



alumni

04	Finding opportunity in crisis
12	Advanced Care at Home
22	Convalescent plasma treatment

Letter from the president

I never would have imagined what 2020 was going to bring. Our lives have been altered, and many of us have experienced significant loss.

Life during a global pandemic is challenging — even more so for physicians, scientists and health care professionals. To our colleagues in emergency medicine, primary care, pulmonary and critical care, infectious diseases and epidemiology, and laboratory medicine, we tip our hats to you. You've carried a disproportionate share of the load, and we're grateful for your indefatigable service. To our colleagues in research, now more than ever we see you toiling behind the scenes to develop, evaluate and process the tests and provide us with data that have been critical during this time. We sing your praises!

If there's one good thing to come out of the pandemic, it's heightened appreciation for each other. We know how it feels to not be able to visit an elderly parent, a friend, a grandchild, a college student. And our Mayo Clinic family. Normally, we'd see each other at conferences around the world, at a Mayo Clinic campus or as friends outside of work. Zoom isn't a replacement for a big bear hug with a friend from medical school. But we'll make do as best we can until we can see each other in person and warmly embrace.

In the meantime, reach out to each other. Remind those who are important to you how much you care about their well-being. Our profession can take a unique toll on emotional and mental health during the best of times. A phone call, email or care package from a colleague can make all the difference to a fellow alum who is struggling with today's challenges. If you want to reach out to someone, check the people finder on the Alumni Association website alumniassociation.mayo.edu, or call 507-284-2317.

I mentioned heightened appreciation for each other. We're bonded by our common Mayo Clinic roots. We're one Mayo family. We want all of us to be safe and well. Please check in and let us know how you're doing (mayoalumni@mayo.edu). We want to hear your stories and challenges. Many of you have stories of Herculean efforts similar to the ones in this magazine. One final note — please don't neglect your own health during this time. Get your cancer screenings, flu shots and exams. We preach to patients the importance of screenings to detect disease when it's most treatable, but we often fail to take our own advice. Self-care is important. We want to be able to see you at Alumni Association events when in-person events return!

Be well.



Carl Backer, M.D. (MED '80)
Chief, Section of Pediatric
Cardiothoracic Surgery
Professor of surgery
UK Healthcare Kentucky
Children's Hospital
Lexington, Kentucky

Contents



Finding opportunity in crisis

Mayo Clinic response to pandemic across practice, research and education fast forwards strategic plan.

06 Mayo Clinic pivots to virtual, returns to 'normal' & has eyes on new normal of telemedicine

12 Home sweet home — transforming hospital care in the digital age

18 Matthew Binnicker, Ph.D., reflects on a lab in a pressure cooker

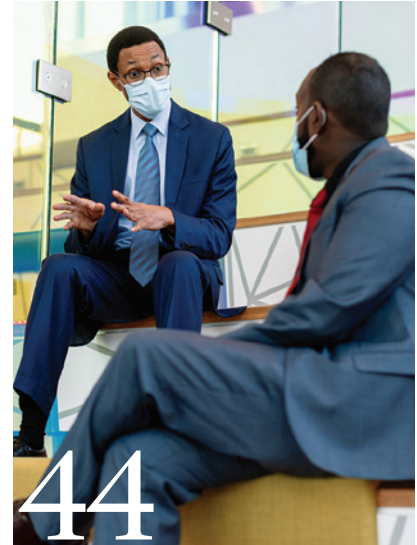
22 Michael Joyner, M.D., leads a union of forces

28 Queen of Serology Elitza Theel, Ph.D., finds her voice

34 John Mills, Ph.D., goes back to his roots

38 'Necessity is the mother of invention'

40 Leveraging new-world technology to elevate old-world subject



On the shoulders of giants: 'I want to do what he does'

Lewis Roberts, M.B., Ch.B., Ph.D., makes mentoring Essa Mohamed, Ph.D., personal.

46 Mayo Clinic update Obituaries

50 New mission statement

Illustrations by Federico Gastaldi

COVID-19 photography disclaimer: Some photos were taken before the pandemic. In others, individuals were alone in nonpatient care, nonpublic settings and were, therefore, in compliance with Mayo Clinic's COVID-19 safety guidelines while unmasked.



