devices.) Once a patient is checked in, they can wait in any part of the building. When the care provider is ready for them, workers use a tracking device to locate patients and escort them to an exam room.

“We liberated the building from the limits of a traditional medical facility,” Pukszta says. “We no longer need reception desks and waiting areas by a door. Spaces are more luxurious because people can sit anywhere they want. Care providers will come and get you when they are ready for you. There are no more tiny little boxes, no more dark waiting rooms.”

Pukszta says this project represents the beginning of a healthcare design revolution. “I’ve been doing healthcare archi-

says Renee Cheng, professor at the University of Minnesota School of Architecture.

“It used to be that patients were not considered customers or consumers,” she says. “Their experiential needs were not to be catered to. You had these medical experts that patients came to and asked for service. Now these experts are being given customer satisfaction ratings. Their facilities are being critiqued online. That turns everything upside down.”

Trends backed by research

Changing attitudes about medical care and patient satisfaction are reflected in many examples of modern healthcare design, Cheng says. Backed up by research and evidence-based practice, these design innovations are helping enhance the features included in many modern medical facilities.

Perhaps the most important shift in healthcare is the movement toward a teamwork approach, where physicians and other care providers, such as nurses, physician’s assistants and social workers, collaborate to treat patients.

“In the past, the emphasis was more on the individual doctor as the decision-maker,” Cheng says. “One doctor would have a series of exam rooms, the patient would wait until they were called in and they’d see the physician for a certain amount of time. That was it. Nowadays, patients see a whole team of providers. The idea is more about better care through cooperation and teamwork.”

A collaborative approach to healthcare means that medical buildings need bigger spaces for team meetings and fewer individual offices for doctors, Cheng says.

“The new design model includes a kind of ‘bullpen’ area for caregivers,” she



PHOTO BY PHILIP PROWSE PHOTOGRAPHY

At PrairieCare Hospital, patients, staff and visitors share the dining room, a labyrinth and outdoor recreation areas. A large recreation area opens off the dining room, secured by a 10-foot fence designed to be inconspicuous while keeping the area secure.

ecture for 30 years now,” he said. “This is the most innovative project I’ve ever been involved in. It’s energizing.”

The Health Clinics and Surgery Center’s revolutionary approach is an extreme example of a recent shift in healthcare design, one that steps away from a traditional provider-focused model to an approach that emphasizes the patient experience,

“The previous environment was very compartmentalized and I find that I can easily find who I am looking for, which allows for more effective and timely conversations with staff, providers and patients. It is a very transparent work environment.” **NICOLE WEIS, ONCOLOGY MANAGER, UM HEALTH CLINICS**

re!

explains. “There is a trend away from an individual doctor having designated exam rooms. This change is partially for flexibility and efficiency, but it is also more about promoting the collaborative team mentality.”

This is the case at the Health Clinics and Surgery Center, where all physicians’ offices were eliminated and care providers were expected to roam in the designated provider space, looking for open work stations and settling in—temporarily—just as Silicon Valley programmers do in their work environments.

“We created ‘touchdown’ spaces that anyone can go to,” Pukszta explains, adding that they borrowed this idea from companies like Facebook and Google. “Not a single space is assigned in the building. Even the building manager doesn’t have an assigned space. There are all kinds of different environments, including stand-up, sit-down. Every Friday they go through and clear out the office environments. Innovations like these have never been used in healthcare.”

Not everyone is enthusiastic about this move. Some physicians—and even entire departments at the University, Pukszta says—expressed concern about this more egalitarian approach to office space. The opposition has quieted since staff moved into the building, but healthcare design experts still question whether Cannon Design went a bit too far in their focus on patient as customer.

“I applaud the concierge motif,” says Kathleen Harder, director of the Center for Design in Health at the University of Minnesota, “but we need to make sure that the care delivery team is also comfortable. These days, the focus is on the patient experience. I have always had the perspective that if we focus on what the providers need in terms of the care that they are trying to deliver, then the patient experience will, by extension, be better.”

Another consumer-focused trend in healthcare design is drawing clear lines between patient and provider, Cheng adds. “In healthcare design today, you’ll often hear the terms ‘onstage’ and ‘offstage.’ Architects have been taking lessons for

One goal of CannonDesign, the architect for the University of Minnesota Clinics and Surgery Center, was to create more luxurious spaces for patients to enjoy.

PHOTO BY CRAIG DUGAN PHOTOGRAPHY



SIGHT

“The clinic space is designed with exam rooms along hallways running in one direction and work space for the doctors, nurses, etc., in collaboration zones that run perpendicular to and across multiple hallways. Each collaboration zone will have several providers, nursing staff and rooming staff working side by side. As the name of the space implies, this lends itself much better to the collaboration that is so critical to the functioning of the multidisciplinary teams that are necessary for the complex care we provide. For example, I am a medical oncologist caring for GI cancers, and when I am in clinic, standing next to me are the surgeon and the gastroenterologist and the nurse practitioner and the nurse and the pharmacist, etc., who are sharing in the care of the patient I am seeing. The ability to discuss the care of our patients in the moment is invaluable. If I need extra help from one of my palliative care colleagues, it’s just a few steps to the next collaboration zone [where I know she is sitting because of the same RTLS system we use to track the patients] to ask for advice. This creates a lot of energy—which is mostly positive—but there is certainly a significant learning curve for everyone to be a good neighbor in such an open environment. The space is designed so it is feasible to close off pieces of it if people want, but that seems to happen very little, and there are private spaces behind the clinic that can be used for times when necessary.”

EDWARD GREENO, MD, ONCOLOGY, UM HEALTH CLINICS

Disneyworld where there are layers behind the stage.”

In “onstage and offstage” facilities, Cheng says, “The care provider space is very separate from the patient space. From the patient side, you see a very orchestrated, clean space with no dirty linen. Much of the real dirty work goes on somewhere else.”

Let the sun shine

Psychiatric care was once considered part of the dirtiest work in medicine. Facilities that served people with mental illness were too often dark, dank and isolated, with a focus on controlling patients and keeping them from harming themselves and others. Building esthetics were not much of a concern.

Today, psychiatric hospitals and treatment centers also benefit from a changed focus in healthcare design. Recent research about the positive health effects of enhanced design elements on outcomes for patients in traditional hospitals also influences mental health facilities.

At PrairieCare Child Psychiatric Hospital in Brooklyn Park, a new secure in-patient psychiatric care hospital for children and adolescents, a team from St. Paul-based Pope Architects incorporated the latest in healthcare design trends to create a light-filled, open facility.

The building’s exterior was designed to incorporate natural materials that blend well with the environment. These features soften and humanize the hospital, creating a calming, welcoming front door for families.

“You wouldn’t assume what kind of hospital it is from the outside or the inside,” says Pope Architects principal Erica Larson. “There are a lot of security features in the building, of course, but it also has a feeling of warmth and healing. It is well-suited for children. It is fun and playful architecturally, as much as a psychiatric hospital can be.”

Research has shown that patients in rooms with outdoor views recover faster than those with no windows, Larson says. She and her team built that research into their designs, making sure that all patient

Access to light and areas for play and recreation help children recover from mental illness; PrairieCare Hospital maximizes light and views of the outdoors.



PHOTO BY PHILIP PROWSE PHOTOGRAPHY

rooms had exterior windows. Nurses' stations in psychiatric hospitals must have clear views to all bedrooms, so halls were designed with open-concept nurses' stations at the internal core.

Borrowing from the egalitarian architecture favored by many new medical centers, Larson says, PrairieCare Hospital's design emphasizes "equality for patients and staff." "Us vs. them" divisions, like glassed-off nursing stations and locked recreation rooms, discourage healing, she says. Staff and patients share dining facilities, outdoor recreation areas and public spaces that are designed to welcome family members of all ages.

Larson and her team created an open, two-story indoor gym for PrairieCare Hospital. They also have a large outdoor recreation area that opens off the dining space. It is secured by a fence, one that's as nondescript as 10-foot-high fence can be. "We wanted to create a safe and secure place that does not feel institutional," she

says. Research also has shown that access to natural spaces, daylighting and areas for play and recreation can aid in the recovery from mental illness and may reduce the need for psychiatric medications.

The PrairieCare design approaches are bold but in line with industry trends, Larson says. The company is attempting to improve outcomes for patients with mental illness by taking a new approach to treatment. True change, Larson and her colleagues at Pope say, can only come

when the physical space of care facilities adapts to these changing attitudes.

Like the care team at the University of Minnesota Health Clinics and Surgery Center, staff at PrairieCare are "trying to lead the charge in regard to the way that patient care is delivered," Larson says. "They understand that that the design of their buildings is central to encouraging change and improving outcomes. That's their goal, and we're incredibly excited to help make that happen."

"I like that the patients like the new facility. They are impressed with technology, the modern look of the building and the convenience of valet parking. When patients feel comfortable in an environment, they are happy to return, which helps with continuity of care."

DEANA GRUENHAGEN, PHYSICIAN'S ASSISTANT, DERMATOLOGY, UM HEALTH CLINICS

“My favorite part of the new building has relatively little to do with the actual work processes or space. When you enter the building there is an elegant automated grand piano, playing softly—a much more pleasant source of background music than the usual canned stuff playing through overhead speakers. The piano sits at the base of an open staircase arcing in front of 30-foot-high windows leading to the second floor where I see patients. I find that each day when I come to clinic I go out of my way to walk past the piano and up that staircase [rather than the more efficient back stairs] as it sets a positive tone for the rest of my day.”

EDWARD GREENO, MD, ONCOLOGY, UM HEALTH CLINICS

Patients at the University of Minnesota Clinics and Surgery Center are given an electronic tag when they check in. Then they can wait anywhere in the building, until they are “found” by a tracking device and escorted to an exam room by a staff member.

Can design innovation pay for itself? Cannon Design’s Mike Pukszta, lead architect on the University of Minnesota’s Health Clinics and Surgery Center, says that when they started the project, the University’s goal was to reduce the cost of care. While the building cost \$165 million to complete (the medical equipment inside cost an additional \$40 million), he argued that efficiencies created by design innovation would significantly cut personnel costs.

“What we’re doing with this building is making a little bit of magic occur,” Pukszta says. “It goes back to the fact that 10 percent of any health care institution’s annual spend is on facilities. Fifty-five percent is on people. If I do nothing more than take that capital investment and build a really smart building, I can save you 10 percent off your staff costs,” Pukszta said. “Then the building is free—because the cost of staff is so high.”

Other savings from efficient design come from the patient side, adds University of Minnesota architecture Renee Cheng. Better design can pay for itself.

“You can reduce insurance costs because patients have shorter stays in better designed hospitals,” she says. In healthcare, smart design that cuts costs can be an easy sell. “With healthcare providers, if you can shorten everybody’s stay by a half a day, that’s a million extra dollars a year.”

Pukszta and his team began the design process at the University of Minnesota by organizing a series of meetings with 40 campus healthcare leaders. They mapped out a typical patient’s journey through their system.

“I said,” Pukszta recalls, “Say we have a person in Minneapolis who has a need. Tell me how we are getting them into your institution and seeing a physician for the first time.’ It took us four hours to map how that happens. There were 21 different paths that they could have taken. Every path led them to situations that were inefficient.”

The next day, the group came back. “We said, ‘If we did this perfectly, what would it look like?’” Pukszta says. “We mapped that in 45 minutes. We then started to design



PHOTO BY CRAIG DUGAN PHOTOGRAPHY

PHOTO BY PHILIP PROMISE PHOTOGRAPHY



Every patient room at PrairieCare Hospital has an exterior window.

a building around those principles. When we did that, we reduced the cost by \$36 million because we were more efficient with staff, technology, space.”

That moment, Pukszta says, “was a milestone in the process. They, as a client and a provider of care, said, ‘We need to start thinking completely differently about how we manage our patients and their treatment.’”

The building that ultimately grew from these meetings has gained international acclaim. The demand for tours soon grew so large that the University launched a website for visitors to sign up for a tour. Since the building was opened, hundreds of visitors from, according to Pukszta,

“every state and six countries” have come to take a look.

