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MAY/JUN 2023 • $9.99

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Erica Timko Olson, PhD, RN
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Colin West, MD, PhD

Technology as servant, not master

Digital health—for some physicians, this phrase conjures images of sterile, disconnected interactions devoid of human touch and antithetical to relationship-centered medical practice. Others have an almost instinctual recoil born of years trying to wring efficiency gains out of electronic health systems with limited success.

Yet others are excited by the promise of technology for faster, more accurate data management and summarization into interpretable patterns that might guide care plans or even more mundane aspects of daily life. Rather than fearing the impersonal taking hold, these physicians see hope in artificial intelligence, big-data analytics, and linkage of medical records across healthcare systems to improve patient care and actually bring us closer to understanding our patients' lives.

Every instance where I have to deviate from my care routines to "feed the computer" feels like an unacceptable intrusion into my sacred time with my patient.

So what separates these contrasting views of technology in medicine? Sure, some of it may be reluctance to adapt to change, but physicians use fancy technology every day without much difficulty, so we are generally not averse to modern advancements. For me, one of the main determinants of my reaction to new technology is whether it serves my needs or I am expected to modify my behaviors to meet its requirements. For example, the development of most electronic medical record systems seems to have largely excluded consideration of the user experience so that EMR processes often disrupt clinical workflows rather than support them. Every instance where I have to deviate from my care routines to "feed the computer" feels like an unacceptable intrusion into my sacred time with my patient.

On the other hand, I can also confidently say that being able to search the entire medical record for one phrase to find the key clinical note from a visit seven years ago is quite incredible when compared with searching dusty handwritten charts pulled from storage. (For the younger generations, yes, this was a thing.) In addition, getting approval from a patient with the click of a button to allow me to immediately see the thought processes of their care teams around the world is amazing—there is no question these aspects of digital health serve both patients and physicians.

If the difference between digital health as boon or bane is who's serving whom, we can use this to determine which technological advancements are most worth our time. We can also use this criterion to evaluate other technologies that might help our patients in their daily lives and could even help us be healthier. The growing science around fitness trackers and AI to guide health behaviors is an example where technology might serve our health needs directly by collecting, analyzing, and interpreting complex data to advise patients and us on healthier behaviors. Imagine these tools alerting us to unhealthy behaviors we may not be fully aware of, nudging us to be more active, get an asymptomatic but potentially dangerous heart rhythm evaluated, or spend more time amid the healing effects of nature.

Even greater benefits present themselves if personal data collected by these tools can be integrated into and organized within patients' medical records. This would help shift the EMR from a data repository to an EHR, a true electronic health record. These possibilities are increasingly becoming an accessible and exciting reality. The key, though, is to maintain the first principle: Rather than requiring that we serve digital health tools, technology should serve patients and physicians. **MM**

Colin West, MD, PhD, is professor of medicine, medical education, and biostatistics, Mayo Clinic. He is one of three medical editors for *Minnesota Medicine*.

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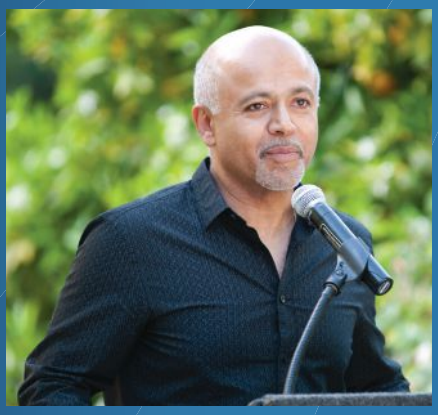

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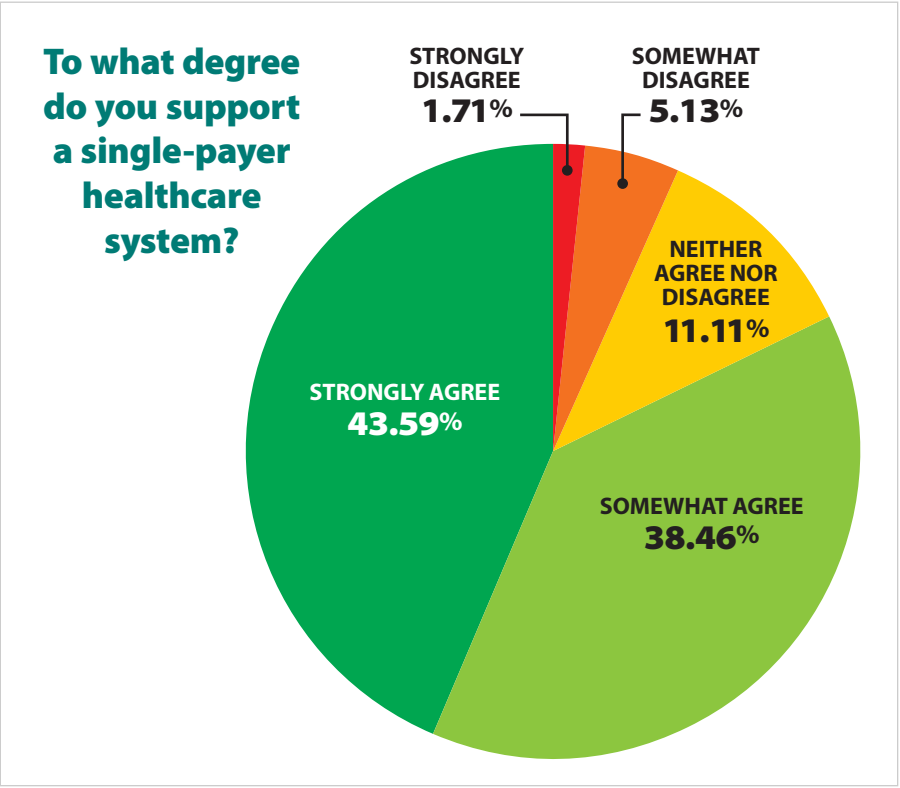
Minnesota Medical Association

Minnesota medical students back single-payer healthcare…

…but not without reservations about cost and implementation.

BY ABIGAIL RICE, MS3

In a survey of 117 medical students across all four years of education at the University of Minnesota Medical School, more than 80% of respondents somewhat or strongly support a single-payer healthcare system.



In this survey, the definition of single-payer healthcare was based on that of the advocacy group Physicians for a National Health Program: "Also known as 'Medicare for all,' [it] is a system in which a single public or quasi-public agency organizes health care financing, but the delivery of care remains largely in private hands. Under a single-payer system, all residents of the U.S. would be covered for all medically necessary services, including doctor, hospital, preventive, long-term care, mental health, reproductive health care, dental, vision, prescription drug and medical supply costs."

The students surveyed were highly familiar with the topic—over 70% said they were moderately to extremely familiar with the single-payer model. But their support came with concerns.

Respondents were recruited by an email sent to all students in the medical school. Participants were randomly selected to receive a gift card for participating (our way to try to decrease selection bias). Using a thematic analysis, patterns in the survey were identified to best summarize the opinions of the student respondents. Examples of students' responses are quoted to indicate their range of opinions about healthcare financing models.

Broadening discourse

With this survey, I hope to broaden medical student discourse about single-payer by identifying what medical students find attractive about the model, as well as where they think it can be improved.

Critiques coming from a highly supportive and highly informed group are necessary to address points that will make a policy better and broaden the base of support. Engaging with students' concerns allows them to better focus conversations with medical students going forward. Instead of speaking just about what people already agree on, addressing points of concern can make the policy better overall and find solutions to tough problems. While inviting debate may not be comfortable for single-payer advocates, if we cannot talk about our problems, we cannot solve them.

By helping bring awareness to how students think about single-payer, it is my hope that this survey can guide conversations when speaking to this stakeholder group in the future. The support of physicians, as key members of the healthcare community, will be crucial in the journey toward a more just system. My hope is that the conclusions from this survey can be used to pursue it.

Starting with the positive, when medical students were asked what they find attractive about a single-payer system, five key themes emerged. In order of frequency, those themes are:

Access: Students believe a single-payer system would improve the access that people have to healthcare.

- "Increased access to healthcare for all, but especially those with low resources."
- "Single-payer would reduce at least one barrier for all people to be able to access healthcare."
- "Improved access to primary care would decrease utilization of the emergency department for nonemergency complaints."

Simplicity: Respondents of the survey think a single-payer system would be less complex, benefitting both providers and users of healthcare.

- "It would reduce the workload for physicians by less writing prior authorizations and no longer having to know what medications are available to patients so they don't end up prescribing something the patient does not have coverage for. It would also allow charting to be more focused on medicine than bureaucracy."
- "Patients would have less confusion in navigating the health system."

Affordability: Many believe a single-payer system would be more affordable.

- "Fewer overhead administrative costs at healthcare systems/facilities that would theoretically decrease overall cost to patients."
- "It would remove profits from healthcare and reduce billing paperwork time and expenses."
- "People would no longer hesitate to get the care they need because of cost, increasing the likelihood that people would seek out preventative services, driving down costs as a whole to our society and bettering the overall health of our population."
- "Ability to negotiate drug prices would drive down prices."
- "People would not need to bankrupt themselves in order to afford necessary procedures or treatments."

Health: Students believe this public policy would improve the overall health of the American people.

- "I hope that it would encourage people to seek out healthcare that they need, which would in turn help focus our healthcare model on preventive healthcare instead of reactive healthcare."
- "Greater allowance to focus on the social determinants of health."
- "Patients would have an easier time actually receiving the treatment I will be prescribing and thus will be able to recover and live a healthier life."
- "Hopefully better sharing of data between systems would lead to better public health outcomes."

Morality: Students felt a moral obligation to support this healthcare model.

- "Breaking the system of making profit off of the health of others."
- "It is wrong for insurance to be tied to employment."
- "I believe everyone has a right to healthcare and the single-payer system allows people to receive the care they need regardless of their income or occupation."

Despite strong support, both students who do and don't favor the overall policy have significant concerns about a single-payer system. When asking about the concerns medical students had about a single-payer system, the following themes emerged:

Cost: Students mentioned concerns with funding the program and who would bear the brunt of those costs.

- "No one goes into the specifics, and [students] wish they would."
- "Since there is only so much money available in the system, somebody has to decide what will be deemed 'medically necessary' and how much of that care we can collectively afford."
- "It's a monopoly and prevents competition in the market."

Implementation: Students worry that although the policy is the best option, the hurdle to getting it running may be too high.

- "I worry about overcoming the political challenges to implement it."
- "Different industries are going to interfere and prevent its installment."

"People would no longer hesitate to get the care they need because of cost, increasing the likelihood that people would seek out preventative services, driving down costs as a whole to our society and bettering the overall health of our population."

"I am concerned that the focus of setting up single-payer in the U.S. will have a large focus on how low the taxes can be kept to minimize upsetting people, which may limit the funding the program needs to function properly."

- "There will likely be system delays associated with increased access and usage, and I wonder if the government has the ability to efficiently handle the transition."

Demand: Many were worried that the system would not be able to handle the increased demand that single-payer would bring.

- "How is the government going to support the increased demand for healthcare? Will they fund more residency spots?"
- "This will likely lead to more burdened providers and increase physician burnout."
- "This could cause a backlog of services, similar to issues you hear about in Canada."

Taxes: Students had more specific concerns about funding, especially with regards to taxes.

- "I am concerned that the focus of setting up single-payer in the U.S. will have a large focus on how low the taxes can be kept to minimize upsetting people, which may limit the funding the program needs to function properly."
- "It will be paid for by taxes, and I am concerned about who's going to pay for it—particularly people in middle-income brackets who will likely be hit the hardest."

Compensation: Physician compensation was also a concern for some respondents.

- "With the current cost of medical education in the U.S. compared to other countries, reducing physician payments places an undue burden on the physicians, many of whom will find themselves in substantial amounts of debt when they leave training. Also, if you pay people less, you incentivize fewer people to go into medicine. There are plenty of people who would make excellent physicians who don't get the chance because of how selective admissions processes are, but there are also many bright people who will decide not to go into medicine because the financial, physical, and psychological burden of training is not worth the payout."
- "Poor reimbursement for primary care and other low-paid specialties."

Government Distrust: Although they might favor the idea of universal coverage, some respondents brought up concerns about government-controlled healthcare.

- "Depending on the administration, the government may limit access to abortions or transgender health care."
- "I am concerned about the volatility of our political system, putting all the power over health insurance in Congress' hands, and unequal funding across states that make their own choices about how to hold back federal funding (for example, states that have withheld Medicaid expansion funds)."
- "Based on several examples of states' giving out vaccines preferentially based on race, I am concerned a government-run healthcare system would subscribe to the same kind of "woke eugenics," and this idea morally horrifies me. I would also worry that the government would push for midlevels to see patients because they are cheaper, claiming that they could provide equally competent care as physicians. My fear is essentially a two-tier system, where poor people would be seeing predominantly midlevels, while rich people could pay for some private or add-on option to see a real doctor."

Limitations: Students identified some limitations on our healthcare options the policy could bring.