20
20



Finding opportunity. in **CRISIS**

When SARS-CoV-2 hit the U.S., Mayo Clinic adroitly pivoted in all three shields to continue to care for patients, educate learners and conduct research — especially research related to the virus.

The speed with which these changes happened was head-spinning. Tens of thousands of in-person patient visits were deferred and conducted virtually. Medical students were removed from clinical experiences, and their curriculum went virtual. Clinical anatomy included livestreams of faculty, rather than students, performing dissection. To assist in the research arena, Mayo Clinic leaders called their contacts around the country to quickly acquire SARS-CoV-2 infection serum samples. Commercial antibody tests were evaluated at a record pace. Mayo organized and oversaw the national Expanded Access Program's enrollment and the blood banking infrastructure to collect and distribute convalescent plasma. At breakneck speed, Mayo Clinic researchers developed a diagnostic test to help guide the practice. And researchers worked around the clock to produce a neutralizing antibody test — one of the first in North America — to evaluate the efficacy of convalescent plasma therapy and vaccine trials. Time frames were compressed from years and months to weeks and days.

The stories that follow describe how Mayo Clinic staff members seized the moment, rose to the challenge and accelerated portions of Mayo's strategic plan to put the organization far ahead of where it anticipated it would be. •



Virtual care

Mayo Clinic

pivots to virtual,

returns to 'normal' & has eyes
on new normal of telemedicine

In March 2020, Mayo Clinic’s Center for Connected Care was halfway through a five-year road map to introduce virtual health care visits as an option across all Mayo Clinic locations.

“We were working our way through the highest priority departments — setting implementation dates, working closely to make sure departments had the necessary tools and comfort level to conduct video visits, and holding their hands until they were ready to launch,” says **Steve Ommen, M.D.** (MED ’92, I ’95, CV ’99), medical director, Center for Connected Care.

Then came the pandemic.

The pivot

On March 7, **Conor Loftus, M.D.** (I ’01, GI ’04), enterprise chair of the Mayo Clinic Outpatient Practice, returned home to Rochester after leading a retreat at Mayo Clinic in Arizona. At the retreat, he heard buzz about the pandemic. On the flight home, he saw a few people wearing masks. Less than a week later, Mayo Clinic leadership decided to implement a shutdown of the outpatient practice. On March 16, Mayo Clinic began deferring in-person appointments for all but high-acuity conditions. The pivot to virtual visits began.

“Things were relatively normal in the practice until the week of March 16,” says Dr. Loftus. “In the prior week, we saw a lot of COVID-19 activity across the country and world, and exposures among our staff that required us to remove them from practice for everyone’s safety. Canceling appointments and sending providers home was shocking. Thankfully, Mayo had the vision to establish the Center for Connected Care six years ago in recognition of the demand for virtual health care, and had developed products for this purpose. With that groundwork and foundation in place, the pandemic simply accelerated our implementation plan.”

Accelerate it did. In a flash, Mayo Clinic shifted from almost 100% to only 5–10% of patient visits in person. The outpatient practice in Rochester went from 5,000 visits per day to about 500. The surgical practice went from 270 cases per day to about 20. On the Rochester campus alone, more than 38,000 appointments were deferred during the first week of the pivot. And use of Connected Care products to facilitate patient video visits increased by 10,000% over three weeks. ▶



Top: Steve Ommen, M.D.

Bottom: Conor Loftus, M.D.





“The overall contraction of the practice was massive and dramatic,” says Dr. Loftus. “Our hand was forced to implement virtual visits, or telemedicine, faster than our road map. Providers were at home, patients were at home — we just needed to connect the two. With the Center for Connected Care, we switched to video and phone visits and seamlessly continued to see established and new patients. Across Mayo Clinic locations, we conducted 5,000 to 6,000 virtual visits each day.”

Dr. Ommen says he was confident in his team and the virtual care products they’d developed. “The pandemic gave us an opportunity to deliver what we had in place and make sure the Mayo Clinic tradition of providing the best possible care was maintained. That could only be accomplished with our tool set, and we recognized that responsibility — playing a key role in helping to protect Mayo patients from a possibly fatal viral infection and making sure they continued to get needed care. It was all hands on deck, with many of our 150 or so team members working remotely.”