For the Cannon Design team, the project is a proud accomplishment, proof that innovative healthcare design is relevant and important.

“That building has set a new bar in ambulatory care delivery,” Pukszta says. “It’s an accomplishment, a radical departure that could usher in great change in the way healthcare works.” **MM**

Andy Steiner is a Twin Cities freelance writer and editor.

Anodized polychromatic stainless steel panels animate the hospital's exterior and change in color depending on viewing angle and lighting conditions. The massing and organization of the building reinforces the street edge and provides a distinctive identity for the hospital along Riverside Avenue. A one-story glass façade greets incoming visitors.



PHOTO BY BRADY WILETTE

For the kids
**University of Minnesota
Masonic Children's Hospital**
Photo tour of an innovative building

BY ANDY STEINER

When the light's just right, the exterior of the University of Minnesota's Masonic Children's Hospital almost glows. Covered in multi-colored anodized polychromatic stainless steel panels, the 245-bed facility changes hue with the time of day, and sometimes seemingly with the weather.

"The building is unique," says Rick Kobus, founder and senior principal of Tsoi/Kobus Design (TKD), the firm that designed the building. "The exterior material was chosen in part because it was cost-effective, but also because it is playful. It changes colors with the time of day. Children refer to it as 'magical.'"

The University of Minnesota has provided care for children since 1909; this most recent children's hospital expansion, completed in April 2011, was developed with an eye toward lean design, or design that creates efficiencies and cuts the use of resources and unneeded staff time. It was one of the first lean-designed hospitals in the country, and the first pediatric hospital that used lean design principles.

"From a design perspective, we wanted to create a distinct, unique design identity," Kobus explains. "From an operational point of view, we wanted to design the leanest possible hospital we could. We wanted to reduce the workload for the nursing staff; to think how to make the workload more convenient and easier for the physicians, staff and other care providers; and to try to design a building that saved operational costs."

In the old University of Minnesota Children's Hospital, nurses and other medical staff had to travel sometimes long distances just to gather supplies for patients. Designers from TKD mapped out that daily travel and created design features that drastically reduced the number of steps nurses took each day—and that also cut down on medical error.

"Our research discovered that in the old building, nurses were walking nine miles a day on average," Kobus says. "We designed the new nursing units so the right supplies were in the right place and it was convenient to the nursing neighborhoods."

PHOTO BY NICK MERRICK



The hospital incorporates an interactive wayfinding theme called "Passport to Discovery." Different patient floors represent different global habitats, offering children learning opportunities about medicine and the environment. Each patient's journey begins in the lobby at a terrazzo compass with inlays leading in different directions.

PHOTO BY NICK MERRICK



Patient rooms are same-handed, or designed so that each element and piece of equipment is in the same location in every room, rather than in a mirror image. The theory behind same-handed design is that it helps reduce caregiver error. Rooms are also private and large, with a family zone that includes sleeping accommodations for two adults, a microwave, refrigerator, table and work area with internet connection. Wall-to-wall expanses of glass provide daylight and outdoor views. One pane of glass extends to the floor so that even small children can see to the outside.

FEATURE

Nurses' daily travel is now cut to five miles. That is significant."

Because this is a hospital for children, Kobus says that his firm also focused on how the building would work for its patients. They created an interior design palette that feels welcoming for children and their families and built patient rooms and specialty units designed to meet the unique needs of the child patients.

"Children are not just small adults," Kobus says. "They have different requirements in their health care. There are a number of adjustments that you need to make to an adult hospital to make it pediatric-friendly. We did that here, and patients, parents and staff say they appreciate it." **MM**

Andy Steiner is a Twin Cities freelance writer and editor.

PHOTO BY NICK MERRICK



The first floor features a family resource center and special children's reading room, as well as space for concerts, puppet shows and other performances.

PHOTO BY NICK MERRICK



Patient areas feature playful and colorful moments of respite, accompanied by natural light and views.

PHOTO BY NICK MERRICK



Lean design principles created a highly efficient, decentralized floor plan that features six-bed "neighborhoods" supported by team stations. This improves patient access to care and significantly reduces the number of miles nurses walk each day (from an average of nine miles in the old hospital to five miles today).

PHOTO BY NICK MERRICK



The hospital's interior design blends playful, colorful elements with practical considerations, such as maintaining good sightlines from nursing desks and stations.



Each patient floor is represented in the “Passport to Discovery” wayfinding theme as a habitat. The elevator lobby for each floor greets patients with a backlit graphic wall that reflects that habitat theme.



PHOTO BY NICK MERRICK

The Green Guide for Healthcare was used as a design tool to help maximize natural light and non-toxic, locally sourced building materials, low VOC finishes, and natural places of respite for patients and staff. Materials with high-recycled content such as terrazzo, Kirei sorghum board and jute-backed resilient flooring helped create an entirely PVC-free interior.

PHOTO BY NICK MERRICK



PHOTO BY NICK MERRICK

LEFT: Glazed notches in the building’s exterior bring daylight deep into the center of the hospital. This “light zone” is home to a playroom and a conference room.

BELOW: Patient rooms feature a white board, allowing family members to leave notes for each other and for staff. In designing the exterior windows, consideration was given to views and sight lines for both toddlers and older children, whether standing or in bed.



Minnesota Academy of Otolaryngology–Head and Neck Surgery

The origin, evolution and impact of a specialty society

BY THOMAS A. CHRISTIANSEN, MD, AND KENT S. WILSON, MD

Medical societies emerged early in the history of medicine in Minnesota. Saint Anthony and Minneapolis Union Medical Society was founded in 1855 and incorporated as the Hennepin County Medical Society (HCMS) in 1869. The forerunner of the Minnesota Medical Association (MMA) was established in 1853 and the Ramsey County Medical Society in 1860. Medical societies served essential purposes, offering forums where members could share information about new medical and surgical developments, emerging diseases and public health concerns. They also played a key role in setting and upholding the standards of the profession.

Frontier or pioneer medicine was characterized as herbal, homeopathic or allopathic. Fewer than 10 percent of physicians were graduates of a medical school and there was no such thing as licensure or certification.

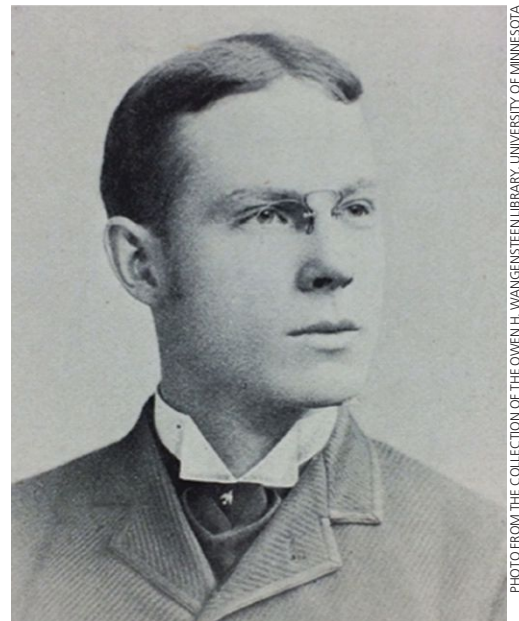
Motivated individuals from frontier areas might do a preceptorship under a graduate of a school from “back East,” thereby authenticating their intention to practice the healing arts. Those with medical degrees often obtained specialty training in Europe, then brought these skills to places like Minnesota. In 1851, the territorial legislature enacted a bill establishing a university with five departments, including a Department of Medicine. But the uni-

versity barely functioned through the Civil War years and medical education was in the hands of private medical colleges such as the St. Paul Medical College, formed in 1878; The Minnesota College Hospital, formed in 1881; The Minneapolis College of Physicians and Surgeons, started in 1883, which would become part of Hamline University by 1895; and a homeopathic medical college that was started in 1896.

Without a medical school, the nascent University of Minnesota had a non-teaching but examining medical faculty. In 1883, the Minnesota Legislature authorized that faculty to examine candidates before granting them licensure to practice medicine, the first such medical board in the United States. This board function transferred to an independent board of medical examiners in 1887. The examining faculty could also evaluate graduates of the University with a Bachelor of Medicine degree, who could then do a preceptorship with an MD graduate of an approved medical school. Following a preceptorship, these medical school graduates could be rewarded with an MD degree; nine such diplomas were granted before 1888, the year the medical school was founded.

The University of Minnesota Medical School was created after influential physi-

cians in the state convinced the St. Paul Medical College, The Minnesota Hospital College and the Homeopathic School to relinquish their charters to the University. The Hamline College of Physicians and



Howard McIlvain Morton began the drive for the first statewide medical specialty society in Minnesota in 1911.

Surgeons did the same in 1909, the year that the medical school began creating departments.

It was in this context of a growing professionalism in medicine that, Arthur S. Hamilton, MD, a neurologist, addressed the Hennepin County Medical Society and proposed the creation of subsections of

PHOTO FROM THE COLLECTION OF THE OWEN H. WANGENSTEEN LIBRARY, UNIVERSITY OF MINNESOTA

county medical societies that reflected an increased interest in specialization. Hamilton explained the need for such subdivisions thus: “As the county medical society grows, its needs and duties increase until finally the social, legal, legislative, business and public functions require as much attention that the scientific program necessarily suffers. As a result, that class of men who care only for the strictly medical part of the Society’s work find less and less attraction to the Society.” Not long after this address, in 1911, the state’s first medical specialty society formed: the Minnesota Academy of Ophthalmology and Otolaryngology (MAOO).

The founder

One of those to heed Hamilton’s call was Howard McIlvain Morton. Born in Chester, Pennsylvania in 1866 and a graduate of Lafayette College and the University of Pennsylvania with special training in London and Berlin, Morton moved to Minneapolis in 1891 and became an aurist and oculist at Asbury Hospital, chief of the Eye and Ear Clinic at St. Barnabas Hospital Free Dispensary and clinical professor of Ophthalmology and Otology in the College of Physicians and Surgeons of Hamline University. Morton was regarded as organized, administratively skilled, inventive of medical instruments and highly inquisitive. A collection of Morton’s letters and responses from physicians around the country are preserved and retained by the Minnesota Academy of Ophthalmology.

In 1893, Morton communicated with prominent Boston physicians Frederick Jack and Clarence Blake, each of whom were performing stapedectomy in both sclerotic and suppurative ear disease, resulting in an occasional gain in hearing. Jack referred to a paper on the subject being prepared by Morton. Morton also queried numerous ophthalmologists around the country as to the safety of enucleation in the presence of panophthalmitis.

In 1910, Morton and Hamilton promoted the concept of specialty organizations to various county medical societies. Hamilton formed the Twin Cities Neuro-

logical Society, while Morton focused on a statewide Minnesota Academy of Ophthalmology and Otolaryngology (MAOO). He invited “a number of men prominent in these specialties in the two cities” to write him if they were interested in forming a specialty society “for the members of the profession engaged in the practice of diseases of the eye, ear and throat.” In the letter, he pointed to Hamilton’s success: “The neurologists of the Twin Cities have a successful Society, and inasmuch as we outnumber them it seems that we should have at least equal success.” The list of those to whom the letter was sent included John F. Fulton, a founder of the St. Paul Medical College, the first professor of Ophthalmology and Otology at the beginning of the University of Minnesota Medical School in 1888, the first president of the Minnesota Academy of Medicine, the second president of the MAOO (following Morton), and for whom Fulton Street on the University of Minnesota campus is named. Other recipients included the first three department heads of Ophthalmology and Otology at the University: Frank C. Todd, William R. Murray and Frank E. Burch.

The favorable response to Morton’s letter resulted in the founding of the MAOO—the first statewide specialty society in Minnesota—on Feb. 8, 1911; The Minnesota Neurological Society was formed shortly after that.

Evolution of the Academy

The developments in Minnesota paralleled those happening nationally.