- "Would a single-payer system limit access to things like integrative medicine, vision, dental, etc.?"
- "I worry about our ability to provide affordable coverage for rare diseases, such as cystic fibrosis." **MM**

Abigail Rice is a third-year medical student at the University of Minnesota Twin Cities and a Twin Cities Medical Society Public Health Advocacy Fellow, 2021.

Mayo's "deaths of despair" study reveals importance of community support

BY ANDY STEINER

Minnesota's death rate rose 17% during the first year of the COVID-19 pandemic compared with previous years, according to a study published this winter by Mayo Clinic.

While 9.9% of those deaths were due to the virus, the greatest increase in deaths was due to other factors, including gun deaths and accidental poisonings and overdoses, all which saw a 49% increase. Another cause of death, alcoholic liver disease, increased 25% from prior years. Perhaps most surprising was a 48% increase in deaths by malnutrition.

Rozalina G. McCoy, MD, MS

The study's lead author, Rozalina G. McCoy, MD, MS, an endocrinologist, primary care physician, and medical director for Mayo Clinic Ambulance Community Paramedic Service, said that she and her co-authors feared at the pandemic's outset that they would see an increase in deaths of patients with chronic illnesses like diabetes, cancer, and heart disease who delayed seeking medical treatment. But Minnesota saw no increase in such deaths, she said. Instead, McCoy and colleagues learned after analyzing the state's death certificate data that, COVID deaths aside, the deaths that increased during the pandemic were "deaths of despair," largely preventable deaths mostly caused by a larger societal malaise that overtook the state.

"I was not surprised by the nearly 10% rise in deaths due to COVID," McCoy said. "That is consistent with what was seen in other studies. But the extent to which other deaths increased was somewhat unexpected. The increase in deaths due to homicide and overdose and alcohol—it just speaks to the acute collapse of our social fabric."

The fraying of the social fabric was even more evident in the rise in deaths due to malnutrition, McCoy said. These deaths, she explained, were "isolated to older women living in rural areas."

Learning that vulnerable Minnesotans were unable to access the food they needed to survive was a shock, McCoy said. "For me, as a primary care physician, the thought of lonely, older patients with no resources and no support dying from malnutrition was devastating. That's where I really thought about despair and the urgent need to both call attention to what was happening and the need for all of us to help."

Many of these unexpected deaths were tied to isolation, said Shannah Mulvihill, executive director of Mental Health Minnesota, a statewide mental health advocacy and support nonprofit. Social interaction, something that was hard to come by for many people at the beginning of the pandemic, is central to a person's overall health, she explained.

"We can't underestimate what social connection does for us," Mulvihill said, "not just emotionally, but physically as well." She said that research shows that human brains grow and make healthy connections based on outside experiences with others. "When we don't have those connections, things start to break down."

Mulvihill believes the loss of connection many people faced during COVID's darkest days is at the root of the increase in demand for online mental health screenings offered on her organization's website, which were up by as much as 700%. "I expected that once things opened up again, once kids were back in school, we'd see those things come down," she says. "That hasn't been the case. January 2023 was our highest number yet."

McCoy said she hopes that her research will inspire physicians to develop ways they can better support people before the next global health crisis and in their everyday practice even outside a pandemic. She's started screening all of her patients for isolation or lack of support systems. In her personal life, she's active in Rochester's Jewish community, where local synagogues support older members and others who may be homebound, isolated, or need other forms of support. The Mayo Clinic Ambulance Community Paramedic Service also cares for people in the home environment and seeks to ensure that everyone has access to the medical and social care they need. During the peak of the pandemic, the community paramedic team was the only source of home-based care in the community and a lifeline for many.

"When I think of despair," McCoy said, "I think of the people who died from lack of support. Many of these deaths could have been prevented. Even a little bit of connection can go a long way to help the people around us. It is so important to check in on your neighbors, friends, and family, make sure they are able to get food and medications, and just be there for them." **MM**

Andy Steiner is a Twin Cities freelance writer and editor.

CASE STUDY: Too much of a good thing

Vitamin D oversupplementation causes harm

DOMINIKA JEGEN, MD, MA, CCFP (EM), DABFM

Vitamin D supplementation has become a global phenomenon, based on the premise that limited amounts of sunlight cause preventable ailments. Over-the-counter supplements are therefore widely used and misused in place of sun exposure with often intentional ingestion of supratherapeutic doses.

The symptoms of supratherapeutic vitamin D levels are wide-ranging and vague, adding to their elusive presentation. This patient reported insidious-onset arm weakness and migratory polyarthralgias of the upper extremity joints. He reported taking 20,000 units of vitamin D daily for two months for "general health." Laboratory investigations revealed a supratherapeutic serum level, and the patient was advised to stop his supplement. On follow-up eight weeks later, he reported a marked improvement in his symptoms. Despite being used ubiquitously, vitamin D oversupplementation can cause harm. It is therefore recommended to use vitamin D judiciously, as this case report illustrates.

Substantial doses of vitamin D

Vitamin D is a common dietary supplement, especially in the northern hemisphere. I have seen this personally while working in northern Canada, where physicians prescribed as much as 30,000 units orally three times weekly. In the northern United States, I knew patients self-treating with over-the-counter formulations. Despite being skeptical of such large doses, as a new physician I was told by senior colleagues that excessive vitamin D ingestion posed no risk to patients. Excessive exposure to the sun does not result in vitamin D toxicity, as the unnecessary amount of vitamin D in the body's tissues is removed by photodegradation into inactive metabolites. But the same cannot be said of excessive vitamin D ingestion, particularly if one is not spending substantial time in the sun.

There is firm evidence to support the need for supplementation with correct doses. For example, the National Health and Nutrition Examination Survey conducted from 2001 to 2004 found that 76% of 11,009 American adults had vitamin D insufficiency. Because of such studies and their reporting in the popular media, supplementation has become a global phenomenon and has seen a marked increase compared with previous decades. In fact, the amount spent on vitamin D supplements in the United States rose from $40 million in 2001 to $600 million 10 years later. Over-the-counter supplements are widely used and misused with recorded incidents of manufacturing and prescribing errors and intentional ingestion of supratherapeutic supplementary doses. Many quasi-scientific sources recommend it as a panacea for many ailments based on its wide range of physiologic activities. As a result, toxicity due to high vitamin D levels, otherwise referred to as hypervitaminosis D, has become increasingly prevalent.

The symptoms of supratherapeutic vitamin D levels are wide-ranging, nonspecific, and mimic hypercalcemic states, adding to their elusive presentation. These include difficulty concentrating, confusion, drowsiness, depression, and psychosis. Gastrointestinal symptoms include abdominal pain, nausea, anorexia, and constipation. Cardiovascular manifestations include hypertension and bradyarrhythmias. Renal symptoms include polydipsia, polyuria, nephrocalcinosis, and renal failure. Much less commonly, with no frequency defined, bone pain and weakness have been cited; albeit, no case reports illustrating this have been published thus far. Ironically, vitamin D deficiency has also been shown to mimic these same symptoms, further complicating clinical diagnoses.

TABLE 1

The patient's laboratory investigations for calcium and vitamin D on the day of initial presentation and two months thereafter.

COMPONENT (UNITS IN BRACKETS)	INITIAL PRESENTATION	TWO MONTHS AFTER INITIAL PRESENTATION	NORMAL VALUE
Calcium, Ionized (mg/dL)	4.97	—	4.57-5.43
Calcium, Total (mg/dL)	9.2	—	8.6-10.0
25-Hydroxyvitamin D2 (ng/mL)	<4.0	<4.0	—
25-Hydroxyvitamin D3 (ng/mL)	73	35	—
25-Hydroxyvitamin D Total (ng/mL)	73	35	20–50

"There is always something"

A 47-year-old man presented to the family medicine clinic with five weeks of symmetrical weakness and pain in the wrists and elbows. He reported insidious-onset arm weakness and migratory polyarthralgias of the upper extremity joints. He stated that "there is always something" when describing the symptoms in his upper extremities. He found it was difficult to carry items or perform tasks with his arms, a significant concern given that he is a police officer. He reported no history of similar symptoms, trauma, new exercises, or new routines.

He did not have symptoms in his legs or torso or a family history of rheumatological conditions. He used acetaminophen and ibuprofen for the pain, but even then, found himself waking at night because of the symptoms. His past medical history included depression, insomnia, migraines, gastroesophageal reflux disease, hyperlipidemia, and erectile dysfunction. He took the following medications, none of which were new: bupropion 300 mg daily, eszopiclone 3 mg as needed, a multivitamin daily, rosuvastatin 10 mg daily, and sildenafil 100 mg as needed.

On further questioning, he acknowledged taking large doses of vitamin D for "general health" that he had bought online. The dose was 20,000 units daily for two months.

On physical examination, vital signs were all stable on room air. His body mass index was 27.6. He was not in acute distress and was alert and oriented. Mental status was at baseline, and the patient was not confused nor reporting any neurological symptoms. His head was normocephalic, eyes nonicteric and his cardiovascular and respiratory examinations were unremarkable. On examination of his upper extremities, he had no evidence of swelling, deformity, or injury of either limb. He had normal range of motion of both shoulders, elbows, wrists, and hands. He did have tenderness to palpation of both elbows and wrists, though they appeared normal. He had normal radial pulses bilaterally and normal sensation and motor function of the radial, median and ulnar nerves bilaterally. He had normal strength to resistance of both shoulders, triceps, biceps, and wrists, though he noted that he felt weaker than usual on the examination of these joints. He was able to squeeze the examiner's fingers bilaterally equally, and objectively this was felt to be within normal limits.

X-rays of bilateral wrists and elbows proved normal. Given his extremely high ingested doses of vitamin D, laboratory testing was performed for both calcium and vitamin D levels (Table 1). Serum testing revealed a supratherapeutic level of vitamin D of 73 ng/mL (normal range is 20–50 ng/mL) and the patient was advised to stop his supplement.

On follow up eight weeks later, the patient reported a marked improvement in his symptoms; albeit, they had not completely resolved despite his vitamin D level returning to normal. He had also stopped his rosuvastatin and symptoms further improved, illustrating a potential element of statin-induced myalgia. He was placed on atorvastatin and his symptoms continued to improve.

Bottom line

Vitamin D is recommended to both prevent and remedy wide-ranging symptoms. Supplementation with vitamin D is recommended by both adult and pediatric advisory committees, especially during the winter months in the northern hemisphere. This case review illustrates the need for caution with vitamin D supplementation. Oversupplementation can cause patient harm. It is therefore recommended to use vitamin D judiciously. When investigating vague symptoms such as bone pain, consider ordering a vitamin D level if history suggests overuse. If excessive levels are found, there is no specific treatment available aside from discontinuing the supplement and monitoring for resolution of symptoms. Current recommended vitamin D intake amounts recommended by both Health Canada and the Food and Drug Administration are listed in Table 2.

Although excessive sun exposure does not cause hypervitaminosis D, excessive oral supplements can cause patient harm. Symptoms of supratherapeutic vitamin D levels are wide-ranging, nonspecific, and mimic hypercalcemic states, adding to their elusive presentation. These include neurologic symptoms, gastrointestinal symptoms, cardiovascular hypertension and bradyarrhythmias and renal dysfunction. Much less commonly, bone pain and musculoskeletal weakness can be the only manifestations of vitamin D oversupplementation. **MM**

TABLE 2

Daily recommended dietary vitamin D intake

AGE	RECOMMENDED DIETARY ALLOWANCE PER DAY	TOLERABLE UPPER INTAKE ALLOWANCE PER DAY
0-6 months	400 IU (10 mcg)	1,000 IU (25 mcg)
7-12 months	400 IU (10 mcg)	1,500 IU (38 mcg)
1-3 years	600 IU (15 mcg)	2,500 IU (63 mcg)
4-8 years	600 IU (15 mcg)	3,000 IU (75 mcg)
9-70 years	600 IU (15 mcg)	4,000 IU (100 mcg)
71+ years	800 IU (15 mcg)	4,000 IU (100 mcg)
Pregnancy and lactation	600 IU (15 mcg)	4,000 IU (100 mcg)

Adapted from Ross et al. IU stands for international units. Mcg stands for micrograms.

Dominika Jegen is a board-certified family physician in Canada and the United States who currently practices full-scope family and obstetrical care in Owatonna. She is a senior associate consultant at Mayo Clinic Health System and an assistant professor of family medicine at the Mayo Clinic School of Medicine in Rochester.

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Take two aspirin AND A walk in the park

The idea that time spent in nature is good for your health has deep roots in American thought, literature, and medicine. But is it really true?

BY SUZY FRISCH

PHOTO BY R. HAMILTON SMITH PHOTOGRAPHY

PHOTO BY DARIN KAMNETZ

Erica Timko Olson, PhD, RN

Erica Timko Olson, PhD, RN, grew up on a Minnesota farm and spent her childhood—and as much of her adulthood as possible—outdoors. She knew intuitively that being outside made her happy and healthy, whether she was helping with chores, working at a national park and rowing during college, or taking her kids on nature walks.

While completing her doctorate in nursing, Timko Olson and family spent a year in decidedly urban Philadelphia, and her lifelong connection to nature was severely hampered. She stressed and struggled until the family returned to Minnesota and their outdoorsy way of life. That experience planted a seed that already had been growing: her conviction that spending time in nature has a positive effect on health and well-being.