Dr. Ommen says his team was overjoyed when they saw the first patient satisfaction data, which indicated that patients liked virtual visits.

The Center for Connected Care recruited other Mayo staff members to fill in on call centers to set patients up with virtual visits and field physicians’ questions about virtual visits.

“Initially, it was controlled chaos, with questions coming from every direction,” says Dr. Ommen. “The handholding we’d done with departments prior to the pandemic went out the window. Now, we gave them tools and tips and nudged them to go.”

The barriers to virtual health adoption before the pandemic were relieved when the federal government and third-party insurers relaxed state licensure requirements.

Dr. Ommen says his team was overjoyed when they saw the first patient satisfaction data, which indicated

that patients liked virtual visits. Dr. Loftus says the scores have equaled those for face-to-face visits.

“The rapidity with which we shut down the face-to-face practice and kept the practice going virtually in every specialty was amazing,” says Dr. Loftus. “Equally impressive was the speed with which we returned the practice to face-to-face — all while maintaining the unique Mayo Clinic patient experience.” ▶

Candace Granberg, M.D. (U '10),
Department of Urology at Mayo Clinic in
Rochester, conducts a virtual patient visit.

The reactivation

In mid-April, Mayo began practice reactivation, scheduling face-to-face visits with patients to begin later that month. In-person visits were enabled by safety measures Mayo implemented, including universal masking of patients and staff, universal screening of patients, and COVID-19 testing of procedural and surgical patients.

While virtual visits have since leveled off, they're here to stay, says Dr. Loftus.

"Patients have gotten a taste of virtual care. They're interested in being able to get appointments before work in the morning and after work in the evening. Providers are always looking for schedule flexibility. We envision that in the future, a provider might be in the office two or three days a week and work some virtual half days from home. We're exploring pilot projects of virtual care outside of traditional clinic hours to enhance patient and provider satisfaction. We expect virtual care delivery to comprise 40% of patient visits by 2025 and beyond."

The pivot to virtual care has caused Mayo Clinic to rethink preclinic visits. "Conducting virtual visits with scheduled patients before they come to Mayo Clinic will give us a chance to hear about their symptoms, stories and expectations so we can optimize their itineraries and enhance the on-campus experience.

"The expansion of virtual care also has huge implications for international patients. We want to provide as much care as possible virtually so that only those whose conditions warrant travel to a Mayo Clinic destination do so. Virtual care enhances our outpatient, hospital and procedural practices, and will only make us a stronger, more patient-centric organization. The pandemic expedited our plans, but we're happy to be an industry leader in what has been a slow-moving arena." •

*"We expect virtual care
delivery to comprise*

40% *of patient
visits by 2025
and beyond."*

– Conor Loftus, M.D.





Abimbola Famuyide, M.B.B.S. (OBG '02), chair, Department of Obstetrics and Gynecology at Mayo Clinic in Rochester, sees a patient for an in-person visit.



Advanced Care at Home

Home sweet home

Transforming
hospital care in
the digital age

The timing was perfect. Since early 2019, Mayo Clinic had been working toward introducing Advanced Care at Home, a home-based clinical care program. Enter the pandemic. Preparations for Advanced Care at Home were expedited to begin treating patients in their homes, helping them avoid being hospitalized alongside COVID-19 patients and freeing up critical hospital beds for those patients.

The program admitted its first patient on July 6 via Mayo Clinic in Jacksonville, Florida, an urban setting. On Aug. 3, the first Advanced Care at Home patient in a rural setting was admitted via Mayo Clinic Health System in Eau Claire, Wisconsin. By January, the program had admitted 102 patients in the two locations.

Advanced Care at Home flips on its head the idea of where sick patients can be cared for. Is it possible to provide high-quality acute care outside of a hospital building? Can the health care team go to the patient's location?

Yes and yes.