In 1896, the Western Association of Ophthalmologists, Otologists and Laryngologists was created by Hal Foster, MD, in Kansas City, Missouri. This was the forerunner of the American Academy of Ophthalmology and Otolaryngology (AAOO) and by 1907, AAOO was the largest specialty society in the United States.

While ophthalmology and otolaryngology were considered a single specialty in both training and practice, it was becoming increasingly common for individuals to specialize in one or the other. Remark-

ably, the first specialty board in the United States was Ophthalmology in 1916 and the second was Otolaryngology in 1924. At the University of Minnesota, the department was unified until 1930, when chairman Frank Burch, MD, divided it into ophthalmology and otolaryngology divisions. In 1955, they became distinct departments, each with its own chairman.

Scientific sessions and professional matters at the American Academy of Otolaryngology and Ophthalmology and the MAOO gradually became separate as well, but it wasn’t until 1979 that the AAOO split into the American Academy of Ophthalmology and the American Academy of Otolaryngology Head and Neck Surgery (AAOHNS). In Minnesota, the MAOO continued to jointly meet, in large measure a reflection of collegial preference. In 1985, the MAOO split similarly to the national organizations, with Robert Letson, MD, the first president of the ophthalmology group and George Adams, MD, president of the otolaryngology group. A new logo for the Minnesota Academy of Otolaryngology Head and Neck Surgery (MAOHNS) was created. Officers, members at large, and committee members were drawn from membership around the state and surrounding states as well. Monthly meetings evolved into a mid-winter continuing medical education conference.

Academy impact

Throughout the 20th century and into the 21st, the specialty society pursued its educational and collegial missions and only occasionally veered into scope-of-practice issues, usually pursuing them in cooperation with the Minnesota Medical Association. But in the summer of 1989, MAOHNS became involved in what was perceived as a crisis in professional autonomy. Blue Cross/Blue Shield (BC/BS) of Minnesota had begun to implement a medical review system (MRS) to screen for the appropriateness of surgical procedures. The program was a product of Value Health Sciences of Santa Monica, California, and developed by Mark Chassin, MD, a former researcher at the Rand

Corporation. Of the 10 procedures to be tested in Minnesota, three were in otolaryngology (tonsillectomy, adenoidectomy and PE tubes), selected because of a perception of variable utilization, frequency and high cost.

An MAOHNS ad hoc committee looked into the new system and found that the new MRS guidelines and review criteria were proprietary and secret, an example of corporate practice of medicine without local consultation, not fundamentally educational to the medical profession, burdensome and a reflection of the breakdown of traditional medical decision-making process. The vice president and medical director of BC/BS of Minnesota argued against the MAOHNS position.

The Academy developed a three-pronged approach to defeat the medical review system developed by Value Health Sciences:

First, locally, the ad hoc committee coordinated a statewide effort to develop its own guidelines for appropriate surgical consideration. The April 1990 issue of *Minnesota Medicine* included the committee's "Secret Proprietary Standards of Care" and Preferred Practice Patterns, the guidelines developed by the Academy. These guidelines were widely distributed to physicians, payers and others.

Second, a legislative effort by the Hennepin County and Ramsey County medical societies and the MAOHNS brought the Minnesota Medical Association (MMA) into the discussion. Recognizing the national importance of this dispute, the MMA referred the issue to the American Medical Association (AMA) 1990 annual meeting. The Council on Medical Services of the AMA concluded that the Value Health Sciences MRS criteria and methodology did not reach concurrence or transparency by those under review, that they focused on cost-containment rather than provider education, disrupted the physician-patient relationship without requisite levels of accountability and facilitated the practice of medicine by those not licensed in Minnesota. The report concluded that implementation of the Value Health Sciences MRS in Minnesota was

inconsistent with AMA policy; the AMA Office of Quality Assurance had outlined "Attributes to Guide the Development of Practice Parameters" in January 1990. There was general agreement that guidelines needed to be based on a public, open set of criteria and not driven as a standard of care. Implementation should be specialty-driven and educational. Above all, guidelines should not intrude on good and timely care nor interfere in the doctor-patient relationship.

Third, the authors of this article went to the AAOHNS meeting in 1990 and addressed the Quality Assurance Committee, which concluded in 1991 that the national specialty society had to become involved in clinical outcomes research and to develop clinical practice guidelines. The first AAOHNS guidelines were published in 1993. That same year, the second edition of the MAOHNS Preferred Practice Patterns was published and Minnesota's Institute for Clinical Systems Improvement began publishing practice guidelines.

Conclusion

The Value Health Systems MRS exited Minnesota—and failed to gain traction elsewhere in the United States. The Academy's Preferred Practice Patterns were among the earliest guidelines developed by a statewide medical specialty society, and showed the value of the expertise contributed by both private and academic sources around the state. The Academy's efforts have been followed by national specialty societies and other institutional sources throughout the various medical and surgical specialties.

In their original call for creation of medical specialty societies, Hamilton and Morton recognized that, as medicine was becoming specialized, subspecialty professional societies were needed. Minnesota's first specialty society ended up playing a key role in helping physicians of all specialties assert themselves when they felt their ability to provide quality care was threatened. The MAOHNS played a leadership role in the formation of practice guidelines, a concept whose time had come by 1989. MAOHNS' history with

the Value Health Systems MRS illustrates the value of specialty societies and the role they play in upholding professional values and standards. **MM**

Thomas Christiansen, MD, MS, and Kent Wilson, MD, MS, are retired otolaryngologists who practiced in Minneapolis and St. Paul, respectively, and are former presidents of MAOHNS (Christiansen in 1998 and Wilson in 1990).

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Post-operative prescription of pain medication

BY BRADLEY KUZEL, MD, AND ZACHARY EDGERTON

How much pain medication should we prescribe after surgery? What type of pain medications should we use?

Most orthopedic surgeons likely make these decisions based on their training, past experience, institutional expectations, geographic considerations and patient-specific variables.

Orthopedic procedures pose both challenge and opportunity. They are known to cause significant pain due to the manipulation of musculoskeletal tissue and there are many types or procedures performed. We all would agree that a carpal tunnel release is a minor procedure and that patients with open tibial shaft fractures from a motor vehicle accident will likely experience severe pain. But what about ankle fusion, anterior cruciate ligament reconstruction, rotator cuff repair or an anterior total hip arthroplasty?

An audience survey performed at the 2014 American Academy of Orthopaedic Surgeons revealed that most orthopedic surgeons do not know how many opioid pills to prescribe for a given procedure or how many pills their patients actually take (Stanton). This has led to inconsistent and often excessive opioid prescriptions. According to the American Society of Consultant Pharmacists, millions of pounds of unused prescriptions are left in patient medicine cabinets (Shrank). This, unfortunately, has contributed to the current opioid and heroin epidemic that we face as a state and nation. The United States Centers for Disease Control (CDC) reported 20,101 deaths in the United States related to pain medication overdose and 12,990 related to heroin overdose (Rudd). In Minnesota, a *Star Tribune* analysis of death certificates found the number of opioid-

TABLE X

Number of hydrocodone tablets prescribed for upper-extremity procedures

OPERATION	NUMBER RESPONDING	AVERAGE NO. PRESCRIBED	HIGHEST NO. PRESCRIBED	LOWEST NO. PRESCRIBED
Carpal tunnel release	45	24	90	15
ORIF distal radius fracture	52	51	120	30
Shoulder arthroscopy	40	70	135	30

TABLE X

Number of hydrocodone tablets prescribed for lower-extremity procedures

OPERATION	NUMBER RESPONDING	AVERAGE NO. TABLETS ²	HIGHEST NO. OF TABLETS	LOWEST NO. OF TABLETS
Knee arthroscopy	45	43	135	9
Total knee arthroplasty	50	102	400	20
Total hip arthroplasty	50	67	270	30
Hip hemiarthroplasty	51	67	270	30
Hip intramedullary nail fixation	46	71	180	30
ORIF ankle	57	65	180	30

TABLE X

Number of hydrocodone tablets prescribed for spine procedures

OPERATION	NUMBER RESPONDING	AVERAGE NO. TABLETS ³	HIGHEST NO. TABLETS	LOWEST NO. TABLETS
Laminectomy	19	72	120	20
Lumbar spine fusion	18	101	180	50

NOTE: Mean, median and mode numbers have been converted from MME to 5 mg hydrocodone for the purpose of these tables.

related deaths up in 2016 (402) compared to 2015 (344) (Olson).

The American Academy of Orthopaedic Surgeons (AAOS) and the Minnesota Orthopaedic Society (MOS) have worked aggressively to engage and educate surgeon members to promote further awareness and understanding of this problem. The AAOS published an information statement in 2015 about “Opioid use, misuse, and abuse in orthopaedic practice.” This, with a number of other online tools and educational tools at the annual meeting, has improved surgeon awareness. At the 2017 MOS annual meeting, an entire session was devoted to this issue with physicians from multiple specialties. Our awareness is improving. Yet, we still need more information to provide meaningful recommendations.

Method

In an attempt to understand current prescription practices, the Minnesota Orthopaedic Society sent a survey to 475 board-certified orthopedic surgeons in Minnesota, asking them to calculate the total number of morphine milligram equivalents (MME) they prescribe in their first prescription for the 20 most common orthopedic surgeries, understanding that some of the larger surgeries can require more than one prescription. For example: a provider who typically prescribes 10 5-mg hydrocodone tablets for carpal tunnel release reported “50 MME.” The survey was conducted via surveymonkey.com. Morphine-equivalent unit conversions were provided, along with examples of how to calculate the correct MME for various opioids and tramadol. In all, 97 surgeons participated in the survey—a 21 percent response rate. They were asked to respond only for surgeries they commonly perform.

Discussion

The results of our survey provide an interesting glimpse into the post-surgical opioid prescription practices in our region. These values gain more significance when reviewed in the context of the available literature.

Rogers *et al* evaluated opioid consumption after common upper-extremity surgeries. They studied 250 patients and prescribed 30 hydrocodone or oxycodone

The message should no longer be, “You need to stay ahead of your pain,” but rather, “Work to keep your pain manageable...”

for procedures ranging from carpal tunnel release to distal radius fixation. The average consumption was 10 pills, and 92 percent of their patients reported that their pain control was adequate. Medicare patients in the study consumed an average of seven pills. Half of the patients took pills for fewer than two days and the total number of leftover pills for the group was calculated to be 4,639 (Rogers).

Another study looking only at carpal tunnel release noted that 159 patients who were prescribed opioid pills took an average of 4.9 pills for 2.3 days. Some 110 patients prescribed tramadol took 3.3 pills for 1.8 days on average (Miller).

Another study by Kim, *et al*, published in the *Journal of Bone and Joint Surgery* in 2016, looked at opioid utilization for 1,416 patients after upper-extremity surgery and found the average prescription was 24 tablets. The average number taken was eight tablets—five for those who had had soft tissue procedures and 13 for those with fractures. They quoted a 34 percent utilization rate (Kim).

With the above studies in mind, our average prescription of 24 hydrocodone tablets for carpal tunnel release is similar to what is done in other areas of the country, yet the literature provides us with a powerful tool to help shape our practices. For instance, one could reasonably recommend not prescribing more than five to 10 opioid tablets—or even utilizing non-steroidal anti-inflammatories and Tylenol alone—for carpal tunnel release and other minor upper-extremity soft-tissue proce-

dures. These studies also allow us to communicate with patients in an educated and consistent manner. This communication and expectation management prior to surgery can help guide patient consumption and prevent problems in the post-surgical period (Morris).