Timko Olson, a clinical assistant professor of nursing at the University of Minnesota, already was researching anxiety and resilience in nursing students, aiming to develop effective interventions. Her experience with her own nature deficit prompted her to explore whether being outside could help nursing students regain equilibrium and thrive.

Timko Olson quickly found compelling evidence during a pilot study of nursing students at the College of St. Benedict and St. John's University that she launched early in the COVID-19 pandemic. She developed an audio guide for students to listen to while

outdoors over five weeks, engaging all five senses while absorbing the natural world around them. Called nature bathing or forest bathing, it's a well-studied practice that combines mindfulness and nature experiences to reduce stress and improve health outcomes.

The participants experienced a significant increase in their well-being and a decrease in anxiety, despite living through this nerve-wracking period coupled with the added stress of being thrust into clinical rotations. "I expected to see an increase in anxiety or a decrease in well-being because of the time, so that was even more significant to me," says Timko Olson.

For the past two decades, medical and mental health experts, scientists, and environmentalists have been building a strong case that spending time outside has positive, wide-ranging effects on our overall mental and physical health. They took a deeply rooted concept that it's healthy to engage with the natural world and backed it up with evidence that explains how it works, why it's effective, and how people can best interact with the outdoors to improve their health.

Timko Olson is amassing such a body of work by undertaking several other studies as the A. Marilyn Sime Faculty Research Fellow in the University's Earl E. Bakken Center for Spirituality and Healing. Combined, this research advances scientific understanding of the perception that nature is good for us.

At the heart of why people thrive in the outdoors is a simple premise. "We are nature. Physiologically that's who we are. Through it, we connect with our innate beings," Timko Olson says. "We know that when people have a sense of awe and wonder, our nervous system relaxes in that environment. Nature gives us this peace and sense that the world is much bigger than ourselves."

Jean Larson, PhD, an assistant professor of nature-based therapeutics at the Bakken Center and director of nature-based therapy services at the Minnesota Landscape Arboretum, highlights biophilia as the foundational notion of nature as a healer. Meaning a love of life, the term was coined by psychologist Erich Fromm and popu-

Jean Larson, PhD

"Interestingly enough, when [patients] are engaged with [nature] activities, their Parkinson's symptoms go away. The brain is distracted. And instead of perseverating on what they can't do, they are engaged in what they are doing and concentrating on that instead of their tremors."

Jean Larson, PhD
Assistant professor of nature-based therapeutics at the Bakken Center and director of nature-based therapy services at the Minnesota Landscape Arboretum

Brent Bauer, MD

"It's not a panacea and it's not that we use nature in place of the other tools in the tool kit. But what is the harm when people are struggling with anxiety, sleep challenges, or attention problems in children? There is no harm, and there is lots of potential for good."

Brent Bauer, MD
Research director of the Mayo Clinic Complementary and Integrative Medicine Program

larized by biologist Edward O. Wilson in his book *Biophilia*. It signifies that people are hard-wired to be in nature, fueling a drive to connect with plants, animals, water, and the land.

"It comes from the idea that we evolved with nature, and it's part of who we are," Larson says. "Over our evolution, we've basically worked against nature because it's meant our survival. We're still operating on that animal part of our brain, but we have another part of our brain that is very much the parasympathetic, calm part that really feels connected to nature."

Fertile research

Brent Bauer, MD, research director of the Mayo Clinic Complementary and Integrative Medicine Program, started seeing convincing research about 15–20 years ago. Richard Louv's seminal book *Last Child in the Woods* revealed the broad effects of nature deficits, while other studies confirmed Bauer's hunch that spending time outside benefitted him and his family—and could help others be healthy.

"We can point to lots of studies that being in nature will reduce blood pressure and improve heart rate variability, it can reduce stress and improve sleep," Bauer says. "The studies are pretty obvious. If you peel it back, everyone should spend more time in nature, and all of us care providers should encourage people to do that."

When Bauer struggles to find an effective approach for stressed and anxious patients, he suggests that they connect with nature each week, paired with traditional recommendations for diet, exercise, sleep, and social connections. "It's not a panacea and it's not that we use nature in place of the other tools in the tool kit," Bauer says. "But what is the harm when people are struggling with anxiety, sleep challenges, or attention problems in children? There is no harm, and there is lots of potential for good."

A trove of studies have built the case that being in nature can improve anxiety and depression, reduce cortisol, boost the immune system, and help people relax. Many of these results boil down to attention restoration theory, Larson says. Instead of focusing on stressors—staying safe from a saber-toothed tiger or, more recently, staying safe from a highly contagious virus—going into rich, green nature distracts the brain and provides a renewed sense of energy. "It's like giving yourself a mental massage," she says.

During the pandemic, people turned to nature for activity and respite because it

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PHOTO BY DEBORAH ROSE, MINNESOTA DEPARTMENT OF NATURAL RESOURCES

Nature-based therapy in action

The hospitalized teenager was withdrawn and didn't want to put down her phone, making it difficult for Heather Benson to connect with her and ease some of her stress and anxiety. Then Benson brought out a machine that played different nature sounds, and suddenly she had an opening.

As the teen pressed different buttons and listened to the sounds of ocean waves and forest life, Benson felt the ice breaking. Next the teen selected a video of sleeping puppies at a rehab center. The video made her smile and opened the door for Benson to chat with her. Soon, she shared that like the puppies, she was having trouble sleeping.

Benson, a nature-based therapist at M Health Fairview Masonic Children's Hospital, incorporates a variety of approaches to help children gain comfort, stress-relief, and hands-on fun during an anxious time. Using nature as a vehicle for providing mental health services is an effective way to connect with patients of all ages and backgrounds because it's accessible and varied, Benson says. Interacting with nature—even through videos—gets kids' minds off of being in the hospital and breaks down walls.

Heather Benson

"One of the most important ways nature-based therapies help is that it gives them perspective and distance from the pain and anxiety. It can be a positive, therapeutic distraction to think about something

PHOTOS BY DEBORAH ROSE, MINNESOTA DEPARTMENT OF NATURAL RESOURCES

other than what they are feeling in their body," Benson says. "On the flip side, it can draw attention to their pain or insomnia; they realize that plants and animals might be going through some of the same changes and stressors. Then they feel like they are not alone."

Benson provides nature-based services in varied ways at the hospital, including a twice-monthly *Nature Notes* newsletter for patients, families, and caregivers. It explores a theme, such as spring peeper frogs, providing opportunities for education and outreach. Benson and staff also create nature videos, often at the Minnesota Landscape Arboretum, where they recently took viewers into the conservatory to look at lush ferns and colorful flowers. She also facilitates nature-based therapeutic interventions like prism-making kits for kids to engage in a hands-on activity that might foster a connection to nature through discussions about rainbows, colors, and the sun.

There are numerous ways to incorporate nature into health and healing—as diverse as the natural world, says Jean Larson, PhD, an assistant professor of nature-based therapeutics at the University's Earl E. Bakken Center for Spirituality and Healing. Outside of the hospital, nature-based therapists tap into a variety of formats for improving mental and physical health with nature, including healing gardens, therapeutic landscape and horticulture, animal-assisted interactions, and green exercise like forest walking.

Nature-based modalities are an effective way to provide therapies, Larson says, because "we all evolved from nature and have a love for it—it's in our DNA. When we reintroduce it and reconnect with it, we can find benefit from it."

Cathy Jordan, PhD

"Nature benefits everyone, but it benefits kids who are at a disadvantage relatively more. When it's closing a disparity or an achievement gap, that is really fascinating. It's an all-around healthy, inexpensive way to address and begin to narrow some really important societal ills."

Cathy Jordan, PhD

Pediatric neuropsychologist by training, professor of pediatrics at the University of Minnesota Medical School and consulting director of research for the nonprofit Children & Nature Network.

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was one of the safest places to be. It reignited their affinity for the outdoors while providing even more evidence that people feel restored and renewed after spending time in natural environments, Larson says.

Researchers have pinpointed that people need to spend at least 120 minutes a week in nature to truly realize potential health benefits. And there are many. A 2020 *Current Environmental Health Reports* study reports that time in nature is associated with better cognitive function, blood pressure, mental health, and sleep. Living in nature-rich environments also is associated with warding off neurodegenerative disorders, according to research published in 2022 in *JAMA Network Open*. The study of 62 million Medicare beneficiaries noted that older adults who live in areas with more green space have lower hospitalization rates for Parkinson's disease, Alzheimer's disease, and related dementias.

A 2023 BMJ *Occupational and Environmental Medicine* study highlights an association between people who visit green spaces more frequently and a lower frequency of using medication for hypertension, anxiety and depression, and asthma. In addition, there is mounting proof that being outdoors can contribute positively to mental health. A 2015 *Proceedings of the National Academy of Sciences* study found that people who walked in natural areas compared to urban environments had decreased rumination—negative thought patterns associated with depression and anxiety—and decreased activity in the subgenual prefrontal cortex, a brain region that gets activated during sadness. Plus, a 2023 study in *Lancet Regional Health–Americas* reported a reduced risk of postpartum depression in women who were exposed to street-level green space and tree coverage.

Where do the children play?

Nature also has significant and substantial impacts on child development. Kids who spend time in nature are smarter, healthier, happier, and better stewards of the environment, explains Cathy Jordan, PhD, a pediatric neuropsychologist by training, professor of pediatrics at the University of Minnesota Medical School, and consulting director of research for the nonprofit Children & Nature Network.

"When kids are outdoors playing, they are more physically active and they are getting fresh air and vitamin D. Being in nature tends to enhance positive mood, decrease negative emotions, and decrease stress," Jordan says. "Cognitively, it improves kids' capacity for paying attention and focus, and it helps them better self-regulate emotions and behaviors. Kids do better in school, they are more open to learning because they are paying better attention, and they are less stressed."

Researchers have learned that nature-rich environments affect child development in numerous ways. Kids who grow up in greener areas have higher IQ scores and different brain structures, notably areas of the brain focused on attention and self-regulation, Jordan says. Even more exciting to her is that being in nature has an equigenic effect, meaning that natured-based interventions can have an equalizing influence on children who are born with socioeconomic or other disadvantages.

"Nature benefits everyone, but it benefits kids who are at a disadvantage relatively more," Jordan says. "When it's closing a disparity or an achievement gap, that is really fascinating. It's an all-around healthy, inexpensive way to address and begin to narrow some really important societal ills."

Mollika Sajady, DO, MPH, a developmental-behavioral pediatrics physician at Children's Minnesota, did research with Jordan on the connections between being in nature and wellness during her fellowship at the University of Minnesota. Some of the studies compared students who learned in outside versus inside classrooms. Other work explored the behavior of fifth graders at schools with higher and lower concentrations of surrounding green space. At schools with more built-up surroundings like pavement and courtyards, researchers found correlations with higher conflict and problem behaviors compared to schools with more adjacent green space, Sajady says.

Most of Sajady's patients have autism spectrum disorder, ADHD, genetic disorders, or other health conditions. She talks frequently with them and their families about spending more time outside, noting that nature can positively impact kids' balance and motor skills, weight, vision, creativity, and problem-solving abilities. "Everybody needs it, and everybody benefits from time in nature," Sajady says. "It's important that we allow kids to find ways

Mollika Sajady, DO, MPH

When children get overstimulated, "many times I bring the family outside to an aspen grove courtyard where they can run around. The kids go from stressed and crying to happy, smiling, and with sheer joy. I see a totally different kid."

Mollika Sajady, DO, MPH
Developmental-behavioral pediatrics physician at Children's Minnesota

to be outside in nature to recharge in ways that might be comfortable for them."

At her Minneapolis clinic, Sajady has witnessed stressed and anxious kids do a complete 180 when going from inside to an outdoor play space. When children get overstimulated, "many times I bring the family outside to an aspen grove courtyard where they can run around. The kids go from stressed and crying to happy, smiling, and with sheer joy," Sajady says. "I see a totally different kid."

Larson has been putting nature-based therapy concepts into practice at the Arboretum since 1992 and began collaborating with the Bakken Center in 1995. The two entities partner on providing direct therapies to a variety of populations while offering the Nature Heals Initiative for the general public. They both serve the community with nature-based interventions while providing opportunities for practitioners to study the impact of such work.

For example, therapists engage with people with dementia by showing videos of the Arboretum's flower show and bringing in fresh flowers and essential oils. Larson has seen these interactions trigger long-term memories in uncommunicative patients, who often start telling stories about their experiences with flowers. Therapists at the Struthers Parkinson's Center incorporate nature in topical or seasonal ways. In March, they focused on maple syrup, tapping trees, and tree identification to connect with patients and help ease some of their symptoms.

"It's not about saving them from Parkinson's. We're addressing the secondary symptoms like depression," Larson says. "Interestingly enough, when they are engaged with the activities, their Parkinson's symptoms go away. The brain is distracted. And instead of perseverating on what they can't do, they are engaged in what they are doing and concentrating on that instead of their tremors."