Advanced Care at Home provides patient-centric, high-quality, location-independent hospital services in the home for acute and complex patients. It is the first initiative of Mayo's Virtual Care Platform, which aims to create remote care offerings across the spectrum of acuity. The Virtual Care Platform is one of the three initial platforms within the broader Mayo Clinic Platform (page 17).

"Advanced Care at Home is an excellent example of the Mayo Clinic mission and values optimized for the digital age," says **Clark Otley, M.D.** (DSRG '96), chief medical officer of Mayo Clinic Platform.

Advanced Care at Home flips on its head the idea of where sick patients can be cared for. Is it possible to provide high-quality acute care outside of a hospital building? Can the health care team go to the patient's location?

"We're doing what we've always done but with more technology. This innovative program helps us provide high-quality care in a new environment and save hospital beds for sicker patients who must be in the hospital."

The conception

Mayo Clinic conceived of its Platform in 2019, with President and CEO **Gianrico Farrugia, M.D.** (I '91, GI '94), emphasizing that it should complement Mayo's physical presence. The Platform is a way to expand and scale Mayo Clinic across the world in transformative ways that are powered by data science and give many more people access to Mayo Clinic care and innovation.

Platform leaders evaluated 185 innovative ideas — a list that was winnowed down to half and then half again and finally to 10. When Dr. Farrugia reviewed the top three ideas, he asked where Advanced Care at Home ranked. Told it was last on the list of 10, he said, "Push it to No. 1," according to Dr. Otley.

"The idea of providing hospital-level care in someone's home was daunting, to say the least. Hospitals are incredibly complicated, and the patient population we were discussing is very sick. However, Dr. Farrugia said if we started with the hard stuff and mastered something incredibly difficult, the subsequent ideas would be easier. That began our journey to bring Advanced Care at Home to life."

The fundamentals

Mayo's Advanced Care at Home team identifies appropriate hospitalized patients and discusses the option with patients' physicians and then with patients and their families. Appropriate conditions include cellulitis and disorders of nutrition and metabolism; COPD and congestive heart failure; fevers, migraines and headaches; gastroenteritis; pancreatitis and renal failure; pneumonia, bronchitis with asthma, and respiratory failure with infections or inflammations. Patients must live within 25 miles of Jacksonville or Eau Claire — the first two locations where the program has been rolled out.

Built into Advanced Care at Home are a command center with a virtual nursing station at Mayo Clinic in Jacksonville, in-home technology, a rapid response team, a robust supplier network of support services and a software platform that's compatible with Mayo's electronic health record. Mayo Clinic's partner in this initiative is Medically Home, a Boston-based company that coordinates third-party vendors and provides software and hardware services. ▶



Once a patient is admitted to the program, the following steps occur:

- A tailored technology package, including an iPad, Wi-Fi phone, Bluetooth vital signs monitoring equipment, and possibly intravenous (IV) fluid equipment, home oxygen and wound care supplies, is delivered to the patient’s home, usually by paramedics or an emergency medical team.
- The patient is transported home via ambulance.
- Advanced care providers visit the patient at home as do nurses, paramedics, physical therapists, phlebotomists, respiratory therapists, home health aides and infusion therapists as needed. Medications, durable medical equipment and medical meals are delivered, and medical waste is retrieved. Lab tests, imaging and intravenous therapies are provided in the home.
- Mayo Clinic physicians based in the command center in Jacksonville direct the patient’s care and conduct daily telemedicine rounds during the acute phase of the patient’s care, typically when a nurse practitioner or physician assistant is present at the bedside. During the restorative phase of care, an advanced practice provider manages care.
- Nurses check in with the patient when it’s time to take medications and check vital signs.
- Patients have immediate video and phone access to the Mayo Clinic team and real-time remote monitoring 24 hours a day. The patient and family members can ask questions of the care team in the command center at the touch of a button.
- If a patient’s health deteriorates, emergency medical personnel are immediately dispatched to the home.

“Advanced Care at Home is an excellent example of the Mayo Clinic mission and values optimized for the digital age. We’re doing what we’ve always done but with more technology.”

– Clark Otley, M.D.