Future considerations

As more evidence becomes available, we will be able to make procedure-specific recommendations to help guide surgeons in their post-surgical prescription practices. The studies discussed here provide insight into upper-extremity surgery. Studies related to more invasive surgeries with longer surgical time and larger blood loss (i.e. the correction of a spinal deformity) will help us better understand appropriate prescription practices for procedures expected to cause severe pain. Current global recommendations include:

- Avoid prescribing opioid pain medications for patients with pain related to chronic musculoskeletal problems before surgery.
- Avoid using long-acting opioids such as MS Contin or OxyContin.
- Before surgery, set realistic expectations with patients for the amount and duration of opioid use.
- Work as an empathetic guide for patients through the surgical period. Managing psychological distress and optimizing coping strategies may be more effective than opioids in reducing post-operative pain perception (Ring).
- Educate your staff in clinic as well as the inpatient and outpatient wards about how to appropriately and safely treat pain. The message should no longer be, “You need to stay ahead of your pain,” but rather, “Work to keep your pain manageable and make sure you use adjunct medications and techniques as well.”
- Fully utilize adjunct pain-management tools such as ice, elevation, splinting, perioperative intravenous and oral non-opioid medications, over-the-counter medications and perioperative nerve blocks.

- Identify at-risk patients prior to surgery and develop a clear plan with them and their primary doctor for pain-management after surgery. At-risk patients include those between the ages of 16 and 45; those with a personal or family history of alcohol-, prescription- or illegal drug-abuse; patients with psychiatric diagnoses such as schizophrenia, bipolar disorder, obsessive-compulsive disorder, attention-deficit-hyperactivity disorder, depression, anxiety disorder, and post-traumatic stress disorder; and patients with a history of pre-adolescent sexual abuse (Morris).
- Use the state's prescription drug-monitoring program when appropriate.
- Work within your medical organization to establish guidelines for appropriate prescription after common surgeries. As more guidance becomes available, we can make a positive difference in our patients lives and in our communities with sound post-surgical prescription practices. The limitations of our study include sample size and possible under- or over-re-

porting by physicians responding. Another variable that was not evaluated was the age of the physicians responding, which might have provided interesting information about generational differences in post-surgical opioid prescription. **MM**

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Ten principles for effective clinical teaching

BY CLAUDIO VIOLATO, PHD

Most physicians will teach medical students, residents, patients or other learners at some time during their career. Notwithstanding scientific advances in the study of thinking, perception, memory, learning and teaching in the past several decades, much of teaching in medicine is based on lore, intuition, anecdotal evidence and personal experience. But there are evidence-based principles of best practices for clinical teaching.

PRINCIPLE 1: Effortful and challenging learning is durable and results in long-term retention. Although “no pain no gain” may be an overstatement, there is some validity to it.

Learning that is easy and entertaining is evanescent—here today, gone tomorrow. Three important elements of learning are encoding (creating long-term memory traces), consolidation (organization, re-organization, stabilization of memory traces) and retrieval (cues that allow remembering the memories). Learning psychologists refer to “desirable difficulties” that enhance all three elements. Short-term complexity makes learning difficult and requires effort and focus. Learning is then slower, but more durable, precise and elaborated so remembering increases and forgetting decreases. For example: teaching medical interviewing with difficult patients includes difficulties that can enhance learn-

ing, compared to interviewing with “easy” patients.

Teaching Tip: In your clinical teaching, use patients of graduated difficulty (e.g., agitated, angry, incoherent) to enhance student learning of history taking and medical interviewing.

PRINCIPLE 2: Effective teachers create opportunities for continuous learning, to help students continually develop and acquire skills and knowledge to improve clinical performance.

Both teachers and students must work hard to form the cognitive structures and neural networks of meaningful learning that is deep and durable. With continuous learning (for example, exploring the latest techniques for minimally invasive direct coronary artery bypass surgery), students acquire knowledge and increase their “learning intelligence”—or knowledge of how to learn.

The human brain’s remarkable changeability—its neuroplasticity—refers to changes in neural pathways, synapses and myelination due to learning, thinking, emotions and changes in behavior. Although the architecture and gross structure of the brain are largely genetically determined, the detailed structure and neural networks are shaped by experience and can be modified.

A recent naturalistic study has elegantly demonstrated this. To become a licensed taxi driver in London, trainees must learn the complex layout of London’s streets during a four-year training period. Trainees

who passed the tests of London streets had an increase in gray matter volume in their posterior hippocampi in brain scans. Controls and trainees who failed did not have structural brain changes.

Teaching Tip: Teach your students continuous learning skills (eg. read and abstract medical journals). Provide techniques (eg. clinical relevance) for critically evaluating research findings or guidelines and demonstrate how to apply these techniques.

PRINCIPLE 3: Frequent and regular assessments enhance student learning, capitalizing on the testing effect.

Retrieval practice with testing—using memory to recall or retrieve facts or knowledge—is more effective than reviewing content or re-reading text. Long-term memory is increased when some of the learning period is devoted to retrieving the information to be recalled. Testing practice produces better results than other forms of studying. This is called the forward effect of testing.

A recent randomized study of neurology continuing medical education courses compared the effects of repeated quizzing—test-enhanced learning—and repeated studying on retention. Performance on a final exam after five months showed that repeated quizzing led to significantly greater long-term retention (almost twice as much) than either repeated studying or no further exposure.

Teaching Tip: Have your clinical learners quiz and test themselves and each other on skills, techniques and the material to be learned.

PRINCIPLE 4: Spaced practice and learning is more effective than massed practice.

Massed or block studying (e.g., six continuous hours) is less effective for learning than distributed or spaced out practice (e.g., three study sessions of two hours each). The initial learning curve is flatter than with massed practice, but learning is more durable and the rate of forgetting is flatter as well. Combining initial block practice (producing rapid learning) with spaced practice (producing reduced forgetting) maximizes the efficiency of learning principles.

Surgical residents learning microvascular anastomosis in a distributed group performed better on efficiency of hand movements, expert global ratings of performance and success on live anesthetized rats' anastomosis than a massed learning group. Similarly, gastroenterology residents in a spaced course learned more nutrition knowledge in the short term and at a three-month post-test than a comparison massed group. As the theory predicted, surgical skills and nutrition knowledge were learned more effectively and better retained in the long-term through spaced learning as compared to massed learning.

Teaching Tip: Space out learning in “chunks” of time over several days, rather than in a massed block.

PRINCIPLE 5: Deliberate practice and learning is effective for improving knowledge or performance.

Deliberate practice is a purposeful, planned and structured activity with the specific goal of *improving* knowledge or performance. Psychologist K. Anders Ericsson, the foremost expert on the topic, has identified four essential components of deliberate practice that results in optimal learning of diagnostic accuracy. For example, in learning to use mammograms

Based on findings of cognitive and educational psychology, we can use evidence-based practices to facilitate clinical teaching and learning.

in diagnosis, residents view one mammogram (#1: a structured task) at a time from a library of digitized mammograms (#2: prior knowledge) with a known location of tumors and correct diagnoses. Residents provide detailed diagnoses and receive *immediate feedback* from a teacher about accuracy. Residents then have the opportunity for reflection and correction (#3: focus and motivation). They continue to examine series of cases and repeat the process over many occasions (#4: repetition). Learning will be much faster and allow residents to achieve a higher level of diagnostic accuracy than the conventional haphazard methods now employed.

Teaching Tip: Create deliberate practice opportunities for clinical learners using structured tasks based on prior knowledge, with opportunities for reflection; repeat the process as needed to achieve mastery. Provide immediate, constructive, formative feedback.

PRINCIPLE 6: Feedback is very important to facilitate learning and improvement of skills.

The illusion of knowing misleads learners about their own competence and provides a false sense of confidence. Novice learners are susceptible to illusions of knowing, especially when engaging in unproductive strategies such as re-reading text, underlining, highlighting, watching recorded lectures, etc. Tests, quizzes and other

forms of objective feedback should always be part of any learning activity to maximize the learning and to correct the illusion of knowing. Corrective information for physicians in the form of multisource feedback, for example, can result in improved practice.

Teaching Tip: Use credible feedback (e.g., objective scores) to maximize learning and check the illusion of knowing. (Neither “Great work!” nor “How did you ever pass the boards?” is useful, credible feedback)

PRINCIPLE 7: Interleaved and varied practice maximizes learning in the clinical environment.

Interleaving practice involves working on multiple skills in parallel or series with the following principles:

- Activate prior knowledge and prepare instructions (e.g., demonstrate cardiac and pulmonary auscultation).
- Use the principles of deliberate practice with the interleaving process.
- Be wary of “flow”—automated responses that elicit the illusion of knowing—and make each task effortful and challenging.
- Review prior knowledge so as to consolidate and integrate new learning; capitalize on the spacing effect.
- Track progress with test and performance data. This will confirm progress and identify diagnostic information about areas in need of remediation.

The effectiveness of interleaving on medical students' learning of ECG diagnosis has been demonstrated empirically. Students were randomly assigned to instructional approaches organized around features (e.g., QRS voltage) or diagnostic categories (e.g., bundle branch blocks), followed by interleaved (examples from various categories were mixed together) or block practice (examples in a single category). Students in the interleaved practice had superior diagnostic accuracy compared to the block groups.

Teaching Tip: Use examples from various categories mixed together when

teaching skills, procedures or content. For example, vary the area for physical exam from patient to patient when teaching palpation skills.

PRINCIPLE 8: Advanced organizers activate prior knowledge that facilitates new knowledge integration.

Almost all new learning is based on prior knowledge. Advanced organizers are mechanisms to help students elicit what they already know, so as to facilitate the integration of new knowledge. Learning is based on some complex processes of receiving information and combining it with pre-existing knowledge. One such process in learning is *subsumption*, in which new material is related to relevant ideas that students already have.

Teaching Tip: Provide an advanced organizer in the form of a diagram, sketch or bullet points of the material, skill or procedure that you teach.

PRINCIPLE 9: Effective learning is multimodal, engaging all learning styles.

Teaching and learning styles should be based on the content and instructional objectives. The style of presentation should be what is appropriate to the material to be learned. In teaching anatomical structures and function, for example, visual styles with physical models, pro-section or 3-dimensional visual technology should be used.

The empirical evidence clearly shows that matching instruction to learning style does not improve learning. Students who say they are “visual learners” do not do better with curriculum that is visual compared to when the same is presented in other modalities (e.g., aurally).

Teaching Tip: For teaching case history, for example, aural styles modelling empathic listening and communication (e.g., repeating key phrases, nodding and making eye contact, touching on shoulder) should be used.

PRINCIPLE 10: Schemas are cognitive representations of some knowledge area such as “pulmonary edema.” They are central to the organization and assimilation of new information.

Jean Piaget’s theory (one of the great cognitive-developmental theories of the 20th century) is that we adapt to the world using the dual processes of assimilation (taking information into schemas, or patterns of thought or behavior) and accommodation (changing the schemas as a result of new information). These schemas are representations of perceptions, ideas, and/or actions that go together (e.g., pneumonia and infectious diseases). Piaget’s theory helps explain key ideas such as deliberate and interleaved practice, retrieval practice and learning styles.

Improvement in learning results when schemas are altered, an accommodation that requires cognitive effort. Medical teachers can use organizations of schemas or *cognitive maps* to help students organize their learning and facilitate the assimilation of new information and the subsequent accommodation by expanding, altering or reorganizing schemas.

Teaching Tip: Develop a cognitive map by relating schemas to each other and to the whole in teaching skills, knowledge or procedures. Draw the maps for students (e.g., circles, squares, triangles, etc.) and show the interrelations (e.g., unidirectional, bidirectional arrows, etc.) between various schemas.

Conclusion

Based on findings of cognitive and educational psychology, we can use evidence-based practices to facilitate clinical teaching and learning. Learning is most effective when it is effortful, spaced, deliberate, interleaved and followed by frequent and timely feedback. We can capitalize on the testing effect of learning and have students test themselves. Advanced organizers activate prior knowledge and connect new learning. Instruction and learning can be designed for many learning styles. Finally, by helping students extract key ideas and organize them into schemas and

cognitive maps, learning can be facilitated and enhanced. **MM**

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A closer look at the pamphlet approach

Addressing social determinants of health requires community-based outreach

BY LUCAS ZELLMER

The brochure or pamphlet wall is a fixture in most healthcare systems, free clinics, schools and social service agencies. With information about various topics, from prenatal care and health insurance enrollment to food assistance and transportation services, these highly informative handouts are designed to help patients navigate both internal and community-based health care and social needs resources. But, brochures, pamphlets, impersonal referrals and other web-based platforms do little to address compliance, are not outcome-driven and should not be the primary mode to meet patients' basic social needs.