PHOTO BY DEBORAH ROSE, MINNESOTA DEPARTMENT OF NATURAL RESOURCES

Healthier healthcare

Timko Olson sees nature as an effective option for improving health and the quality of life for people with varied and sometimes overlapping mental and physical conditions, such as diabetes, cancer, or anxiety—a vital step to relieve some of the burden on overloaded healthcare systems and burned-out providers. "Our system is not sustainable. Our patients are too sick, and we don't have enough time or providers or money to cover the costs," she says. "We need to think of innovative, cost-effective, and accessible ways to care for people. I would love to see nature-based programs be a part of people's treatment plans."

Some health care providers have started doing just that by writing prescriptions for patients to go outside, a concept promoted by Park RX America and its founder Robert Zarr, MD. The organization provides resources to clinicians that make the case for spending time in nature, including a repository of scientific studies that illuminate nature's role in improving mental and physical health. It also provides toolkits for how to best use nature prescriptions and engage with patients on the benefits of spending more time outdoors.

Bauer, of the Mayo Clinic Complementary and Integrative Medicine Program, often writes nature prescriptions for patients who are struggling and for those who want to optimize their health. He likes the Park RX America site and its ability to connect with patients' electronic medical records, suggest several parks near their home as well as send reminders (with their consent) to get outside. "It's a simple tool, but it says to the patient that this is important. It takes it the next level," Bauer says. "It's an opportunity for people to be held accountable if they want that, and it's more habit-forming."

If there was a powerful pill that reduced stress, tamped down obesity, improved cardiovascular health and sleep, and enhanced people's mood, most physicians would say it's worth a shot. Researchers are showing that spending time in nature—in any form that seems enticing—can make inroads in these areas and so much more. That's why Jordan and others are encouraging physicians to talk with their patients about getting in nature more often.

"If you're inside, you're more likely to be sedentary and plunked in front of a screen," Jordan says. "Being in nature is a healthy activity that can really promote improved mental health, better mood, and decreased stress. Everyone feels that, from small children to older adults." **MM**

Suzy Frisch is a Twin Cities freelance writer.

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Should medicine make time for smart watches?

Smart watches and fitness trackers can provide a wealth of health-related information. But is it reliable and useful?

BY GREG BREINING

Tracy Blichfeldt's father-in-law struggled with shortness of breath. A slow walk up a gentle slope would force him to stop for long rests before continuing. A chemical stress test hadn't provided much insight into what was happening or why.

Over Thanksgiving 2021, the family was headed out on a walk, so Blichfeldt borrowed her husband's Mobvoi TicWatch, which like many other modestly priced smart watches, tracks heart rate and monitors blood oxygen.

"I said why don't we just put this on and then I can just see what happens—if your oxygen stays OK when you're short of breath. I know they're not real reliable. I'm not promoting them as a diagnostic tool—just kind of thought it might be helpful," recalls Blichfeldt, MD, an internal medicine specialist with the Veterans Affairs clinic in Bemidji (who was not treating her father-in-law).

When they returned to the house, Blichfeldt's husband downloaded the tracing of her father-in-law's heart rate. "As we're going, his heart rate is going up and then all of a sudden it falls down to 50 and stays there. That's a great resting heart rate, but it's not a heart rate you want when you're exercising," Blichfeldt says.

Blichfeldt had had a recent patient with a similar presentation and suspected her father-in-law might have sick sinus syndrome. "I told him, when you go see the cardiologist, I want you to tell him about this so they can do the appropriate testing, and we can see if this is the issue. And sure enough, in this case the watch was accurate. He did the same thing under medical surveillance," she

says. Follow-up tests led to a diagnosis of symptomatic bradycardia and, shortly after, a pacemaker.

Data goldmine

More than one in five U.S. adults wore smart watches or fitness trackers in 2019, according to a Pew Research Center study. Since then, sales and shipments have continued to grow. Use skews toward college educated, higher incomes, suburban, under 50, and Hispanic slightly more than white or Black. Of Americans living in households earning $75,000 or more a year, 31% say they regularly wear a smart watch or fitness tracker. A survey by the American College of Sports Medicine named consumer wearables as this year's top fitness trend and noted, "wearable data is increasingly being used in clinical decision-making."

Devices such as various models of Apple Watch, Fitbit fitness trackers, and others—many costing under $200—track and record heart rate, provide an ECG, notify users of high and low heart rates, compute heart rate variability, calculate the level of oxygen in the blood, and record the number of steps you take. They purport to track not only your hours of sleep, but also your quality of sleep based on the amount of time in various sleep stages. Some estimate cardio fitness adjusted by age.

In theory, wearable devices should provide a goldmine of information to physicians, if only because so many people wear them and the devices are always at work. "I think the people who use them are almost using them 24/7/365," says Stephen W. Smith, MD, an emergency medicine physician at Hennepin County Medical Center who has begun to consult data from the watches in his practice. "Aren't they always on?"

But can a physician trust the data to make a diagnosis, or even to gain insight into a problem?

Tracy Blichfeldt, MD

When Tracy Blichfeldt, MD's father-in-law's smart watch recorded a heart rate drop, "I told him, when you go see the cardiologist, I want you to tell him about this so they can do the appropriate testing, and we can see if this is the issue. And sure enough, in this case the watch was accurate. He did the same thing under medical surveillance."

Stephen Smith, MD

"I think the people who use [smart watches] are almost using them 24/7/365," says Stephen W. Smith, MD, an emergency medicine physician at Hennepin County Medical Center who has begun to consult data from the watches in his practice. "Aren't they always on?"

For example, various trackers have shown variable accuracy in measuring heart rate during supraventricular tachycardia. Four devices—Apple Watch, Fitbit Charge HR, Garmin vívosmart HR, and Polar A360—had difficulty in accurately measuring heartbeat during episodes of tachycardia lasting less than 15 seconds in a 2020 study in *Heart Rhythm Journal*. (The devices, the Apple and Polar in particular, did better when tachycardia lasted a minute or more.)

Apple Watches are programmed to issue notifications of a crash to 911. The newest devices, with more sensitive software, have been inundating dispatchers near Colorado ski towns with alerts when watch-wearers take a tumble on ski slopes.

As more and more of their patients wear consumer wearables, physicians are trying to make sense of what the devices tell them. Many are skeptical. Many are skeptical but are also finding ways to make use of the information. And they worry not about a goldmine, but a firehose of information in the years ahead.

Paroxysmal and infrequent

Despite glitches, some studies have demonstrated the devices' accuracy and utility.

In the Apple Heart Study, published in 2019 in the *New England Journal of Medicine*, researchers from several centers recruited more than 419,000 Apple Watch users to determine if the device's heart-rate pulse sensor could produce data to reliably identify atrial fibrillation, which affects up to 6 million Americans. Only 0.52% of the relatively young sample (mean age: 41) received a notification of an irregular pulse that suggested the possibility of atrial fibrillation. These subjects received follow-up monitoring with a Philips ePatch; of those, 34% were determined to have atrial fibrillation. As the study noted, atrial fibrillation, especially in early stages, is "paroxysmal and infrequent," so the fact that it wasn't detected by a patch doesn't imply the Apple Watch produced a false positive. In fact, the researchers calculated the watch's algorithm has an 84% positive predictive value.

According to the study, "We believe that these data support the ability of the algorithm to correctly identify atrial fibrillation in users whom it notifies of irregular pulses." But as a subsequent article in the newsletter *NEJM Resident 360* noted, "Although groundbreaking, the study raises new questions about technology in healthcare. How do health care professionals deal with such large volumes of data? How do clinicians interpret findings using non-validated algorithms? How will patient privacy be maintained?"

Nothing is validated

Compared with heart beat, the complexities of sleep are a bit tougher to characterize. According to a 2017 article in the *Cleveland Clinic Journal of Medicine* (admittedly, a lifetime ago in wearable electronics), the devices showed "reasonable accuracy" in measuring time and duration of sleep, but were poor at determining wakefulness and are not very reliable at characterizing "disturbed sleep."

The devices use an algorithm to make an assessment of whether the person is awake or asleep based on muscle activity and body movement. "Typically what it means is that if there is less movement, you are asleep. If there is more movement, you are awake," says Snigdhasmrithi Pusalavidyasagar, MD, associate professor and sleep medicine physician at M Health Fairview Sleep Center Riverside in Minneapolis. "A patient lying quietly but wide awake may be counted as sleeping. Devices can also be thrown off by a bed partner who tosses and turns even though the patient doesn't wake up," she says.

Moreover, it's tough to interpret results because "nothing is validated. The algorithm—we don't know what algorithm they are using. Particularly when you are looking at sleep stages," Pusalavidyasagar says.

Device makers are incorporating more data, such as heart rate variability, into their estimation of sleep. "So many changes are happening, so I would say that it is promising, but it is also dependent upon the manufacturers' being forthcoming about the algorithms they use. Right now, if I am using actigraphy, I have the algorithm. It is publicly available," she says. "With more research and more validation studies with good algorithms, I am very positive a day will come when it may be usable."

Snigdhasmrithi Pusalavidyasagar, MD

Sleep medicine physician Snigdhasmrithi Pusalavidyasagar, MD, says it's tough to interpret [smart watch sleep tracking] results because "nothing is validated. We don't know what algorithm they are using, particularly when you are looking at sleep stages."

William Roberts, MD, MS

"I had been looking at wearables but never got to apply them until this guy landed in my schedule," says William Roberts of the University of Minnesota. "If you'd seen cardiology, you couldn't say there was anything wrong with his heart." But Roberts had additional insight because the athlete's Garmin Instinct smart watch had captured several episodes.

"This guy landed in my schedule"

But even in the here and now, some physicians are curious and eager to try to make use of the data.

"I had been looking at wearables but never got to apply them until this guy landed in my schedule," says William Roberts, MD, MS, professor and sports medicine physician at the University of Minnesota.

"This guy" was a 16-year-old competitive runner and cross-country skier. Starting about a year before he showed up in Roberts' office, he would be training or competing, his heart beating about 135 beats a minute, and then suddenly it would shoot up to more than 200 beats a minute and stay high until he stopped to rest.

"He describes the episodes as a sudden surge in his chest with the sensation he has hit a wall, or a hand is holding him back," Roberts writes in a 2022 case study in *Current Sports Medicine Reports*. "If he keeps running, his legs get fatigued, and he cannot maintain his running pace. He has finished many races despite the rapid heart rate, but he drops from the lead pack to the mid pack."

"The interesting thing was that if you'd seen cardiology, you couldn't say there was anything wrong with his heart," says Roberts. But Roberts had additional insight because the athlete's Garmin Instinct smart watch had captured several episodes. The

"table pattern" of the heart tracings led to Robert's tentative diagnosis of paroxysmal atrial tachycardia.

In fact, Roberts and the athlete were never able to capture a record of the tachycardia on more sophisticated equipment, such as a Holter monitor or the sternum-mounted Frontier X ECG fitness tracker the patient's family bought. Says Roberts, "If you don't have the stuff on at the time it happens, you don't catch it."

After an evaluation and discussion with the patient and his parents, Roberts cleared him to compete. He prescribed a short-acting beta blocker before races. The episodes stopped. The runner eventually quit the drug because of the fatigue it caused. Last Roberts heard, the patient had not experienced another bout of tachycardia.

Since then, Roberts has been more eager to study the data produced by his patients' fitness trackers. "I think they do have a place and now that I've been paying more attention to them I have had more patients show me stuff," he says. "Sometimes patients give histories and you don't quite understand what they're saying. And this gives you some objective data to deal with and work off of. I found it helpful."

And unlike some physicians, he welcomes conversations about fitness trackers and sleep. "Being able to track your period of really deep sleep early in the sleep cycle is really helpful," he says.

It's not going away

Kristopher Krueger, MD, PhD, a cardiologist at Allina Health Minneapolis Heart Institute, agrees that watches and fitness trackers can be helpful.

When a patient reports palpitations, "if you have two to three episodes a year the chance of capturing that on a two-day Holter monitor or even a two-week Zio patch monitor that they wear based on our giving them a prescription for it—very unlikely," says Krueger. "If you're lucky, great, but if not, you could probably do five of them back to back, and you're never going to get an answer."

On the other hand, people almost always wear their watches or fitness trackers, "so if they have two episodes over the course of a year, the chances they are going to be able to record it with those devices is very high."

Kristopher Krueger, MD, PhD

"It's definitely not for everybody. But I think at the end of the day the technology is very useful," says Kristopher Krueger, MD, PhD. "And even if we didn't think it was useful, it's not going away."

Can a fitness tracker get you to exercise more?

A lot of people use their smart watches and fitness trackers to, well, track their fitness. The devices count steps, tell you when your exercise raises your heart rate, and reports if you get a full eight hours of sleep.

Researchers and physicians wonder if the watches can help us stick to our fitness regimens—whether by laying a data-driven guilt trip on us, encouraging our "engagement" and enthusiasm, or simply by giving an objective measure of how we're doing.

"I review that a lot with folks because I think they've been very helpful to quantify their activity. I think many people are much less active than they would gauge. And so having some objective data is very helpful," says Christopher Wenner, MD, family medicine physician in Cold Spring, Minn. "Sitting is the new smoking. It is a huge issue. So I think that there's a lot of benefit."