“You can think of this as a virtual ward of care,” says **Michael Maniaci, M.D.** (I ’06, CMR ’07), chair, Division of Hospital Internal Medicine at Mayo Clinic in Florida and physician lead for Advanced Care at Home in Jacksonville. “Each morning during rounds, we run through the patient’s care plan for the day. We work around the patient’s preferences and availability for the multiple scheduled interactions throughout the day. We try to limit the number of health care team members going into the patient’s home. If one person, an EMS professional for example, can administer IV medications, provide infusion therapy and flush an IV line, we’ll have that person do all three things instead of send in several people.”

The experience

Dr. Maniaci describes an Advanced Care at Home patient in his 80s who had a bladder infection that spread to his kidneys. Bladder cancer contributed to his recurrent infections and repeat hospitalizations. The patient was septic

and had low blood pressure, a fever and nausea, and multiple comorbidities. After fainting at home, he went to the emergency room and was admitted to the hospital. Although he was stabilized within 48 hours, he still needed another three to five days of hospital care. The patient was identified as a good candidate for Advanced Care at Home and transported to his residence. At home, his percutaneous nephrostomy tube was maintained and his creatinine and electrolytes were monitored daily. After the acute phase of the patient’s care, he was, like all Advanced Care at Home patients, monitored for the next 30 days by an advanced care practitioner in the restorative phase of care. This helps to make sure patients follow up with appointments and are educated about their condition to improve their overall long-term health and prevent readmission to the hospital. ▶

“If we can make them happier and just as healthy in the environment in which they’re more comfortable, isn’t that what we should do? We think so.”

– Michael Maniaci, M.D.



Above: Longtime Mayo Clinic patient John Jolly recovered from symptoms related to bladder cancer treatment at home in Jacksonville, Florida. His wife, Letty, describes their Advanced Care at Home experience as first-class care at home.

Opposite: Michael Maniaci, M.D., and physician assistant Heidi Felix work in the Advanced Care at Home command center on Mayo Clinic’s Florida campus.



Top: Margaret Paulson, D.O.
Bottom: Michael Maniaci, M.D.

Right: Margaret Paulson, D.O., visits with an Advanced Care at Home patient.

“We care for these patients for a month at their home at a lower cost than a hospitalization, transitional care unit stay and subsequent home health care,” says Dr. Maniaci. “A lot of hospital costs are fixed to the hospital building; we can reduce that by caring for patients in their homes. It’s safer and less expensive and, more importantly, it’s what many patients want. If we can make them happier and just as healthy in the environment in which they’re more comfortable, isn’t that what we should do? We think so.”

Margaret Paulson, D.O. (I ’18), physician lead for Advanced Care at Home in Northwest Wisconsin, says she’s been surprised by how happy the patients are. “Our first three patients in Northwest Wisconsin all cried tears of joy. They were overwhelmed and delighted to get this level of care at home and be with their families and pets, surrounded by the things they enjoy. As a hospitalist, I’m usually the one telling patients they can’t go home yet or that they need to go to a skilled nursing facility. It’s professionally satisfying to tell them we can provide the care they need at home.

“Patients in traditional hospitals often feel intimidated with health care staff coming in and out of their rooms at all times of day and night. Receiving hospital care at home levels the playing field. The dynamic shifts when we meet them in their environment and see their family members. If we can demonstrate a superior patient experience, improved outcomes and lower cost, why would we not provide care at home? Other countries have decades of data about hospital care at home, but it hasn’t been viable in the U.S. in terms of reimbursement until now.”

As luck would have it, the launch of Advanced Care at Home was accompanied by the Centers for Medicare & Medicaid Services (CMS) issuing a hospital without walls waiver,

allowing health care institutions to be reimbursed for services provided in unconventional, nonhospital settings.

According to **John Halamka, M.D.** (I ’19), president of Mayo Clinic Platform and the Michael D. Brennan, M.D., President’s Strategic Initiative Professor, Mayo Clinic is working with the federal government and other payers to ensure Advanced Care at Home continues to be reimbursed. “Any clinical innovation requires payer innovation. In the meantime, the regulatory changes due to the pandemic provided us with the opportunity to implement Advanced Care at Home immediately.”