Medical institutions are struggling to adapt their strategies to better address the complex determinants of health for underserved populations; the literature continues to show that a patient's social needs, built environment and economic status play a dominant role in their overall health and well-being.

Defining the 'pamphlet approach'

The pamphlet approach can broadly be defined as the use of, and dependence on, impersonal and untraceable tactics to guide individuals to both internal and external resources. This definition is not limited to pamphlets, brochures and handouts; the pamphlet approach also includes outside referrals, with hopes of addressing social issues, that lack personal direction and follow-up.

In the pamphlet approach, practically speaking, all pertinent information is listed on a single piece of paper or website so that issue-specific information can easily be provided to patients who need it. Most clinical providers are not aware of

available community resources and many believe that patients must display a certain degree of accountability for their own health; reaching and following through with outside services should primarily be the patient's responsibility. Health systems have adopted interactive patient portals and web-based media to increase awareness of community resources and personal health information with hopes of increasing patient activation, but research on these methods has shown mixed results on whether they augment patient knowledge, compliance or satisfaction, particularly in underserved populations lacking access and capacity to navigate such platforms.

Silos do not belong in health care

Currently, addressing the health-related needs of a patient is largely dependent on that patient entering a hospital or clinic. After the patient successfully secures health insurance and makes it to a scheduled appointment, primary care providers have less than 20 minutes to evaluate the patient's health and social status, answer any questions and develop a treatment plan. The patient is then expected to comply with the provider's plan for the next six to 12 months, until they return to the clinic.

A patient's social environment, understanding of their disease and their personal priorities all impact compliance with the medical plan determined by medical professionals. Often, medical staff will make referrals and set up outside appointments for patients with little communication with the patient or community agency post-referral; patients may be left to navigate the social service system alone. After an unsuccessful referral, the patient may be deemed "non-compliant" or unwilling to

follow their care plan. How would health care change if there were no "non-compliant" patients? Would there be a shift from "this patient missed their appointment" to "what caused this patient to miss their appointment and what can we do to help?"

The evidence

There is little research about the efficacy of hospital and clinic social worker referrals to outside resources in the literature, but studies evaluating social needs screening in clinical settings have gained popularity recently. Articles about the social determinants of health screening and referrals often lack data concerning contact to resources or success of such referrals, but several studies (published in *Pediatrics* and *Clinical Pediatrics*) have quantified the referral efficacy of the intervention. Referral success, often defined as the patient contacting the agency providing a resource, has shown mixed results in these studies; successful referral rates ranged from 39 to 50 percent. Two of these studies were not randomized control trials and baseline referral success was not identified. In comparison, 2-1-1, a helpline that only provides callers with agency contact information, showed that 82 percent of those receiving a referral went on to contact the agency, with 36 percent receiving assistance. Quantification of social needs referral success, in both health care and non-health care settings, should be emphasized in future studies.

Post-screening interventions in many studies or programs, such as HelpSteps, include providing a patient with a list of resources capable of meeting the patient's needs. This gives quality information to individuals, but providing agency con-

tacts does not equate to providing actual services. Studies often describe navigation and communication with patients as obstacles to resources and limits of the study. Recently, the Centers for Medicaid and Medicare established a 10-question survey designed to identify health-related social needs for patients in an Accountable Health Community (AHC) setting. The article fails to include options for medical professionals to use, aside from “referrals to community services,” for appropriate interventions after a positive screen for a social need. The effects of social needs screening without defined interventions have been discussed in the literature. Health Leads, a Boston-based organization that focuses on addressing social determinants of health, uses volunteer college students to help direct patients to outside resources. Once a patient is identified as having a social need, he or she meets with a patient advocate and is given a list of outside agencies able to meet their needs. As noted in a recent study published in the *Journal of the American Medical Association*, Health Leads advocates contacted individuals roughly once every eight days by phone or email and did not accompany or meet the individual outside of the clinic. In contrast, community health worker (CHW) programs have shown to increase health outcomes, similar to those studied by Health Leads, to a comparable or more significant degree.

Broadening traditional medical services

Identifying the issue is often easier than identifying the solution, but several key ideas can enhance community health and provide more efficient health care delivery.

Medical professionals meet patients where they live, work and learn.

To truly understand what impacts the health of an individual or community, a provider must appreciate patients’ social landscape and personal priorities. To do this, “health care” can’t be synonymous with “health system” or “medical center”; an extension from the hospital into the community must be emphasized.

Successful hospitals, clinics and community-based programs recognize the impact of personal relationships in behavior change.

Empowering and teaching can’t be done by a pamphlet, an impersonal referral or a phone call every few weeks. For example: a diabetic patient who can exercise, cook and talk with a mentor will have better

To think that behavior change can occur during a 20-minute doctor visit or after reading a brochure is simply not realistic.

outcomes than a patient reading a handout explaining the importance of exercise and healthy eating. With personal contact, patient knowledge has been shown to persist even after the intervention has ceased.

Health systems assume some responsibility for the over/under utilization of their services.

Emergency department staff become frustrated by “frequent flyers.” Hospitalists are discouraged by high readmission rates. Primary care providers rely on patient compliance. It is essential for health systems to move from focusing on the issue to focusing on ways in which they can address the problem.

Community-based models

Currently, health-related community outreach is program-based and targets specific shortcomings of health care systems. For example: if opioid-addicted women are shown to give birth to low-birthweight babies at a higher rate than non-addicted women, a program may be enacted to address this issue. But proactively investing in community-based health professionals, rather than implementing reactive programs, is likely to be more successful. Community-based strategies may include:

Community Health Workers (CHWs)

CHWs are frontline public health professionals who come from the community they serve. CHWs have been shown to address chronic disease, play a role in preventive medicine and bolster the communities they are integral members of. Despite this evidence, reimbursement strategies and absent program design standards have plagued the adoption of CHWs into health care teams.

Neighborhood Social Workers (NSWs)

Presently, health care social workers are tasked with educating patients about outside resources to meet social needs. After making a referral to an outside agency, communication with both the patient and the agency is often limited, until the patient returns to the health system. Prospective NSWs could be employed by health systems but function primarily alongside underserved populations and within communities to address adherence, health literacy and social needs. NSWs would not require an additional program or workforce, but rather a change in the status quo for addressing social needs in health care.

Financing community-based systems

The cost of implementing a new workforce or augmenting an existing one can be a limiting factor in instituting change. Despite the CHW return-on-investment data, health systems remain wary of funding community outreach models. The Pathways Community Hub model provides a financing link between addressing social needs and improving health outcomes: following a referral to a Community Care Coordinator (CCC), such as a social worker or community health worker, the CCC utilizes a comprehensive social needs screening tool and assigns distinct pathways to community resources for the patient. Upon completion of each assigned pathway, from housing to smoking cessation, the contracted agency providing the care coordination is reimbursed. This model shifts the norm from providing referrals to ensuring the provision of resources. Despite the infancy of this approach to care coordination,

published results have shown both an increase in health outcomes and significant cost-savings.

A medical center's impact on health pales in comparison to that of the patient's physical environment, community and social landscape. To think that behavior change can occur during a 20-minute doctor visit or after reading a brochure is simply not realistic. Prevention and outreach programs cost money, particularly with the present barriers for reimbursement of such services, but, as has been documented in current research, unmanaged chronic disease, high ER utilization, hospital readmissions and non-compliant patients present monetary and societal costs as well. As the body of scientific research continues to evolve, medicine is gaining the ability to personalize treatments and examine the deepest minutiae of molecular biology. Despite these advancements, we have yet to embrace the role of the community in the health of a patient. A departure from the pamphlet approach and inclusion of community-based interventions are necessary steps for the future of medicine. **MM**

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PHANTOM INFLUENCE:

Pharmacy Benefit Managers 101

As the MMA continues to support legislation that ensures patients have access to needed medication in a timely manner, one roadblock continues to block progress—pharmacy benefit managers (PBMs). To many of our members, this is a new entity, although they've actually been around for decades. So, what exactly is a PBM?

On behalf of health plans, self-insured employer plans and other payers, PBMs negotiate with pharmaceutical manufacturers and use their large purchasing power to reduce the costs of prescription

drugs. They also leverage pharmacies to accept lower payment levels for prescriptions. PBMs make their money by retaining a portion of the savings from these price reductions.

PBMs have an enormous impact on a patient's access to prescription drugs because they manage drug formularies for the major payers. In their pursuit of greater discounts on drug costs, PBMs and other purchasers demand that drug companies provide rebates to payers, designed to reduce the overall cost to the purchaser of the medication. Rebates to a PBM impact

which drugs are included in the preferred formularies or which drugs require prior authorization (PA).

All too often, PBMs do not grant patients access to the drugs their physician prescribes. Instead, they move patients towards the drugs for which a PBM receives the largest cut of the cost.

As physicians know, altering a patient's medications—particularly with chronic conditions such as depression, multiple sclerosis, epilepsy and others—can have disastrous health impacts. Chasing after PA approvals is a burdensome and expensive task for physicians and clinics, leading many health care professionals to spend time on the phone seeking approvals, rather than providing patient care.

One of the nation's largest PBMs, Prime Therapeutics, which is owned by several BlueCross BlueShield health plans, is headquartered in Eagan. ExpressScripts has a large office in Edina and Minnesota-based United Health Group owns a large PBM known as OptumRx. Both Express-Scripts and UnitedHealth Group are Fortune 500 companies.

Increasingly, PBMs are merging with major pharmacy chains. CVS pharmacy merged with the PBM CareMark several years ago and Walgreens is in the midst of a merger with Prime Therapeutics. This consolidation may present additional burdens for patients and prescribers by reducing choices for consumers and creating possible conflicts of interest when determining the best medication for the patient.

The MMA, alongside allies from the patient advocacy community, the professional association of pharmacists and others, will continue to work to educate legislators on the enormous influence that PBMs have on how—and if—patients have access to the prescription drugs their physicians have prescribed.

Minnesota's physicians can do their part by advocating for their patients and their practices by attending the **MMA's Day at the Capitol on March 14**. Add your voice to our education efforts.



News Briefs



More than 100 physicians and physicians-in-training attended the MMA's health equity forum in January.

Successful events in-person and online highlight Health Equity Month

Two successful events hosted by the MMA highlighted the governor-proclaimed Health Equity Month in January.

On Jan. 24, more than 100 physicians and health care advocates gathered in downtown St. Paul to examine the current status of health equity in the state and discuss ways to improve care for all Minnesotans.

In mid-January, dozens of health care workers watched online as MMA hosted a virtual forum on Facebook Live featuring presenters in Minneapolis and Rochester. Since the original online event, more than 700 have viewed the recorded session.

“With Health Equity Month, we are trying to raise awareness of persistent disparities in health, well-being and socioeconomic status among Minnesota’s marginalized communities,” MMA President George Schoepfoerster, MD, told the group gathered at the 317 on Rice Park Event Center in downtown St. Paul. “We want to encourage systematic changes so that every person has equal opportunity to attain the highest possible level of health.”

Speakers at the in-person event included: Bruce Thao, director of the Center for Health Equity at the Minnesota Department of Health, and Brooke A. Cunningham, MD, PhD, assistant professor with the Department of Family Medicine and Community Health at the University of Minnesota. Former Health Commissioner Ed Ehlinger, MD, MSPH, also spoke briefly on the state’s work on health equity and the challenges ahead.

Following Thao’s and Cunningham’s presentations, participants broke into five groups to discuss: The Role of Implicit Bias/Ex-

PLICIT Bias in the Opioid Epidemic; The Role of Providers in Addressing the Social Determinants of Health; How Does Literacy & Health Literacy Contribute to Disparities?; How Can Providers Mitigate Implicit Bias and Structural Racism?; and How Can Providers Drive Their Health Systems and Clinics Toward Equitable Care?