"I think some people really do like the steps—an accomplishment for the day. I hit my goal, yay!" says Kristopher Krueger, MD, PhD, a cardiologist at Allina Health Minneapolis Heart Institute. "And then there are patients who get really kind of geeked out, nerdy about looking at the heart rate data and really analyzing it, yada yada yada. Those are usually patients you don't need to convince to exercise."

William Roberts, MD, MS, professor and sports medicine physician at the University of Minnesota, has also tried to use the step tracker to encourage patients to exercise more—though he isn't sure the technology actually works in that regard. "About as well as any kind of advice," he says. "People who are motivated, do things. And people who aren't, don't. If it gets one person moving, I'm happy with it."

But while the data is helpful, it also needs explanation. "I've had a number of patients— literally the first line out of their mouth when I meet them in clinic is, 'It all started with my Apple Watch!' They get these tracings that freak them out," Krueger says. "It's definitely not for everybody. But I think at the end of the day the technology is very useful. And even if we didn't think it was useful, it's not going away."

Stephen Smith, the emergency medicine physician at Hennepin County, has used tracker data to quickly zero in on a diagnosis. "I just recently saw someone who had palpitations, and she had premature ventricular beats on her wearable, which was very useful. I just took that and I could refer her to our electrophysiologist immediately, knowing exactly why she had her symptoms." Despite the lack of detail from a watch's single-lead pickup compared with a 12-lead ECG, "it doesn't take all that much detail, really," he says.

"Patients have frequently come in with symptoms of palpitations or syncope—syncope meaning they suddenly lose consciousness and we don't really have any idea what happened at that moment in time," says Smith. "And if they had a wearable on, we'd be able to see if the heart was slow, if it was fast, if it was regular. If there were things called PVCs [premature ventricular contractions], if there was atrial fibrillation, if there was ventricular tachycardia. It would be very useful for us to have patients to be wearing those."

Exploring the electrocardiogram

Smith, an expert in 12-lead ECGs, anticipates a day when consumer watches have more electronic pickups to gather data. "They don't tell you what's going on in your heart when you have chest pain. OK, are you having a heart attack or not? And a wearable that would have more leads would be very useful."

For example, according to a study in *American Heart Journal* last year, a head-to-head comparison showed the 6-lead KardiaMobile 6L was superior to the single-lead Apple Watch 5 and Withings Move in sensitivity and specificity for detection of atrial fibrillation.

Smith also expects that further research enlisting artificial intelligence will unlock information available from the current crop of smart watches. "We don't know what information is held in the electrocardiogram," he says. "There may be all kinds of information that only neural network or artificial intelligence would be able to discern."

Paul A. Friedman, MD, professor of medicine and chair of the Department of Cardiovascular Medicine at Mayo Clinic, has used artificial intelligence to explore the potential of the ECG function of the Apple Watch to warn of left ventricular dysfunction, a common condition that often precedes serious illness. "If you have a weak heart pump, there may be treatable causes for it, and there are definitely medications as well as implantable devices and other therapies that can prevent hospitalization, prevent the development of symptoms, and minimize the risk of death," Friedman says.

The usual way to measure the strength of the heart pump is to calculate ejection fraction, the amount of blood pumped by each heartbeat. That requires a fairly expensive echocardiogram, ultrasound of the heart, MRI, or CT scan. To simplify the diagnosis, Friedman and colleagues found they could train an artificial intelligence network to interpret 12-lead ECGs to estimate ejection fraction.


Paul A. Friedman, MD

Paul A. Friedman has used artificial intelligence to explore the potential of the ECG function of the Apple Watch to warn of left ventricular dysfunction. Apple Watches allow wearers to take a 30-second ECG, which, says Friedman, is "super easy to acquire. With the watch, you could be sitting on your sofa after dinner and say, 'I'll get an ECG.'"

"Of course, that requires going to the doctor and getting an ECG," Friedman says. "We thought it would be very helpful if you could do it from something wearable so you could screen people from home."

They looked to the Apple Watch for their study. Apple didn't participate, but the company did "open up their health kit to allow anyone, any programmer, access to data, the raw ECG signals that are stored on the phone after you use the watch to record a signal," says Friedman. "And so we took advantage of the access to that signal."

Apple Watches allow wearers to take a 30-second ECG. "Super easy to acquire," says Friedman. "With the watch, you could be sitting on your sofa after dinner and say, 'I'll get an ECG.'" In five months, Friedman's team was able to enroll approximately 2,500 patients and received over 125,000 ECGs from people in 46 states and 11 countries.

"And it worked really well," he says. In a study published last year in *Nature Medicine*, they showed that the Apple Watch data identified left ventricular dysfunction not quite as reliably as a 12-lead ECG but better than a treadmill test—without an office visit. Says Friedman,"It was a very impressive screening test."

According to an accompanying article, "This new, early-stage study demonstrates that smartwatches can be used to identify people with diminished heart function and can potentially serve as an early-warning system for heart failure."

360-degree view of digital health

Mayo Clinic has recently undertaken clinical trials to learn if smart watches can provide "a 360-degree view of digital health,"

says Arjun Athreya, PhD, MS, an electrical and computer engineer and assistant professor at Mayo.

The researchers have been using consumer-grade devices, such as Garmin's vívosmart or vívoactive activity trackers, which are compatible with Android and iPhones and have an open-science approach to sharing data that aids the research, Athreya says.

"The first question that we are trying to ask is can wearables like smart watches provide an accurate snapshot of one's functioning? And the next related question is if the answer is yes, can we use that data for proactive behavior management? Can we predict an individual's depression state? Can we predict, is the child going to throw a tantrum?" he says. For adults, heart rate and activity levels may reveal they're at risk of burnout in their jobs.

"We do have extensive digital health studies that are investigating all these different aspects," he says. But the studies will take at least another two to three years to complete, Athreya says. "Hopefully in the next couple of years, we will reveal some pretty interesting facts of whether or not these can truly live up to expectations of transforming the way we understand individual functioning through remote monitoring to potentially manage treatment options as next steps."

Arjun Athreya, PhD, MS

Mayo Clinic has recently undertaken clinical trials to learn if smart watches can provide "a 360-degree view of digital health," says Arjun Athreya, PhD, MS. "The first question that we are trying to ask is can wearables like smart watches provide an accurate snapshot of one's functioning? And the next related question is if the answer is yes, can we use that data for proactive behavior management? Can we predict an individual's depression state? Can we predict, is the child going to throw a tantrum?"

Sometimes more information is not better

As smart watches become even more popular and play an increasing role in medicine, data from the devices threatens to become a deluge.

"Just like more medicine is not always better medicine, sometimes more information is not better and has the potential to cause more consternation and anxiety among patients, and certainly has the potential to further clog up the medical system," says Christopher Wenner, MD, family medicine physician in Cold Spring, Minn.

"Many primary care doctors are getting bombarded with emails on patient portals about various things, and then we start getting ding-donged for various alarms on smart watches, and that sort of thing," Wenner says. "What are we trying to achieve here? People are wearing these watches that are telling them that they're having whatever pending health issue—how are we going to deal with that? Because right now the system just isn't set up for that."

Friedman, the Mayo cardiologist, says the medical system will have to become more selective in which data it pays attention to. If physicians begin examining tracings from "every 20-year-old who had an Apple Watch," they'd have lots of work, lots of false positives, and few results to show. "But if we start saying, look, when you're 65 or in certain cohorts who we know are at risk, then I could see the watch being part of a program that's integrated into a medical approach to screen for or help manage disease."

Krueger of Allina Health recently saw a patient who had 12 hours of heart tracings from a Frontier X2 to submit.

First was the challenge of conveying data in a way that complied with requirements for medical records. "We have to have a mechanism that uses our electronic medical records and our normal avenues for people to get ahold of us," says Krueger.

Second was the chore of reading the data. "When we do a Zio patch or a Holter monitor, we have a whole group of techs and a whole computer software system that analyzes everything for us, spits out a report, and we get a select group of tracings that we personally review to make sure it's accurate," says Krueger. "This is 12 hours of data that I can't go through on my own. I'm sorry, I can't."

And in skimming the information, what if he overlooks something?

"Legally, am I responsible for everything he sends me? If I miss a short run of something that might be important, and that short run of thing is 15 seconds, am I responsible for that? I don't know the answer to that," Krueger says.

"On some level I'm fascinated by it, on some level kind of scared where it's going to take us," Krueger says. "The sheer amount of data that it generates is kind of mind-boggling. How we're going to sort through that is going to be a big thing that we'll have to figure out in the next five to 10 years." **MM**

Greg Breining is editor of *Minnesota Medicine*.

A strategy to boost rural healthcare

A new University of Minnesota Medical School campus in St. Cloud is designed to train more specialists to serve the state's farm country.

"How ya gonna keep 'em down on the farm?" asked the lyrics of a century-old song. Maintaining rural communities has been a long-time challenge. Like much of America, Minnesota has for decades seen rural populations—especially farm communities—dwindle as new generations seek livelihoods in larger cities. The trend has affected the practice of medicine as well, as many small towns, rural areas, and reservations lose medical services—to the detriment of rural residents.

"We know that rural Minnesotans report poorer physical health status. They travel farther for healthcare. They have trouble getting appointments. And they really have greater risk of death from heart disease, from cancer, from injury, from chronic respiratory disease, and from stroke," says Jakub Tolar, MD, PhD, dean of the University of Minnesota Medical School.

Tolar and Kenneth Holmen, MD, president and chief executive of CentraCare, have been promoting a new University Medical School campus in St. Cloud as a way to recruit new medical students to serve Minnesota's farm communities when they graduate.

Tolar spoke to *Minnesota Medicine* about the demand for medical care in rural areas and plans to repurpose the former CentraCare administrative building in St. Cloud into the new Medical Education Center. The interview has been edited for clarity and brevity.

Describe this proposal for a new medical school to be located in St. Cloud and focusing on rural Minnesota.

I'm delighted to do that. But first, just to be precise, it is not a new medical school. This is a campus of *our* medical school. We have had this medical school for 135 years in the state. We are very proud of it, and we had for 50 years of that 135, two campuses, one in the Twin Cities and one in Duluth. And we are adding a third campus.

If you look at the structure of physicians in greater Minnesota, about 25% of them will stop working, will leave the profession by the end of the decade. That's bad news for people who live in rural Minnesota, because they will have to drive hours in cold weather and feet of snow to get to their regular appointment.

We started with the Duluth campus, actually. We decided that the solution is in fact simple. If you want to have physicians practice in rural Minnesota, you train them, you put them in the position they get to know the community. They get to know people in the market, people in the school. And the local people will get to know them. And that adhesion, that "stickiness," will then translate into their decision to go to greater Minnesota and practice medicine there.

And the reason I know that that is a good solution is that we have done it. We have had the Rural Physician Associate


Jakub Tolar, MD, PhD

Program, and that basically means that we send our medical students to smaller communities and we have them there for many, many months, practice with a mentor, with a preceptor, and in this way we have been able to retain about 45–46% of people in rural Minnesota, as opposed to the 13–15% that you get from the general class.

In early 2022 CentraCare approached us with the proposal to have a campus here. And because Ken Holmen is my friend and partner in many other things, I was very open to it. The way we have billed it is we already have a good relationship with CentraCare. We have had a family medicine residency there for two decades, and recently we have created a very successful orthopedic group there. They know us. They know *of* us. Dr. Holmen is one of the physicians that trained and worked at the University of Minnesota Medical School. So it came pretty naturally.

We are now at a point that we are putting this together as a business. Both of us went in front of the CentraCare Board of Directors and got it approved. And we went into the Board of Regents at the University of Minnesota and got it approved. So we are looking at a pretty rapid pace here and would like to matriculate 20 to 24 new medical students in the fall of 2025.

The students you are sending out into the rural areas for their training in hopes of establishing community ties—who are these students? Are they people who grew up in rural areas for the most part? Or not?

Some of them are and some of them are not.