Training future experts in virtual health

Michael Maniaci, M.D. (I ’06, CMR ’07), chair, Division of Hospital Internal Medicine at Mayo Clinic in Florida and physician lead for Advanced Care at Home in Jacksonville, plans to establish a medical virtualist fellowship.

The future

The Advanced Care at Home team is focused on optimizing the product and expanding it across Mayo Clinic. Longer term plans include national and international expansion.

“Medicine has evolved, but health care delivery hasn’t kept pace,” says Dr. Maniaci. “There are other places where we can and should deliver health care. We need to take our focus off of physical buildings and instead look at building high-quality supply chains for other environments. We’re not looking to replace hospitals but only to replace hospitals for some patients. We believe that within the next year or two, patients will expect to have home hospital care available to them. We see the future as having virtual wards of hospital-level care like this.

“There’s a whole world of virtual medicine to explore, which will allow us to spread high-cost resources such as physicians around the world and better care for an aging population worldwide, and share Mayo Clinic knowledge to benefit more.” •



John Halamka, M.D.

Mayo Clinic Platform

Mayo Clinic Platform is an ecosystem of strategic initiatives focused on transforming health care by using technology, data and artificial intelligence to make connections.

John Halamka, M.D. (I ’19), president of Mayo Clinic Platform, uses an analogy to explain the Platform, “What is Airbnb? Do they own hotel rooms? No. They are a platform that links folks looking for a place to stay with those offering a place to stay. A platform in health care is very similar. You may have signs and symptoms. You may have data. You may be seeking care. But we need to link you to whatever that means. Could that be outpatient consultation, an inpatient stay? Could it be an algorithm that helps with diagnosis and treatment, helping you navigate the health care system?”

“Mayo Clinic Platform is a network of big data analytics, artificial intelligence and telemetry systems that link the customer — the patient — with the provision of the services they need.”



“The eyes of the entire institution were on us. We understood the importance of a test and knew we had to deliver.”

– Matthew Binnicker, Ph.D.



Diagnostic test

Matthew Binnicker, Ph.D.,
reflects on a lab in a

pressure cooker

Matthew Binnicker, Ph.D. (CM '06), director of the Clinical Virology Laboratory in the Division of Clinical Microbiology at Mayo Clinic in Rochester, has been involved in his fair share of viral outbreaks. He led a team that worked to develop a test for the Zika virus outbreak in 2016. He was involved in planning for patients during the Ebola outbreak in 2014 and for the H1N1 virus outbreak in 2009. During his fellowship in clinical microbiology at Mayo Clinic Graduate School of Biomedical Sciences, he developed a test to diagnose Valley Fever, a fungal infection in the Desert Southwest. His was the first polymerase chain reaction (PCR) molecular test to diagnose Valley Fever in a clinical laboratory in the U.S.

Despite that experience during two decades at Mayo Clinic, Dr. Binnicker says the early days of the COVID-19 pandemic were the most hectic of his career. He and his lab staff were under intense pressure to deliver a test to diagnose COVID-19 for Mayo Clinic and its patients. “The eyes of the entire institution were on us. We understood the importance of a test and knew we had to deliver.”

Test development at warp speed

Dr. Binnicker began hearing about the new coronavirus during the final weeks of 2019. At a meeting in mid-January 2020, he asked representatives of some diagnostics companies if they were considering test development. At that time, the general attitude was wait-and-see. Coronavirus outbreaks in 2003 and 2012 didn’t spread widely, and many experts didn’t expect a pandemic in 2020.

15
people worked
around the clock
to produce and
validate Mayo’s test

A month later, many experts began to realize this coronavirus outbreak wasn’t waning. Late in February, Dr. Binnicker and his colleagues

at Mayo Clinic decided to commence development of a molecular diagnostic (i.e., PCR) test. At the time, no manufacturers offered tests to detect the virus in respiratory samples.

From late February through the second week of March, a team of 15 worked around the clock to produce and validate Mayo’s test and submit it to the Food and Drug Administration (FDA) for Emergency

Use Authorization (EUA). On March 12, Mayo began using the test, which ultimately received EUA from the FDA.