Sponsors included: Hennepin County Medical Center; Minnesota Psychiatric Society; Twin Cities Medical Society; HealthPartners; American Indian Cancer Foundation; Aquí Para Ti; Children’s Minnesota; Honoring Choices Minnesota; Minnesota Academy of Family Physicians; Minnesota Doctors for Health Equity; Minnesota Chapter, American College of Physicians; MN Community Measurement; MMA Foundation’s Physician Volunteer Program; Physician Advocacy Network; and Zumbro Valley Medical Society.

The online event, moderated by Christopher Reif, MD, MPH, director of clinical services with Community University Health Care Center and co-chair of the MMA Health Equity Advisory Group, covered a variety of topics from implicit and explicit bias to the social determinants of health. Speakers included: Thao; Sarah Atunah-Jay, MD, Mayo Clinic, chair of the Minnesota Chapter of the American Academy of Pediatrics Poverty/Health Disparities Work Group; and Stephen Nelson, MD, Children’s Minnesota, member of the MMA Health Equity Advisory Group.

For more information on Health Equity Month, read *Viewpoint* on page 40.



Opioid lecture series continues to educate docs around the world

The MMA's Pain, Opioids, and Addiction online lecture series had more than 3,000 views during 2017, nearly four times as many as in 2016.

Since it launched in late 2014, the series has continued to grow, now with 27 free online course offerings (with more coming) and approximately 5,000 health care professional customers around the world including 47 states, the Caribbean, Europe, Asia, Australia and

New Zealand. Nearly 2,800 views are from Minnesota alone.

The MMA teamed up with the Steve Rummler Hope Network (SRHN) and the University of Minnesota Medical School to bring medical education on the topic of opioids to medical students, residents and practicing physicians. The lectures are recorded live at the University of Minnesota Medical School and made available for CME and MOC on the MMA website in partnership with the SRHN.

The series was created to provide a medical curriculum on pain, opioids and addiction, as it should be in a medical school setting: balanced, practical, evidence-based information free of commercial bias. Through the series, physicians and other providers learn how to 1) assess a patient's pain and function, 2) make informed treatment decisions and 3) recognize and manage addiction.

On the calendar

Event	Date	Location
Day at the Capitol	March 14	St. Paul
Networking Event #1	April 3	St. Cloud
Networking Event #2	April 24	Mankato
Networking Event #3	May 23	St. Paul
Networking Event #4	June 7	Rochester
Networking Event #5	Oct. 16	Duluth
Annual Conference	Sept. 21-22	St. Paul

Free networking events scheduled for 2018 across state

A series of free networking events, called the Doctors' Lounge and hosted by the MMA for physicians and physicians-in-training across the state, has been set for 2018.

The social events, now in their fourth year, include free food, wine, beer and other beverages. They are designed to be a celebration of medicine, a thank-you to members and a welcome to new and prospective members. Spouses, significant others and children are welcome to attend.

All events are from 5 to 7 p.m. Save the date for the following:

- April 3—Olde Brick House in St. Cloud.
 - April 24—Number 4 American Bar and Kitchen in Mankato.
 - May 23—The Lexington in St. Paul.
 - June 7—Doubletree Hotel in Rochester.
 - Oct. 16—Hoops Brewing Company in Duluth.
- Stay tuned to *MMA News Now* for more details.



Physicians are job creators in Minnesota

Physicians create more than 171,000 jobs and generate \$30.5 billion in economic activity in Minnesota, according to a new report, *The Economic Impact of Physicians in Minnesota*, released in early January by the AMA and MMA.

“Minnesota is known for offering outstanding health care. We have some of the most gifted physicians in the world, right here in our state,” said George Schoepfoerster, MD, MMA president. “What is often overlooked is how much impact physicians have on the state’s overall economy. This study shines a bright light on how many jobs are created and how much the economy is affected by the work of physicians.”

The study quantifies the economic boost that 13,401 active patient-care physicians provide to the state’s economy, producing a ripple effect that is felt statewide. The study measures physicians’ impact using four key economic indicators:

- **Jobs:** Physicians support more than 171,000 jobs in Minnesota—12.8 jobs for each physician, on average.
- **Economic activity:** Physicians generate \$30.5 billion in economic output, comprising 9.3 percent of the Minnesota economy. Each physician generates \$2.3 million for the state economy, on average.
- **Wages and benefits:** Physicians contribute \$15.7 billion in total wages and benefits paid to workers across Minnesota, empowering a high-quality, sustainable workforce. Each physician contributes \$1.2 million to workers' wages and benefits, on average.
- **State and local tax revenue:** Physicians' contribution to the Minnesota economy generates \$1.3 billion in state and local tax revenue for their communities, translating to nearly \$100,000 for each physician, on average, and enabling community investments to be made.

The report found that every dollar applied to physician services in Minnesota supports an additional \$2.11 in other business activity. An additional 7.36 jobs, above and beyond the clinical and administrative personnel that work inside the physician practices, are supported for each \$1 million of revenue generated by a physician's practice.

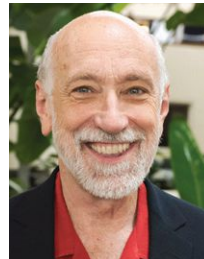
Across the country, physicians add \$2.3 trillion to the U.S. economy, support more than 12.6 million jobs nationwide, contribute \$1 trillion in total wages and benefits paid to U.S. workers and generate \$92.9 billion in state and local tax revenue.

MMA launches quality measurement work group

As part of a grant from the COPIC Foundation, the MMA has formed a work group to review the state's quality measurement and quality improvement efforts. The group will define key measures of health care and health and develop and recommend a physician-consensus core measure set. The MMA will use this set to influence the state's mandated quality measures of physician practices, as well as the work of MN Community Measurement. The work group began meeting in late February and will continue through June.

Med students discuss opioids with legislators

Eighteen medical students met with State Rep. Dave Baker (R-Willmar) and Sen. Chris Eaton (DFL-Brooklyn Center) to discuss the opioid epidemic at the MMA office in early January. The students are part of Hands on Advocacy, which is focusing its work on addressing the opioid epidemic this year. Baker and Eaton, each of whom has lost a child to the epidemic, are both sponsoring legislation to address the issue.



George Schoephoerster, MD



Janet Silversmith



Dave Renner



Elizabeth Anderson



Niels Knutson

MMA in Action

MMA President **George Schoephoerster, MD**; MMA CEO **Janet Silversmith**; **Dave Renner**, director of state and federal legislation; and **Elizabeth Anderson**, membership director, met with Sanford Health in January to discuss current and future priorities, as well as opportunities for increased Sanford engagement with the MMA.

Silversmith and board member **Edwin Bogonko, MD**, met with Metro Urology in early February to discuss membership and current issues.

Renner, MMA Board Chair **Randy Rice, MD**, and MMA Policy Council Chair **Lisa Mattson, MD**, were in Washington, D.C. at the AMA National Advocacy Conference in February. There, they met with staff members of the Minnesota House of Representatives delegation.

In February, **Niels Knutson**, manager of member outreach, met with representatives of the Minnesota Academy of Family Physicians and the Heart of the Lakes component medical society to discuss resolutions on health care reform and pharmacy reform.



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Janet Silversmith

Q&A with MMA's new CEO Janet Silversmith

Although she may be new to her role as CEO, Janet Silversmith is not new to the MMA. She is well-versed with the association, having worked with, and then directing, its policy department. She began 2018 by moving her office one door to the east. While the physical move was easy, the job she has assumed is not. *Minnesota Medicine* talked with Silversmith in February about her vision for the 165-year-old organization; it appears to be in good hands.

Minnesota Medicine: *What are your short-term goals for the association?*

Silversmith: I have three short-term goals. First, I want to work with the MMA board to revisit the organization's strategic plan. That means gathering input from physicians across the state, both members and nonmembers; identifying the key trends that are affecting medical practice in Minnesota; understanding the best ways to communicate with and engage physicians and physicians-in-training; and focusing our work so that we can maximize our strengths for the benefit of physicians and their patients. Second, I want to introduce myself to and hear from as many

members and medical group leaders as possible. Third, I want to ensure that the MMA's dedicated and professional staff can be as successful as possible. To that end, I want to assess our internal operational processes to understand our assets, our gaps and our potential inefficiencies.

MM: *What are your long-term goals?*

Silversmith: My vision is for the MMA to be a community of and for physicians who are dedicated to improving the health of their patients, the health of their communities and the strength of their profession. As medicine has changed, so too must medical associations. We can't continue to expect that physicians will automatically join; we can't continue to communicate in the same ways, we need MMA leadership to reflect the diversity of the physician workforce, we need to articulate the power and value of collective action and we need to engage physicians in work that is personally meaningful and professionally relevant. Every day I see physicians who are volunteering their time, who are giving back to their communities and to their profession; that power and passion is what I hope to be able to further harness and expand.

MM: *The last two CEOs have been physicians. How is having a non-physician CEO going to change how the MMA operates?*

Silversmith: In short, it won't. The MMA is successful and respected because of its elected leadership and membership. Physicians on the board and those who serve on MMA committees and work groups will continue to set MMA direction and policy. My two predecessors, both of whom I had the privilege to know and work with, brought unique skills, perspectives and connections to the job. I bring similar but also different skills and perspectives to the role. The four key pillars of MMA's work are advocacy, information, education and engagement. Organizing and managing that work does not require a medical degree; in fact, physician leadership of state medical associations is the exception

rather than the norm. The MMA has a dedicated and professional staff that will continue to work hard on behalf of physicians and patients.

MM: *What do you see as the biggest challenges immediately facing medicine in Minnesota?*

Silversmith: The challenges facing medicine are several, but from my perspective, the big three are the rising cost of health care, the impact and expectations of new technologies and the constant uncertainty and hyper-partisanship in the health care environment. The MMA is uniquely situated to help the profession step up and offer solutions. The cost of health care, in particular, demands medical leadership; without it, changes will be imposed by others.

MM: *A year from now, how will you gauge your success?*

Silversmith: My success is linked to the success of the organization. Some short-term measures of success include a clear and focused strategic plan, an engaged and high functioning board, advancement of MMA legislative priorities, a well-attended annual conference and, greater physician awareness of the MMA and its activities. Ultimately, however, the MMA is successful when it is able to amplify the work of individual physicians at a community or statewide level: improved access to care, fewer administrative burdens and distractions, improved physician wellbeing and professional satisfaction and greater awareness and attention to the social, economic and environmental factors that impact health. The MMA needs to do work that physicians support, that they believe in, and that matters to them. That, in turn, will hopefully be reflected in greater MMA membership. Personally, this new position has energized me in both expected and unexpected ways. I hope to continue to feel energized a year from now.

VIEWPOINT

We are all responsible for attaining health equity

In late January, I had the honor and pleasure of hosting the MMA's Health Equity Forum held in downtown St. Paul. I left the event with mixed emotions. First of all, I felt great pride; it was a fantastic event filled with great energy and attended by many young, fresh faces that we don't normally see at MMA events. It fills me with hope that we have the drive needed to take on the daunting task of achieving health equity in our state.

Minnesota has long been regarded as one of the healthiest states in the nation, yet we have some of the largest health disparities for people of color, people living in rural areas, low-income households, people who identify as lesbian, gay, bisexual, transgender and queer (LGBTQ), and other communities. We can certainly do better. We have to do better.

But it's going to take a lot of work and focus. That's why I also left that January event feeling concerned. We need to educate and empower our peers to step out of their comfort zones and re-approach how they work with patients. We are all filled with implicit and explicit biases, as hard as we try to resist them.

We also need to better address the social determinants of health. Do we really expect Minnesotans to focus on preventive care when they are not sure how they are going to pay the rent, have limited access to public transit or feel unsafe in their own neighborhood?

Then, there are the basics of health literacy—do our patients have the wherewithal to find and understand basic health information and services so that they can make the right decisions for their and their children's well-being?