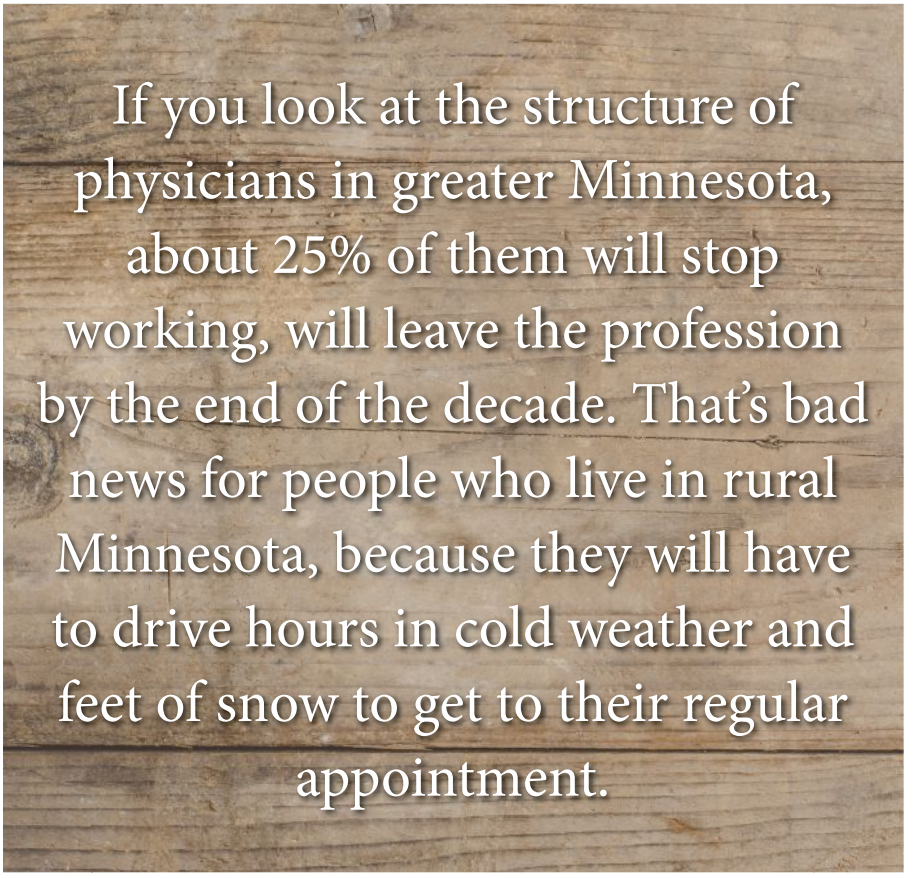
My experience with physicians and healthcare professionals in general, pharmacists and so forth, the vast majority of people do it for a search for meaning in

their lives. And practicing in a small community checks a lot of boxes. They know who you are. You know the whole family. You know them, how they live. And that all is relevant to the health and well-being of that person or her family or her community.

A lot of physicians find that agency, that ability to truly realize to the fullness of their potential to be relevant and helpful to others in alleviation of human suffering, in the place of a small community. It makes more sense to them than to be on the quote-unquote treadmill of some of the more business-oriented environments in which physicians work. When you work for the RVUs [relative value units] you have 15 minutes per patient, you are coding two hours after you have done this—they don't see that as themselves, their vision of their profession, healing others and helping others in need, which brought them to medical school in the first place.

What are the big gaps in rural health care—both in terms of geographic areas that are poorly served, and the medical specialties that might be lacking?

I can tell you that the needs are spread unevenly, but pretty much the gaps are comprehensive. For example, you cannot have a high-risk pregnancy north of Duluth. Why? Because there are no high-level OB-GYN up there. You need both the primary care and family medicine, and we have specialized in Duluth to train people that go to primary care. We are ranked number two in the United States in the ability to do that. We are ranked number three in training in family medicine. So these are very high rankings. As a school, as a point of pride, we are number eight in the United States among the public medical schools. So we have been able to produce, to train, to create the physicians that are very effective in primary care, family medicine. Many of them, which is another point of pride, are coming from the environments that are underserved in medicine. The point here is the Native American doctors—we are number two in the United States in training Native American physicians, and we are very proud of it.



Second need is in the specialties. OB-GYN surgeons, general surgeons, or otherwise. That is, I think, where we are going to go with the St. Cloud campus. We will focus more on the physicians that are able to provide rural Minnesota with the specialized training because what we do have is an incredible need for people not to have to go to the big city and big hospital for some of their specialized care.

In farm country—westward and southward from St. Cloud, where this campus will be located—many small communities barely exist anymore. All of the activity seems to have moved into larger regional centers like Detroit Lakes or Alexandria or Marshall. I imagine that is true of medical care as well, is it not?

Oh, absolutely. It's an incredible deficit to lose this because this is a different mindset. This is a different complimentary strength of Americans to have that enormous place where I'm told about 65 million Americans live just outside of the big cities in the farm country, in the countryside.

This is our responsibility, to build an environment where they can remain, our responsibility to provide the architecture that permits that lifestyle. That is a part of who we are. And in addition to healthcare, I think it is schools, it's daycare, and it is employment for a spouse. These things I hear over and over. These are the reasons that people not of their own, if you will, independent choice, but truly by necessity, mostly economic, they actually have to leave farm country.

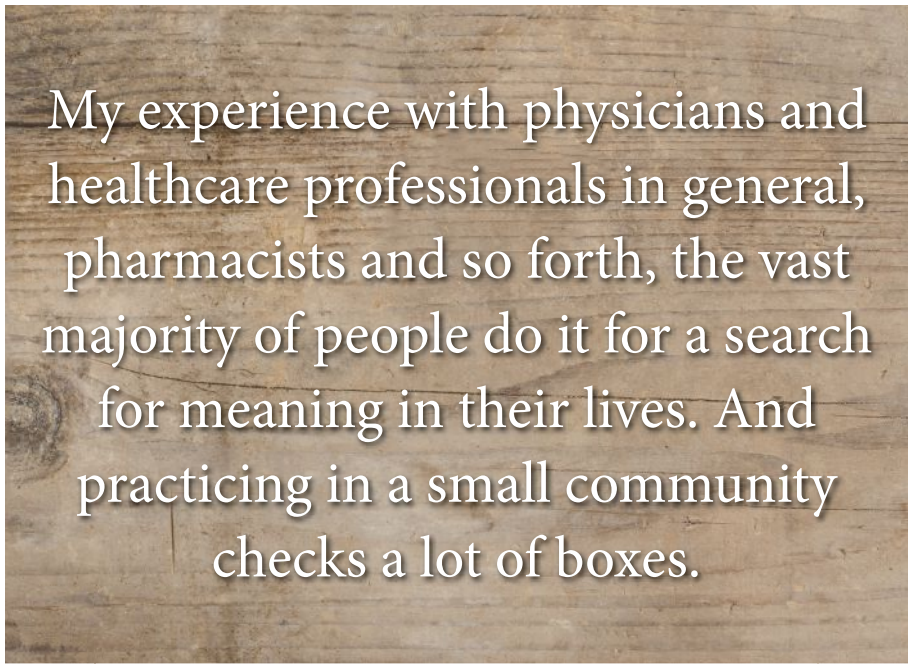
Doctors are retiring and there are fewer people to replace them. What's the difficulty in keeping doctors in rural areas?

I think, you know, it's similar to everybody else. If you don't have the schools, daycare, employment for a spouse, chances are you think, how am I going to make it here?

Another reason things are moving away is the big business. The healthcare systems tend to get bigger, and bigger is not better

in healthcare typically. We of course always start with the patient. But the second group that is hurt by this is the providers. If there is a monopoly, for example, of a single healthcare system, even in greater America or Minnesota, what typically happens is they get some of the profits by squeezing the providers, and that for many physicians is a somewhat hostile environment. There's another reason the physicians may not want to stay.

And the last one is sort of—if I can flip it—is they don't know what it is to practice in rural Minnesota unless you put them there. And that's where Dr. Holmen's and my idea about putting together the third medical school campus in the state is coming from. Let's get them there. Let's make it possible for not-yet physicians, for the medical students and residents, to see what it is, and how comfortable and how effective they can get practicing in rural Minnesota.



University of Minnesota Duluth is one of the top medical campuses in the nation for graduating rural doctors. Explain how a new location, a new campus in the St. Cloud area, would improve upon getting docs into rural areas.

The reason this third campus is so important, is it's a new area. I'm told it's one of the fastest-growing areas in the state. It is building upon success we have in Duluth while making it different. As I mentioned, primary care and family medicine and Native American health are really the dominant features at the Duluth campus. We are going to produce more specialized physicians in St. Cloud. That I think will create that composite that will serve rural Americans best.

Also, it's important that these are new students. These are not redistributed from the Twin Cities or Duluth. These are new students that will be added to about 220 that we graduate every year.

Where will faculty come from?

Some of the faculty will come from the Twin Cities, because we have obviously the basic sciences usually the first two years. You have to learn biochemistry and molecular biology to be any good in the clinic or in the operating room. But then the preceptors will come from the St. Cloud physicians, and we already discussed with Dr. Holmen how this is going to work. There has been tremendous support from the side of the physicians that practice in CentraCare and in St. Cloud to be the preceptors for the medical students.

Medicine is one of the areas, one of the themes of knowledge of mankind, where you cannot learn this from the textbooks or the PowerPoint or some kind of recording alone. You have to actually see it done. You have to see a mastery. And then you spend your lifetime trying to mimic it. What I do in the operating room has been motivated much more by how I have seen it done, in people who were true masters in this, than reading about that. I think that the students will be motivated by somebody who is a rural practitioner who is in this way integrated into the community. And they will say, "I want to specialize in general surgery, OB-GYN, ENT, and so forth, but I don't want to do it in a big city. I want to do it in a community where I can be much more part of the community."

It's a two-way street. I can tell you that the life of a practicing physician is enriched when she or he is surrounded by trainees. They have fresh ideas. They keep you on your toes. They make things much more dynamic for the mentor. Plus, patients love it. People who are starting in the physical practice of being a physician have a lot of energy they can put in service of the patient.

How will students be recruited? How are you going to sell the program to them?

Exactly the same way I am selling it to you. The Medical School has a significant number of applicants each year, so recruitment has never been an issue for our programs. That's the quantitative part of this we don't have to worry about. There are a lot of people who want to become physicians. The qualitative is more challenging. And it matters to me a great deal that we get the right people for this. I personally have seen generations of different physicians coming through the medical school, and most of them don't know what kind of a physician they are going to be. Most of them don't know, or they change their mind, where they want to practice and with whom. But one thing doesn't change, and that is their gut-level ability to almost selflessly work on behalf of others. If you have that, that aligns beautifully with our mission to serve rural Minnesota. So that would be my pitch. **MM**

Interview by Greg Breining, editor of *Minnesota Medicine*.

Brittanie Hernandez-Wilson, equity and justice director at The Arc Minnesota, kicked off the Summit with a discussion on transition care from the patient's point of view.

Project ECHO summit shines light on transition care

More than 70 advocates gathered in person and online March 13 for a day-long summit created to improve the transition from pediatric to adult care for youth with medical complexity.

The event was the culmination of a nearly year-long Project ECHO series made possible by a grant from the COPIC Medical Foundation. Since July, the MMA and the MMA Foundation have been hosting a series of noon-time online sessions on the topic.

"Because of clinical and technological advances, many children with medical complexity now live into adulthood," said series medical director Tori Bahr, MD, who is the associate medical director of pediatrics at Gillette Children's. "Yet they face numerous practical hurdles in moving from pediatric care to adult providers."

The series and the March 13 summit were held to improve the competence and confidence of Minnesota adult primary care clinicians to manage youth with complex conditions, thereby increasing the number and capacity of clinicians willing to accept new patients.

Amy Wilson, LICSW, ACM, clinical social worker with the Center for Bleeding and Clotting Disorders at M Health Fairview in Minneapolis, explained transition care is a multi-year process.

The summit included discussions on how national guidelines can be implemented into across-system transitions and how patient and parent groups can influence improved care. It also included firsthand accounts of patients who have gone through the transition from pediatric to adult care and are now advocates themselves.

"Creating successful transitions should start long before a person turns 18," said Brittanie Hernandez-Wilson, the equity and justice director at The Arc Minnesota, an organization that promotes and protects the human rights of people with intellectual and developmental disabilities.

Several speakers noted how important communication is with this work. Amy Wilson, a clinical social worker with the Center for Bleeding and Clotting Disorders at M Health Fairview in Minneapolis, detailed how it's a multiyear process.

The speakers also agreed that while there is room for improvement, Minnesota is a leader in transition care. A three-member patient panel that kicked off the afternoon session complimented Minnesota care.

National speaker Peggy McManus, MHS, noted that four out of five juveniles do not get the transition care they needed. McManus is president of The National Alliance to Advance Adolescent Health, a nonprofit organization dedicated to improving access to comprehensive health care and insurance coverage for adolescents. She also oversees the well-known federally funded Got Transition program for transition to adult care.

Founded in 2003, Project ECHO is a global nonprofit that empowers practitioners and professionals in rural and underserved areas to reduce disparities and improve the well-being of people in the communities where they live. ECHO's free, virtual mentoring model addresses some of the world's greatest challenges in healthcare, education and more, with a mission to touch 1 billion lives by 2025. **MM**

News Briefs

MMA celebrates 170 in 2023

The MMA will celebrate its 170th anniversary on July 23.

It was on this date in 1853 that John H. Murphy and 10 young physicians gathered at the new St. Paul courthouse for the first-ever statewide convention for the medical profession. This convention was the formation of the Minnesota Medical Society.

In 1869, the Minnesota Medical Society reorganized as the Minnesota State Medical Society. Then, in 1903, the Minnesota State Medical Society changed its name to the Minnesota Medical Association.

The MMA launched the journal *Minnesota Medicine* in 1918.

"I am proud to be part of an organization that was founded to improve patient care, public health, and medical standards—goals that continue to drive our work today," says Will Nicholson, MD, the MMA's current president.