To put the test’s development into perspective, Dr. Binnicker says the normal time frame to bring in a new test is six to nine months, using a lab team of one or two staff members. In this case, the time frame was three weeks, and the team numbered 15.

To motivate team members in a pressure cooker situation, Dr. Binnicker reminded them of their training. “As clinical microbiologists and infectious disease experts, we live for a situation like this. We train our entire lives to meet the needs of and be of service to patients who need diagnostic testing.”

To put the intensity of pressure into perspective, Dr. Binnicker says the Ebola outbreak was a 4 or 5 out of 10. This was a 10.

“I worked 165 days in a row. During the early days, I was on the phone late every night with contacts in Singapore and China. Singapore had many cases early on, and they were great about sharing knowledge they’d gained. For example, they provided experience about how to treat samples to inactivate the virus so we didn’t put lab staff at risk.

“Late-night conversations with **Shawn Vasoo, M.B.B.S.** (CM ’13, IDOR ’14), clinical director at the National Centre for Infectious Diseases at Tan Tock Seng Hospital in Singapore, provided valuable information about what we could expect in the coming weeks and months.” ▶

“We train our entire lives to meet the needs of and be of service to patients who need diagnostic testing.”

– Matthew Binnicker, Ph.D.



Matthew Binnicker, Ph.D.

“I worked

165

days in a row.”

“During the early days,
I was on the phone late

**every
night**

with contacts in
Singapore and China.”

20k

samples per day

Full speed ahead

Within two days of launching the test, Dr. Binnicker’s lab detected the first positive COVID-19 case in a Mayo Clinic patient. “It was confirmation that our efforts had tangible benefits and the patient could be quarantined,” says Dr. Binnicker.

While the three weeks of test development were hectic, Dr. Binnicker describes March 12–31 as the most intense days of his life. With the test introduced, the lab was inundated with phone calls from harried physicians — questions about how to order the test and what the results meant.

“It normally takes months of experience with a new test to figure out the nuances and minor details,” says Dr. Binnicker. “We were learning as we went along and trying to convey information to physicians at the same time.”

Simply having a test didn’t ensure smooth sailing. Initially, Dr. Binnicker’s lab could run only a few hundred samples per day. They’ve worked to increase to about 5,000 samples per day with the single test. By Oct. 1, Mayo Clinic Laboratories, the global reference laboratory for Mayo Clinic, was receiving almost 20,000 samples per day from around the U.S. for testing by multiple commercial platforms.

“Normally, a lab uses just one test for a particular disease,” says Dr. Binnicker. “But there was a global shortage of test reagents and equipment, so we couldn’t accommodate all of the samples with a single test. The logistical challenges necessitated that we increase our testing arsenal.”

The Clinical Microbiology team carefully evaluated new commercial PCR-based tests for COVID-19 and, as of Dec. 1, had implemented nine different molecular tests for diagnosing the disease. “It’s very uncommon for a lab to have multiple tests running at the same time for a single disease, but these aren’t normal times,” says Dr. Binnicker.

The worst days, he says, were when testing had to stop due to assay problems or shortages of reagents or other test components, including pipette tips. “It was frustrating when several thousand people were waiting for their results and we couldn’t proceed due to global supply chain issues.

“It was a crazy time. I received late-night texts from **Dr. (Gianrico) Farrugia** (Mayo Clinic president and CEO, I ’91, GI ’94), asking how he could help us get a piece of equipment from Italy to enable more testing. He was willing to do whatever was needed to keep us running at capacity. He was incredibly supportive of Mayo’s labs — ‘What do you need us to help with? We’ll get you the resources you need.’”



“I’m thrilled that, due to the focus on test development in the pandemic, labs and lab professionals are getting some of the recognition they deserve. They’re among the unsung heroes.”

– Matthew Binnicker, Ph.D.

In addition to praising Mayo’s leadership, Dr. Binnicker is effusive about his lab team. “Everyone worked long hours, sacrificed time with their families for weeks and months, and came together to accomplish things we previously would’ve thought impossible, such as developing a new test in three weeks and validating commercial tests in a weekend. I learned that our wonderfully talented team can get us through any crisis or challenge. My reliance on and trust of our amazing team shot through the roof.