To overcome our health inequities, we need to get beyond the attitude that there is a "them"—one of these communities—

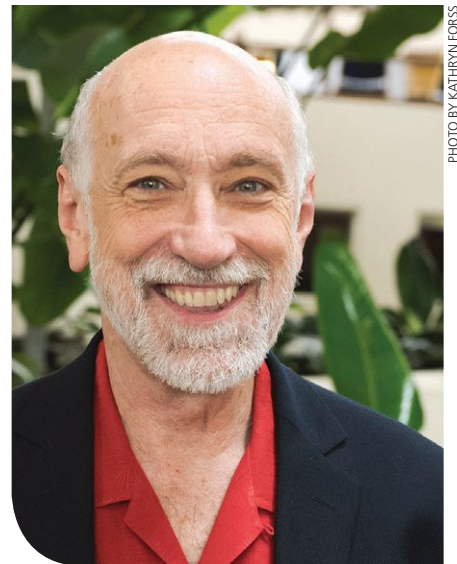
that we must rescue. Rather, we must roll up our sleeves and work with the members of any particular community on improving health disparities by changing social attitudes and bias.

As providers, we all have a role to play in ensuring that our patients receive equitable care. From recognizing our own implicit bias to ensuring that the social factors present in our patient's environments don't have a negative impact on their health ... there are many ways that providers can make a difference.

It's time to move from conversation to action. Here are a few suggestions to get the ball rolling:

- Take the Implicit Bias Association Test (<https://implicit.harvard.edu/implicit/takeatest.html>).
- Seek out stories and opinions from those who are different from you.
- Seek out local or state organizations that are working to address health disparities and achieve health equity, and learn to learn how you can become more involved. Volunteer your time to that group.
- Set up a meeting at your clinic or health system to discuss what work needs to be done to provide equitable care to all patients.
- Seek out training opportunities that will equip you with the tools to address health disparities.

All journeys begin with one step. What are we waiting for?



George Schoephoerster, MD
MMA President

PHOTO BY KATHRYN FORSS

We need to educate
and empower our
peers to step out of
their comfort zones
and re-approach
how they work with
patients.

Negative pressure pulmonary edema-stress-induced cardiomyopathy

An under-recognized syndrome?

A 64-year-old man developed sudden airway compromise after extubation following an elective mandibular debridement, requiring reintubation. Cardiogenic shock and hypoxemic respiratory failure ensued. Subsequent evaluation revealed acute pulmonary edema, severe left ventricular (LV) systolic dysfunction sparing the basal segments, and elevated cardiac biomarkers. Coronary angiogram was unremarkable. The patient's condition, along with his LV function, gradually improved and he was discharged. This case highlights the potential risk of acute upper airway obstruction causing negative pressure pulmonary edema, along with the possibility of stress-induced cardiomyopathy.

BY YOUNGHOON KWON, MD; RYAN J. KOENE MD; SULA MAZIMBA, MD, MPH; JIAN-MING LI MD, PHD

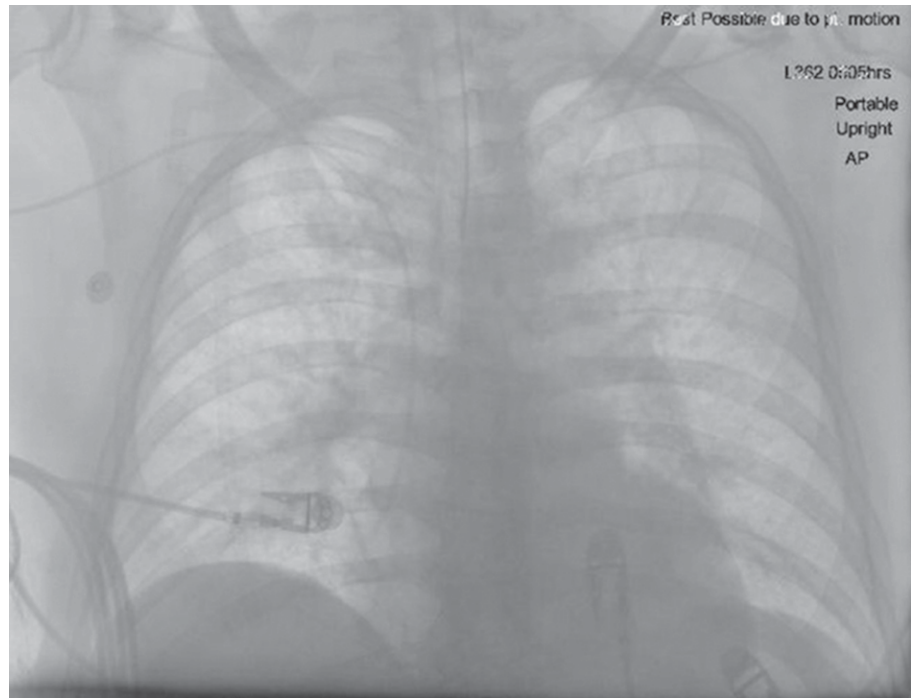
Negative pressure pulmonary edema (NPPE) is an acute respiratory failure that can occur after acute strenuous inspiratory effort against an obstructed airway and has been reported in the peri-operative settings.^{1,2} Stress-induced cardiomyopathy (SICMP), or so-called Takotsubo cardiomyopathy, is characterized by transient left ventricular wall motion abnormality without evidence of obstructive coronary lesions or acute atherosclerotic coronary plaque rupture. Excessive release of catecholamines due to various types of intense stressors have been implicated as the primary underlying mechanism. We present a case of NPPE caused by acute upper airway obstruction during emergence from anesthesia that subsequently led to a SICMP.

Description

A 64-year-old Caucasian male without a history of cardiovascular or pulmonary disease was admitted for debridement of anterior mandibular osteomyelitis. Pre-operative electrocardiogram (ECG) showed normal sinus rhythm, and his blood pressure was 110/70, heart rate 72, and O₂ saturations 96% on room air.

FIGURE 1

Chest X ray showing diffuse pulmonary edema



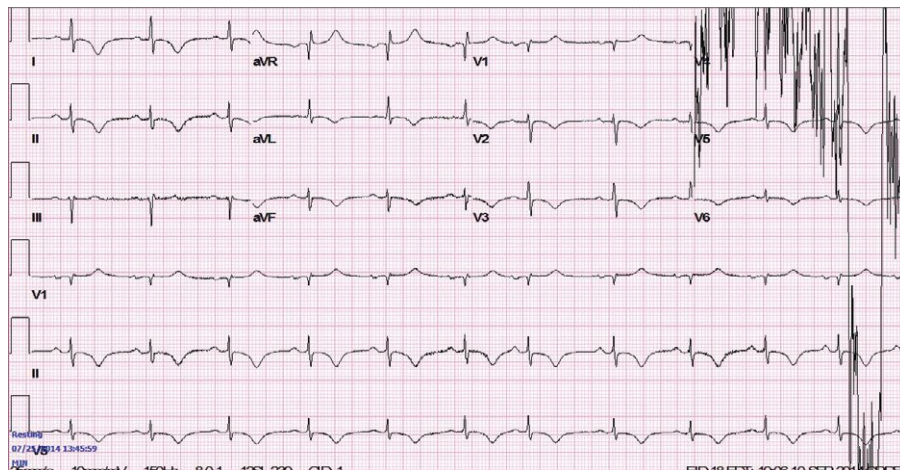
Intra-operatively, the patient underwent the surgery under general anesthesia with sevoflurane 250 ml, received 6 ml of 1% lidocaine with epinephrine, and 1500 cc of crystalloid solution and tolerated the procedure without any complications.

Post-operatively, shortly after extubation, the patient manifested increasing difficulty with breathing and developed inspiratory stridor suggestive of acute upper-airway obstruction. Bilateral crackles were heard on lung auscultation. Deterioration of the

patient's respiratory condition ensued with increasing respiratory efforts despite conservative management, which included an airway opening maneuver, placement of an oral airway, use of 100% oxygen supplement, and bag-valve mask ventilation. He finally required re-intubation by anesthesiology. Laryngoscopic view of the vocal cord did not show any laryngeal edema but was consistent with partial laryngospasm. Tracheal intubation was confirmed by CO₂ detector and bilateral chest movement. However, the patient's oxygenation remained poor (saturation at low 90% on 100% FiO₂). Furthermore, severe hypotensive episodes (70/40 mm Hg) also ensued and led to the initiation of vasopressor support (norepinephrine). The patient was transferred to the medical intensive care unit. On exam, jugular venous pulse was not prominent, bilateral lung crackles were heard, and frothy secretion was suctioned via endotracheal tube. Chest radiograph showed flash pulmonary edema (Figure 1). A 12-lead ECG showed new diffuse deep T-wave inversions (Figure 2). Bedside echocardiogram showed mild increase of left ventricular size (left ventricular LV internal end-diastolic diameter: 5.8 cm [normal diameter <5.8 cm]), severely reduced LV ejection fraction of 20% with diffuse akinesis involving the mid to api-

FIGURE 2

12 lead electrocardiography demonstrating diffuse T-wave inversions

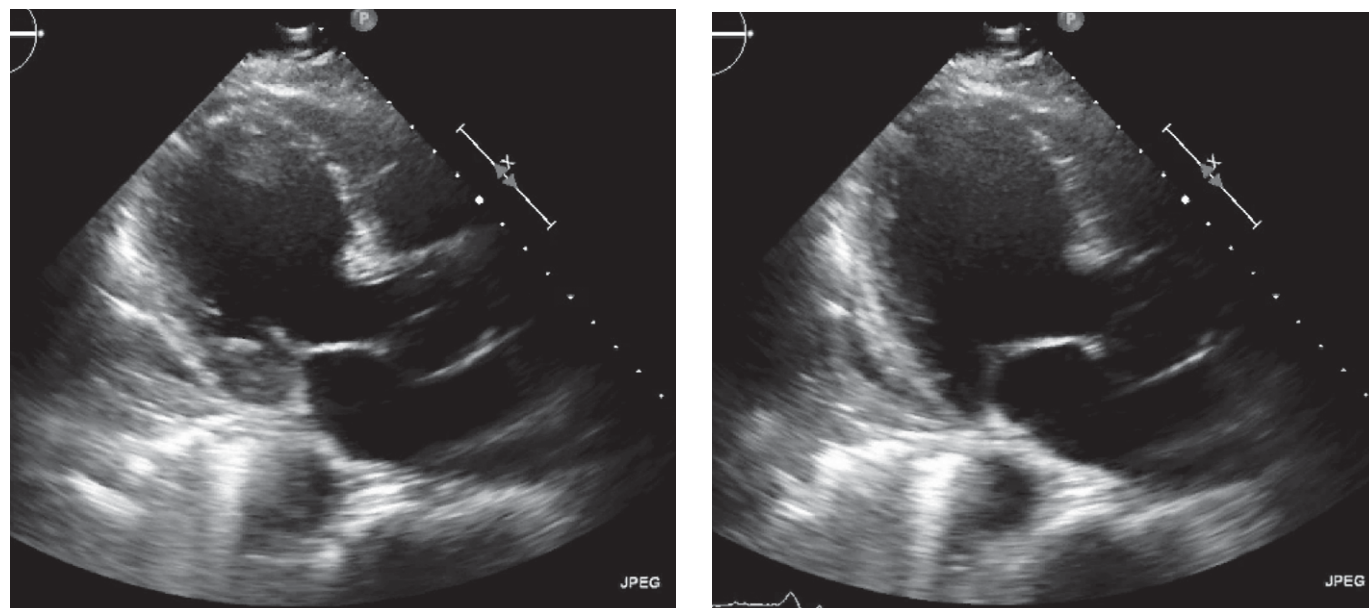


cal segments of the LV, along with sparing of the basal segments (Figure 3). Right ventricular function was normal. Laboratory testing was remarkable for troponin elevation (1.76 ng/ml [normal < 0.021 ng/ml]). Coronary angiogram did not reveal evidence of acute coronary syndrome or any significant obstructive coronary artery disease. It was therefore determined that the acute decompensated heart failure was due to SICMP. Intravenous diuretics were given and over the course of four to five days, vasopressor/inotropic therapy was successfully weaned as his hemodynamic

condition improved. The patient's oxygenation also significantly improved with the clearance of the pulmonary edema clinically and on the chest radiography. The patient was extubated on hospital day 3. Repeat transthoracic echocardiogram (TTE) seven days after the presentation showed improved EF to above 40% with distal anteroseptal periapical and distal inferoseptal hypokinesia and akinesia. He was discharged on hospital day 5 and followed-up in outpatient clinic two months later, where an ECG was normal. He has subsequently had no clinical heart failure

FIGURE 3

Echocardiography. Parasternal long axis view during systole (left) and diastole (right)



and it's been over two years since the incident event.