Medical Assistance, MinnesotaCare resume eligibility review

After a three-year pause during the COVID-19 public health emergency, Medical Assistance and MinnesotaCare will resume annual eligibility reviews of their enrollees. Renewals will begin as early as July for Medical Assistance enrollees and October for MinnesotaCare enrollees.

The state of Minnesota anticipates that for several reasons the upcoming renewal season will be particularly difficult for enrollees. Those who had coverage before the pause have likely experienced a change in address, employment, income, or other eligibility criteria in the past three years. Additionally, the 354,000 enrollees who gained coverage over the past three years will be unfamiliar with the renewal processes.

To empower providers as they seek to help their patients maintain coverage, the Department of Human Services has created communication toolkits (mn.gov/dhs/renewmycoverage/communications-toolkits/). To maintain coverage, it's important for enrollees to go online (mn.gov/dhs/renewmycoverage) and ensure their contact information is current.

State granting $5.7 million to address opioid use disorder

In late February, the Minnesota Department of Human Services announced that it is awarding $5.7 million to 12 grantees to expand the services available to support people suffering from opioid use disorder and make it easier to get help. Almost all the funding is going to organizations primarily serving Native communities, Black communities, and other communities of color disproportionately impacted by the opioid epidemic.

The new investments will address gaps in Minnesota's continuum of care for Native people and people of color with opioid use disorder, and help inform future changes to better serve all Minnesotans. Organizations receiving grants serve the Twin Cities metropolitan area, greater Minnesota, and tribal nations, while others provide services statewide.

More and more Minnesotans are losing their lives to opioid use disorder. The number of opioid-involved deaths in Minnesota reached 924 in 2021, up from 343 in 2018. American Indians and Black Minnesotans are experiencing the opioid epidemic most severely. American Indians are seven times more likely to die from a drug overdose than white Minnesotans, while Black Minnesotans are twice as likely to die from a drug overdose.

The new grants will support practices that cater to specific underserved groups, including preventive care and overdose prevention, workforce development and training, and expansion and enhancement of the continuum of care. The funding includes $1 million for services focused on the East African population.

MMA board approves policy against restrictive covenants

The MMA Board of Trustees approved a policy at its February meeting that opposes restrictive covenants in all physician employment contracts because they restrict competition, can disrupt continuity of care, and may limit access to care.

Many Minnesota physicians are subject to a restrictive covenant or noncompetes within their employment contract. These provisions limit their ability to find new employment because they prevent them from practicing within a certain geographic area for a specified period, or other restriction. These provisions can also prevent physicians from informing their existing patients that they will be leaving and providing their new location. Physicians may be forced to leave the community in which they have been practicing for years, simply because they have a noncompete in their employment contract. The patients in that community also may lose access to that physician if they are forced to leave the community.

The MMA's Ethics and Medical Legal Affairs Committee developed this policy after conducting a memberwide survey, which overwhelmingly showed that respondents wanted to see a change in how restrictive covenants were used by employers in Minnesota. The policy also went through the MMA's online voting tool, The Pulse, where it received support from more than 90% of members.

The MMA Board of Trustees discussed this policy over the course of two board meetings, in order to ensure that they were taking the appropriate stance and that all points of view had been discussed.

AMA petitions Congress to address physician shortage

In mid-March, the AMA sent a letter to Sen. Amy Klobuchar (D-Minn.) and Sen. Susan Collins (R-Maine), expressing its support for the Conrad State 30 and Physician Access Reauthorization Act, legislation that would help address the shortage of physicians (notably in rural and underserved areas) and would play a role in promoting a more diverse physician workforce.

The letter was sent in response to bipartisan legislation that has been reintroduced to build the healthcare workforce in rural and medically underserved areas. This legislation would allow international medical graduates (IMGs) to remain in the U.S. upon completing their residency under the condition that they practice in areas experiencing physician shortages.

The act would extend the Conrad 30 program for three years, improve the process for obtaining a visa, and allow for the program to be expanded beyond 30 slots if certain thresholds are met. The legislation also provides worker protections to prevent physicians from being mistreated.

The letter notes that "in 2021, 25 percent of licensed U.S. physicians were IMGs, with the number of IMGs in active practice growing by nearly 18 percent since 2010. These non–U.S. citizen IMGs play a critical role in providing health care to many Americans, especially in areas of the country with higher rates of poverty and chronic disease."

The letter also points out how "resident physicians from other countries working in the U.S. on J-1 visas are required to return to their home country after their residency has ended for two years before they can apply for another visa or a green card." If Congress enacts this legislation, the reauthorization of the Conrad 30 J-1 visa waiver program would play a role in protecting access to care for many patients, particularly for those located in medically underserved areas.

While attending the AMA National Advocacy Conference in February in Washington, D.C., MMA leadership met with members of Minnesota's congressional delegation and urged their support of key federal legislation. During these meetings, MMA leadership voiced their strong support for the Conrad State 30 and Physician Access Reauthorization Act.

The legislation is endorsed by the AMA, the American Hospital Association, the Federation of American Hospitals, the National Rural Health Association, the Niskanen Center, the American Academy of Neurology, and the Public Affairs Alliance of Iranian Americans.

MMA board OKs policy on illicit drug use

At its February meeting, the MMA Board of Trustees approved a policy proposal titled *Harm Reduction of Illicit Drug Use*, which contains language on a set of strategies to reduce the negative consequences associated with illicit drug use. The policy covers the following topics:

- Reducing stigma associated with drug use.
- Checking for drugs that may include harmful ingredients such as fentanyl.
- Access to safe drug-use supplies.
- Drug testing (e.g., workplace drug testing).
- Medication for opioid use disorder.
- Naloxone access.
- Opioid overdose training.
- Overdose prevention centers (i.e., supervised consumption/injection sites).

The proposal was originally drafted by the MMA Illicit Drug Harm Reduction and Decriminalization Work Group, which was formed by the MMA Policy Council to study the issue from May to November of 2022. In November, the council formally recommended the proposal for adoption by the Board of Trustees.

Prior to the board's consideration, the lengthy proposal was split into six sections and uploaded to The Pulse for memberwide feedback. The range of voting members across all proposal sections was 172 to 184. The range of "yes" vote percentages across all proposal sections was 91% to 98%.

The Board of Trustees also approved in December 2022 a policy proposal titled *Decriminalization of Simple Possession of Illicit Drugs*.

State appoints new leader to health equity bureau

The Minnesota Department of Health announced in March the appointment of Robsan "Halkeno" Tura, PhD, as the new assistant commissioner for the department's health equity bureau. Tura assumes the post held by Brooke Cunningham, MD, PhD, before her appointment in January as health commissioner.

In his new role, Tura will oversee the department's Center for Health Equity; diversity, equity and inclusion efforts; and the Office of American Indian Health. He will also serve as the department's lead for proactive and strategic health equity partnerships and will lead the department's work to advance equity in its day-to-day services and programs.

Tura previously served as the director of the department's Center for Health Equity, where he directed the development, imple-

mentation and evaluation of efforts to advance health equity in Minnesota. Before joining the state health department, Tura served as deputy director for Blackhawk County Public Health in Waterloo, Iowa. In that role he drove health equity initiatives, strategic planning, and implementation of other programs, including disease surveillance and investigation, maternal and child health, and chronic disease prevention.

He also oversaw the county's first joint assessment of community health needs, including outreach to underrepresented populations. Before that, he served as director of refugee and immigrants health programs for EMBARC IOWA, a refugee-led social service organization in Des Moines. He also has extensive experience in international health initiatives serving Africa, Latin America, and the Caribbean.

Report: U.S. lacks support for high-quality primary care

A recently released report finds a chronic lack of adequate support for the implementation of high-quality primary care across the United States.

The Health of US Primary Care: A Baseline Scorecard Tracking Support for High-Quality Primary Care, funded by the Milbank Memorial Fund and The Physicians Foundation, offers baseline trend data for the nation and, when available, for states across four key dimensions: financing, access, workforce development, and research.

Developed in collaboration with researchers at the Robert Graham Center, the scorecard provides a measurement tool to track the health of primary care nationwide to inform federal and state policies.

This inaugural scorecard was developed in response to the challenge issued in the National Academies of Sciences, Engineering, and Medicine 2021 report calling for an annual tracking tool to measure improvements in the implementation of high-quality primary care over time.

The scorecard measures key primary care indicators over the past decade and reveals the need for policies to improve a primary care infrastructure in crisis. Scorecard findings reveal the following:

Financing: systemic underinvestment in primary care

- The U.S. invested less than 6.5% of total health spending on primary care between 2010 and 2020. By comparison, Organization for Economic Cooperation Development (OECD) nations spent an average of 7.8% of total healthcare expenditures on primary care in 2016, according to the national academies report.
- Medicare spent the least on primary care as a percentage of total health spending, and spending in Medicaid has fallen nearly continuously since 2014, from a high of 5.3% to a low of 4.2% in 2020.
- Oregon had the highest primary care spending, at 9.6% of total spending, of the 29 states with data in 2020.

Access: primary care physician workforce shrinking and gaps in access to care appear to be growing

- One in three physicians practiced primary care in 2010, yet only one in five medical residents (20–21%) entered primary care between 2012 and 2020.
- Between 2012 and 2020, the gap in the number of primary care physicians per 100,000 people in medically underserved areas and nonmedically underserved areas increased by 5%.
- More than a quarter (27%) of U.S. adults reported that they didn't have a usual source of primary care or used the emergency room as their source of care in 2020, compared with 23% in 2010.

Workforce development: too few physicians being trained in community settings

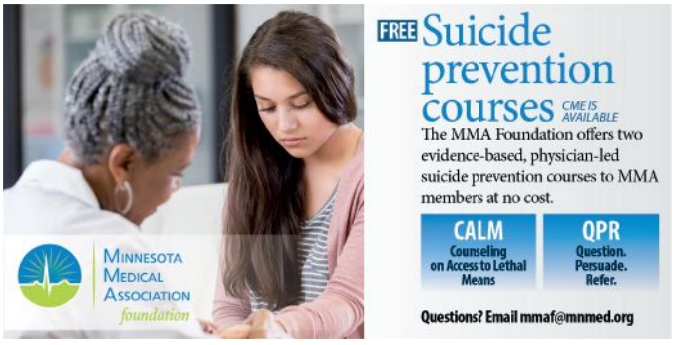
- There are significant discrepancies between where physicians are trained and where people live and work.
- In some states, only 5.9% of resident physicians are trained in medically underserved areas or rural counties, where most community-based training occurs.

Research: almost no federal funding for primary care research

- From 2017 to 2021, the percentage of National Institutes of Health dollars allocated to family medicine departments remained stagnant at just above 0.2% a year.

The report authors also found that a lack of timely, disaggregated data hinders the accurate measurement and implementation of high-quality primary care at the national and state levels. For example, current data cannot provide a complete and accurate picture of the supply and training of all members of the primary care workforce (not just physicians), the percentage of primary care payment that is hybrid, or the impact of information technology on the patient and the provider.

The national academies report identified recommendations for public and private stakeholders related to each of the key primary care indicators highlighted in the scorecard to strengthen support for primary care. To reform payment, for example, the report suggests the Centers for Medicare and Medicaid Services and states increase the overall portion of spending going to primary care. Additionally, to improve access, the U.S. Department of Health and Human Services should target sustained investment in creating new health centers in areas with a shortage of primary care.



Physicians have opportunities to prevent suicide, data show

The March 1 launch of a new public health dashboard reveals that 55% of Minnesotans dying by suicide from 2015 to 2020 had a current diagnosed mental health problem and 48% had a history of mental health treatment.

The Minnesota Department of Health dashboard uses data from the Minnesota Violent Death Reporting System, which pulls together information about violent deaths including suicide, homicide, firearm accidents, law enforcement intervention, and other undetermined violent death between 2015 and 2020.

The data suggest that physicians have opportunities to prevent suicides by increasing the effectiveness of treatments and access to those treatments.

The MMA Foundation offers MMA members physician-led training on two evidence-based suicide prevention training programs. These are free for MMA members.

- Question-Persuade-Refer (QPR) Gatekeeper Training is a 1.5-hour, evidence-based presentation that teaches best practices in suicide prevention and three steps to help prevent suicide.
- Counseling on Access to Lethal Means (CALM) is designed to provide counseling strategies to help patients at risk for suicide and their families reduce access to lethal means, particularly (but not exclusively) firearms.

Attendees can earn CME credit for either program. For more information or to schedule a QPR or CALM training at your clinic, contact Kristen Gloege (kgloege@mnmed.org). The suicide prevention training is sponsored by the MMA Foundation and made possible through the gifts to the foundation.

The MMA has organized a coalition of physicians and other interested individuals and groups on the topic of firearm safety and suicide prevention—with a goal of helping physicians address suicide by firearm in rural Minnesota. For more information, contact Juliana Milhofer (jmilhofer@mnmed.org).

Physicians urge Congress to fix Medicare fee schedule

The MMA, AMA, and 133 other health organizations—representing 900,000 physicians and tens of millions of Medicare patients—wrote congressional leaders in mid-March, telling them that a full inflation-based update is "the principal legislative solution to the ongoing problems plaguing the Medicare Physician Fee Schedule."

The letter notes that Congress has passed stopgap measures in the past few years to mitigate threats to Medicare physician payments. Yet, practice costs have outpaced those efforts. The gap between frozen physician payment rates and rising medical practice costs due to inflation will continue to widen. A permanent solution is needed to avoid this annual panic and legislative chaos.

The letter points out the real-life impact of the eroding value of Medicare payments. According to the Medicare Payment Advisory Commission (MedPAC), among those looking for a new primary care physician, half of Medicare patients had difficulty in finding one. And among Medicare patients looking for a new specialist, one-third struggled to find one. Finding specialists in rural and historically underserved areas is particularly difficult, and the payment system is creating even bigger barriers for patients in those communities.

Also in March, MedPAC called for a physician payment update tied to the Medicare Economic Index (MEI). Medical advocacy groups have long championed this move and appreciate MedPAC's acknowledgement that the current Medicare physician payment system is inadequate—a critical first step toward the larger, necessary work of reforming Medicare to make it more rational and serve patients better.

In the face of inflation, the COVID pandemic, and growing costs of running a medical practice, physicians have struggled to keep open their doors, jeopardizing access to care, particularly in rural and underserved areas. Not only have Medicare payments failed to respond adequately, but physicians saw a 2% payment reduction for 2023, creating an additional challenge at a perilous moment.

"Having surveyed the healthcare landscape, MedPAC recognized that physician pay has not kept up with the cost of practicing medicine," said AMA President Jack Resneck Jr., MD. "Yet, we feel strongly that an update tied to just 50% of MEI will cause physician payment to chronically fall even further behind increases in the cost of providing care. Congress should adopt a 2024 Medicare payment update that recognizes the full inflationary growth in healthcare costs." **MM**

FROM THE CEO

New investments in your community's health

One of the two key components of the MMA's mission is to work to make Minnesota the healthiest state in the nation. Historically, most of our efforts to improve the health of the public have been accomplished through legislative and legal advocacy. State-level policy change is an incredibly impactful means of driving improvements in health.

However, many drivers of health are local, such as housing, education, safety, food access, economic opportunity, clean water. To drive improvements in community health, the MMA recognizes the importance of action at both the local and state level, and we have recently expanded how we—with your help—can continue to make a difference in the health of your community.

A key partner in advancing MMA's mission, including community health improvement, is the MMA Foundation (MMAF). Founded in 1958, the MMAF has evolved from an organization primarily focused on providing loans to medical students, to an organization committed to spurring optimal health and health equity in all communities across Minnesota.

Since 2019, the MMA has provided gifts of $35,000 to the MMAF to support development of a new physician-led, community-based health improvement grant program. The Community Health and Physician Engagement Innovation Grants Program supports local projects, programs, and activities that advance health and health equity and engage physicians. A similar MMAF grant program, the Stearns Benton Community Health and Health Equity Grants Program, funded through a gift from the former Stearns Benton Medical Society, supports projects, programs, and activities that advance health and health equity and engage physicians and physicians-in-training who live or work in Stearns or Benton counties.

These two community health programs award micro grants up to $5,000, with preference given to initiatives that are physician-championed and demonstrate the potential to engage physicians in support of evidence-based efforts to advance health and health equity. The MMAF accepts project inquiries on an ongoing basis.

At first blush, the funding may appear modest. But a small influx of funding has already demonstrated impact and can seed innovation. Let me share four inspiring examples:

- A Duluth-area physician who volunteers at a homeless shelter wanted to provide wound kits to treat early abscesses and cellulitis—both common problems among those who are unsheltered. Through an MMAF Community Health and Physician Engagement grant she was able to purchase the materials necessary to fill 500 wound kits and provide supplies for on-site lab collection.
- A retired physician in Marshall is committed to eliminating the persistent disparities in maternal care for women in rural Minnesota. For many years he has been teaching the Advanced Life Support in Obstetrics (ALSO) course to physicians and nurses in area hospitals with a low birth census. For the past two years, an MMAF community health grant has helped to underwrite his efforts, from offsetting the costs to train 78 rural clinicians to purchasing the mannequins used in the simulations.
- A physician at Lakewood Health System in Staples received an MMAF grant to examine how current health system policies and practices support or impede health equity.
- A physician from CentraCare in St. Cloud received an MMAF community health grant to promote COVID-19 vaccinations in historically marginalized communities.

More information about the MMAF community health grant programs, as well as the other exciting work of the foundation, including medical student scholarships, suicide prevention training, and a new workforce diversification fund, can be found online at mnmed.org/about-us/mma-foundation.

I can't wait to see the new ideas you have and how MMAF can help you help your community. As always, thanks for your support.

Janet Silversmith
JSilversmith@mnmed.org

VIEWPOINT

Self-care doesn't have to be a solo practice

PHOTO BY KATHRYN FORSS

Edwin Bogonko, MD, MBA
MMA board chair

A little more than two years ago, we learned of the tragedy of Lorna Breen, MD, who took her own life in the middle of the COVID-19 pandemic even as she dedicated herself to selflessly serve patients in the ER at New York–Presbyterian Allen Hospital in Manhattan. The stress of having to put self behind every ask of her took its toll, and her story highlighted another tragic physician loss.

We've heard the statistics before. Physicians are tired and many are close to, or have already reached, their breaking point. Surveys and studies show that 60 percent of us have experienced some sense of burnout. According to a 2019 study published by the *Annals of Internal Medicine*, physician burnout costs the healthcare industry more than $4.6 billion a year.

We're not alone. Many American workers report feelings of anxiety and burnout. According to a 2021 survey conducted by the American Psychological Association, 71% of American workers typically feel tense or stressed out during the workday. This is for all workers; you can only imagine that the percentage is that much higher for anyone working in healthcare these days.

There are many things we can blame for this stress/anxiety/feeling of burnout—the pandemic, the growing political divide, increasing administrative burdens—but the source is not as important as how we treat it. Moral injury can no longer be ignored in the workplace. According to the 2022 Medscape *National Physician Burnout & Depression Report*, on average 10% of physicians have had thoughts of suicide. In some specialties, that number is even higher: 13% of pathologists surveyed, for example, reported having suicidal thoughts. Sadly, up to 500 physicians take their own life every year!

The MMA has been at the forefront of addressing ways to mitigate the pressure of doing the job we as physicians love the most. More recently, we advocated for licensure requirements that remove the stigma of disclosing mental health in our application process to allow our colleagues to seek the help they need in confidence. We will continue to implore employers to provide physicians with space to support themselves as well as provide much-needed peer-to-peer resources.

We need to do a better job of taking care of ourselves. I'm sure you have heard of the practice of self-care. It comes up in conversation more and more, but what is it exactly? According to the World Health Organization self-care is: "The ability of individuals, families, and communities to promote health, prevent disease, maintain health, and cope with illness and disability with or without the support of a health-care provider." Although self is in the name, it doesn't mean you have to go at it alone.

A growing number of our peers are working on their self-care through wellness or mindfulness coaches. These coaches can help with your breathing, how you meditate, how to communicate compassionately, among other things. This helps relieve stress, lower blood pressure, improve sleep, reduce chronic pain and help with your anxiety or depression. I'm sure most of us who practice medicine would benefit from addressing some or all of these.

Most physicians are used to providing the care and are reluctant to seek it. But it's like the safety instructions you receive from flight attendants—put on your oxygen mask first before assisting others. We've been through the ringer for the past three years. It's time, if you haven't already, to focus on you. I have found that it helps to work with an expert. Work together to improve you—our patients will be better off and healthier. The MMA stands ready and willing to help. Please reach out! **MM**

There are many things we can blame for this stress/anxiety/feeling of burnout—the pandemic, the growing political divide, increasing administrative burdens—but the source is not as important as how we treat it. Moral injury can no longer be ignored in the workplace.

CHERYL BAILEY, MD

- Board-certified gynecologic oncologist, St. Paul.
- Vice president and complaint review committee chair of the Minnesota Board of Medical Practice.
- MMA member since 2018.
- Grew up in Falcon Heights.
- Bachelor of arts from Bryn Mawr College. MD from the University of Minnesota. OB-GYN residency at Baystate Medical Center in Springfield, Massachusetts. Two-year gynecologic fellowship at the University of Kentucky in Lexington. Joined Minnesota Oncology in 1996.
- Lives in St. Paul with her husband and younger son, who graduates from St. Paul Central High School this spring. Their older son is a sophomore at Michigan State University. And they are hosts of Omar, a young man from Senegal, who works in the French department at Central.
- Shares the house with Shadow, a perfect 13-year-old mixed-breed dog, and Fern, a disgracefully behaved 2-year-old pit bull mix whose preference for chew toys is house pillows, bedding, and shoes.

Became a physician because…

It was in my heart since I was in elementary school. I loved medical TV shows and my mom was a nurse, so I spent a lot of time in her physical medicine and rehab floor at Metropolitan Medical Center.

If I weren't a physician…

I would probably be a writer or involved in the music industry.

I quit practicing…

To be with my two teenaged sons a bit more, to write a novel that had been in my brain for years, and to resume some musical interests. I quit my practice in 2018, and I was so grateful I could be present with my kids when COVID hit, although most interactions entailed an earbud being pulled out and hearing, "Sup, Mom?"

I flew to Green Bay, Wisconsin, for a week each month as a locum to keep up my skills but never felt great about the part-time nature of the position, and I stopped practicing medicine for good in December 2020. You know what's been hard? Deciding not to renew my Drug Enforcement Administration license. Applying for "senior" status in medical organizations. Sitting for hours with my mom during a complicated hospital stay and not being able to check her chart for results or read the consults. (Damn you, HIPAA.)

What a fulfilling job I had for those twenty-plus years, though. Taking care of women with gyn cancers was a perfect fit for my skill set—a unique combination of big surgeries, clinic, administering chemotherapy, and ordering radiation when appropriate. For whatever reason, I felt especially called to the dramatic conversations about life, death, time left on this earth, and the quality of what time remains.

What prompted me to serve on the Minnesota Board of Medical Practice…

The urging of a fabulous Abbott radiologist, Dr. Subbarao Inampudi, who recommended I apply. I started my term in 2018, worked on the Policy Committee for a bit, and have been chair of the Complaint Review Committee for a couple years. It does my heart good to see the workings of a government agency keeping the public safe. When I was first licensed to start my practice in Minnesota in 1996, a board member told me the biggest issues generating complaints from the public were drug and alcohol abuse and sexual behaviors with patients. I think most members of the board would agree that these issues continue to be prominent.

How I keep life balanced…

I play flute in Minnesota JCC Symphony Orchestra, sing with the Mill City Singers, and sit on the board of the League of Women Voters of St. Paul.

Mostly, though, I write. I finished a novel, *A Patient Love Story,* based loosely on my fellowship, and am pitching it to agents. My short story "Love, Frank" was published in the 2022 fall edition of the medical literary journal *Intima*. I remain fascinated by the high conflict and drama we witness so often in medicine. I helped my mom write a memoir for her grandkids this last year, a project I strongly recommend for those with older parents.

The greatest challenge facing medicine today is...

Clearly, finances. We have a broken, illogical, and unfair system. A person's ability to see a doctor should have nothing to do with their job's benefits or being temporarily unemployed or owning one's own business. Here's my dream: Doctors work in a single-payer system, we do our work without having to hire HR and have a huge billing department, and there are no more hassles of preauthorization and unpredictable payments. We'd almost certainly make less money. One National EMR, no asking for copays, no shame for our patients, no $2 billion quarterly profit from insurance companies. Just imagine. **MM**

THE ANNUAL **MMA AWARDS**

Recognize Your Peers

for Their Great Work!

We are now accepting nominations for the annual

MMA Awards

Award categories include:

Distinguished Service Award

Given to a physician who has made outstanding contributions in service to the MMA and on behalf of medicine and the physicians of Minnesota during his or her career.

President's Award

Designated for individuals who have made outstanding contributions in service to the goals of the MMA.

Medical Student Leadership Award

Presented to a member of the MMA Medical Student Section who demonstrates outstanding commitment to the medical profession.

Resident & Fellow Leadership Award

Presented to a member of the MMA Resident & Fellow Section who demonstrates outstanding commitment to the medical profession.

James H. Sova Memorial Award for Advocacy

Given to a person who has made a significant contribution to the advancement of public policy, medical sciences, medical education, medical care or the socio-economics of medical practice. Sova was the chief lobbyist for the MMA from 1968 until the time of his death in December 1981.

Eric C. Dick Memorial Health Policy Partner Award

Given to an individual, group of individuals, a project or an organization that demonstrates their commitment to pursuing sound public policy, building coalitions, creating and/or strengthening partnerships with the goal of improving the health of Minnesotans or the practice of medicine in Minnesota.

COPIC/ MMA Foundation Humanitarian Award

Presented to physicians who volunteer medical services and contribute to their community, specifically to MMA members who go above and beyond to help address the healthcare needs of underserved populations in Minnesota.

Visit the MMA website ***(www.mnmed.org/about-us/mma-awards)*** *to make a nomination by* ***June 30.***

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