Discussion

The first description of SICMP featured an acute coronary syndrome-like presentation with transient myocardial dysfunction characterized by a distinct wall motion abnormality of the LV with apical ballooning.³ With increasing number of reports describing a similar phenomenon, the concept of SICMP since its inception has expanded in recent years into a more heterogeneous syndrome of reversible myocardial dysfunction in diverse clinical settings. While the pathophysiology of this condition is not well understood, several mechanisms including catecholamine excess, vasospasm, and microvascular dysfunction have been suggested.⁴ The triggering factors of SICMP range from subtle stress triggers to critical illness. The phenotypical presentation of LV wall motion abnormalities also varies from the prototypical apical akinesis to mid or basal akinesis (non-apical variant). Although the overall outcome is generally thought to be good, complicated courses including cardiogenic shock, stroke, and death have been reported.⁵

Our case met the mostly accepted diagnostic criteria of SICMP proposed by Mayo Clinic: i.e., 1) transient LV systolic dysfunction with the wall motion abnormalities not confined to a single epicardial coronary territory, 2) no obstructive coronary disease or absence of angiographic evidence of acute plaque rupture, 3) ECG abnormalities (typically ST-segment elevation and/or T-wave inversions) or modest elevation in troponin, and 4) no evidence of pheochromocytoma or myocarditis.⁶

This case is unique in that it involved two interlinked underlying pathologies, wherein negative pressure pulmonary edema (NPPE) led to the development of SICMP. The presentation was initially consistent with NPPE, a rare but well de-

scribed noncardiogenic pulmonary edema often occurring in otherwise healthy patients in the setting of total upper-airway obstruction, such as laryngospasm.⁷ In fact, NPPE is considered one of the important differential diagnoses for acute respiratory distress in the postoperative setting.⁸ Our patient developed acute upper-airway obstruction as evidenced by stridor on exam and manifested increased accessory respiratory muscle use. Unusually large negative inspiratory pressure can be generated when breathing against either a fully or partially closed glottis (such as seen in the Mueller [forced expiration against closed mouth or nose] or modified Mueller maneuver, respectively). Consequently, venous return to the right side of the heart will maximally increase, which, in turn, would propel excessive flow into the pulmonary circulation. Resulting increased pulmonary capillary hydrostatic pressure coupled with elevated transvascular pressure gradient driven by negative airway pressure can draw fluids from intravascular space to interstitial and alveolar space, thus causing acute flash pulmonary edema.⁹ Timely supportive care to relieve the upper airway obstruction is crucial.

In our case, what appeared to be NPPE was complicated by a severe form of SICMP. In addition to exhibiting hallmarks of SICMP consisting of a new ECG abnormality, markedly positive cardiac injury biomarker, and typical Takotsubo-like apical ballooning, the patient developed acutely sustained hypotension, implying a severe hemodynamically unstable SICMP (i.e., cardiogenic shock). We postulate that the excessive forced inspiration against a closed glottis would not only maximize the preload (venous return to the right side of the heart) but also heighten the afterload of the left heart. Buda *et al* demonstrated that Mueller maneuver-induced negative intrathoracic pressure leads to increase in LV transmural pressures and thereby compromised LV function.¹⁰ We speculate that acute enlargement of the right ventricle caused by maximally increased venous return compromised LV filling via ventricular interdependence (i.e., shifting of the

ventricular septum toward the left) and the increase in LV afterload likely could have also contributed to acute LV dysfunction. In addition, the acute respiratory event associated with hypoxemia may have also accompanied adrenergic surges contributing to the development of Takotsubo-like cardiomyopathy. Therefore, acute flash pulmonary edema in our patient may have been due to a combination of noncardiogenic (NPPE-induced) and cardiogenic (severe SICMP-induced) edema.

SICMP occurring in the setting of NPPE has been recently reported.^{11,12} It is noteworthy that the patients reported in these two cases, as is the case with our patient (debridement of mandible), had undergone rather minor head and neck surgeries (tonsillectomy and thyroidectomy, respectively). In both reported cases, as well as our case, ACS was ruled out by cardiac catheterization. Our case was similar to that reported by Lee *et al* in that the patient experienced a rather severe form of SICMP causing cardiogenic shock.¹² In contrast to early normalization of LV function on repeat echo on the fifth hospital day reported by Lee *et al*, our patient's LV function, despite good clinical recovery, was not fully recovered during the index hospitalization. However, our patient's clinical course since has been unremarkable (Table 1).

Long-term prognosis of SICMP is generally good, however, in the acute setting the risk of morbidity and mortality are similar to patients with acute coronary syndrome.⁵ Several factors have been postulated to predict a high-risk group in SICMP. According to one study, the risk of acute decompensated HF caused by SICMP increased incrementally with each of the following risk factors; older age (>70 years old), presence of a physical stressor, and LVEF less than 40%. In the cohort of 118 patients, they reported that the likelihood of acute HF increased from 28% to 58% to 85%, based on the number of risk factors present.¹³ In terms of LV function, many studies have demonstrated recovery of systolic ventricular function in as soon as one to three weeks.^{14,15}

A better understanding of the prevalence, mechanisms, and prognostic implications of SICMP accompanying NPPE is necessary. In the case of NPPE-like development, efforts should be made to first restore the airway, then to correct hypoxemia. In addition, based on our case as well as others, we propose close vital-sign monitoring and a low threshold to obtain ECG, cardiac biomarkers, and readily available imaging such as echocardiography if the patient exhibits hemodynamic instability. While NPPE may occur following acute upper-airway obstruction, providers should consider SICMP in the setting of cardiogenic shock, but only after acute coronary syndrome is excluded.

In conclusion, we report a unique case of SICMP occurring in conjunction with NPPE. Further studies are necessary to better elucidate the prevalence and characteristics of this potentially underappreciated condition. **MM**

Younghoon Kwon, MD, assistant professor of cardiovascular medicine at the University of Virginia, was a fellow at the University of Minnesota. Ryan J. Koene, MD, is a fellow at the Cleveland Clinic and was a resident and fellow at the University of Minnesota. Jian-Ming Li, MD, PhD, is a professor of medicine at the University of Minnesota. Sula Mazimba,

MD, is assistant professor of cardiovascular medicine at the University of Virginia.

Consent for Publication. The patient provided written consent to publish this case report by signing the University of Minnesota IRB-approved form "HIPAA authorization to use and disclose individual health information for research purposes."

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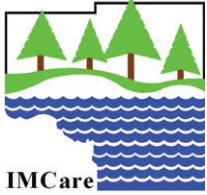
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TABLE 1

Stress-induced cardiomyopathy in the setting of NPPE

CASE REPORT	PATIENT CHARACTERISTICS				MAYO CLINIC SICMP DIAGNOSTIC CRITERIA				PATIENT OUTCOME
	Gender	Age	Surgery	LVEF at Decompensation	WMA not confined	Lack of coronary obstruction	Abnormal ECG/ Elevated Troponin	Lack of Myocarditis or pheochromocytoma	
Kwon et al. 2017	Male	64	Anterior Mandible Debridement	20%	Yes	Yes	Yes	Yes	Status at Discharge Discharged on day HD#5. Echo showed persistent WMA with LVEF >40%; normal ECG at 2 months f/u; no complications
Bharathi et al. 2016 ⁹	Female	65	Total Thyroidectomy	40%	Yes	Yes	Yes	Yes	Hemodynamically stable; normal ECG; persistent WMA
Lee et al. 2012 ¹⁰	Male	56	Tonsillectomy	47%	Yes	Yes	Yes	Yes	Discharged on HD#8. Echo showed no WMA with LVEF 60%; no complications

ECG refers to electrocardiogram; HD, hospital day; LVEF, left ventricular ejection fraction; NPPE, negative pressure pulmonary edema; SICM, stress-induced cardiomyopathy; WMA, wall motion abnormality



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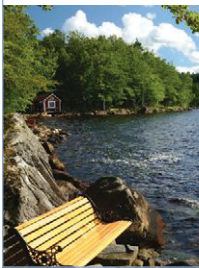


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BY BENJAMIN MARSH, MD

Sometimes in medicine it can be difficult to see the forest for the trees. Tweaking a medication dose here or some additional lab results there ... all are part of the big picture of a patient's health that, over years and years, takes the shape of something we, as individual medical professionals helped form. Rarely do we get the opportunity to fix something in an instant, to be the hero seen on every medical television show—to see the whole forest and all the trees. But every once in a while, Birnam Woods walks right up to Dunsinane, fills up your field of vision and gives you the opportunity to be George Clooney for a brief, shining moment.

The first assignment I had during my intern year was covering night float on a busy trauma and surgical service. I spent the majority of the time terrified and paging my senior resident to ask if it was okay to give patients Docusate. The little downtime I had between pages I spent watching old seasons of “ER” on DVD in the call room. One night, I received a stat page to a patient's room. After running up five flights of stairs, I arrived to find a 21-year-old man having what looked to be a seizure.

He had been admitted a few days prior with an appendiceal abscess; a percutaneous drain was placed and he was started on IV antibiotics with a plan for an interval appendectomy down the road. He had

struggled with severe nausea over the past few days and was on every anti-emetic we could throw at him. He was a Somali-American and his mother had been at his bedside day and night.

On this particular evening, nausea was not this patient's problem. His head was wrenched over one shoulder and he kept sticking his tongue out between brief answers to my questions. His eyes were wide—he looked almost as scared as I was. To make matters worse, his mother was in the corner of the room wailing at the top of her lungs, “My son, my son, help my son!” His nurse looked at me, grabbed my arm and said, “Doctor, you must do something!” in the kind of tone I previously thought reserved for soap operas.

I did a neuro exam and it definitely did not seem like a seizure. Maybe he was faking it to get attention from his mom? Then it hit me. “Fifty mg of IV Benadryl, stat!” I yelled. His nurse gave me a look that simultaneously said, “Why?” and, “Please never say that again,” but she humored me and drew up the medication. Almost the instant it hit his veins, his contorted face relaxed, his neck released and his tongue went back in its rightful place. His mother, still sobbing, wrapped her arms around me saying “Thank you Doctor, thank you, thank you thank you ...” I'll never forget the look of awe on that nurse's face—as if I were some kind of god. If I had sunglasses with me, I would have put them on as I walked out of the room backward, turning



only to give high fives to the imaginary crowd of onlookers.

The irony of the situation was that I only figured it out because I had recently watched an episode of “ER” (Season 3, episode 3) in which a young Dr. Carter takes Compazine for nausea and develops an acute dystonic reaction with torticollis. Treated with (you guessed it) IV Benadryl. Four years of medical school learning and my only dramatic save comes from watching a TV show.

It's unfortunate that real life medicine is rarely as glamorous and flashy as it is on TV, but that doesn't mean our hard work means any less to our patients. Our storylines tend to be on the scale of seasons or series, rather than single episodes. But I take solace in the fact that there are still opportunities for dramatic cures; where I can still yell, “Stat!”—without too much eye-rolling from the nursing staff. **MM**

Benjamin Marsh, MD, is a fourth-year resident in urology at the University of Minnesota Medical School. This article was awarded an honorable mention in the 2017 Minnesota Medicine writing contest.

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