“I’m thrilled that, due to the focus on test development in the pandemic, labs and lab professionals are getting some of

the recognition they deserve. They’re among the unsung heroes. During the COVID-19 pandemic, we’ve been able to put our skills, which have been honed over years of experience, to use; and the lab profession has certainly risen to the occasion. It’s been exciting and exhausting at the same time, and we’re ready to return to normalcy. There are plenty of other diseases that we look forward to focusing on again in the future.” •



Above: Technologist Carly Eggert, Infectious Diseases Serology Laboratory

Above top: Technologists Rachel Tyler and Aaron Kiemele

Convalescent plasma treatment

Michael Joyner,
M.D., leads a

union of forces



It started with a tweet. On Feb. 28, 2020, **Michael Joyner, M.D.** (ANES '92), Division of Anesthesiology and Perioperative Medicine at Mayo Clinic in Rochester and the Frank R. and Shari Caywood Professor, noticed a friend's tweet referring to a Feb. 27 Wall Street Journal commentary by Arturo Casadevall, M.D., Ph.D., chair, Molecular Microbiology & Immunology at Johns Hopkins Bloomberg School of Public Health in Baltimore, Maryland.

In "How a Boy's Blood Stopped an Outbreak: A School Physician's Approach to Measles in 1934 Has Lessons for the Coronavirus," Dr. Casadevall discussed how convalescent plasma was used in 1934 at a Pennsylvania boys' school during a measles outbreak. Convalescent plasma relies on the principles of passive immunity and involves the transfer of antibodies from a recovering person to an infected person to treat or prevent disease. This therapy has a long history of use, dating back to the 1918 Spanish flu outbreak. Dr. Casadevall proposed using convalescent plasma on a small scale to protect health care workers during the COVID-19 pandemic.

“The Mayo brothers talked about the necessity of union of forces to advance knowledge. I have a duty to get out of my comfort zone and pitch in during a crisis.”

– Michael Joyner, M.D.

It's lucky for Mayo Clinic that Dr. Joyner, a self-described extreme extrovert, knows a lot of people and has a considerable network, including almost 13,000 Twitter followers. He's part of a network of scientists that meets regularly and virtually to exchange ideas about medical developments, many related to public health. Washington University, Einstein Medical Center, Michigan State University, Johns Hopkins University, Tufts University and others are represented.

Scientists in Dr. Joyner's network had ideas about how to use convalescent plasma during the new pandemic. Dr. Joyner advocated convalescent plasma as a treatment for early disease in COVID-19 patients in the ICU — similar to the approach in the boys' school.

“In the absence of a vaccine or antibodies, we felt convalescent plasma as a therapy early in the disease was our best bet,” says Dr. Joyner. Mayo's Institutional Review Board (IRB) approved the approach for Mayo Clinic patients.

There was a problem, however. The Food and Drug Administration (FDA) was inundated with requests for compassionate use approval for convalescent plasma. And there was no systematic way to get plasma. Everyone wanted it, and a black market of desperate patients sprang up.

Dr. Joyner continued discussions with his in-the-know friends in the scientific community. Word got around. ▶

Over
five
months

the program served
2,800
hospitals and acute
care facilities

+14,000
physicians

The call

On March 30, Peter Marks, M.D., Ph.D., director of the FDA's Center for Biologics Evaluation and Research, contacted Dr. Joyner to ask if Mayo Clinic would be interested in overseeing an Expanded Access Program (EAP) and providing overarching IRB approval. That would mean each participating institution wouldn't need to seek an IRB.

"The FDA didn't have the capacity to handle the flood of compassionate use requests it was receiving and wanted to establish a program at an institution that could coordinate it and gather and analyze data," says Dr. Joyner. "I was in the right place at the right time and got the call. Of course, Mayo Clinic's reputation speaks for itself."



Michael Joyner, M.D.

The approval, the announcement

Dr. Joyner immediately contacted **R. Scott Wright, M.D.** (I '92, CV '96), chair of Mayo Clinic's Institutional Review Board Executive Committee. Dr. Wright spoke with **Gianrico Farrugia, M.D.** (I '91, GI '94), Mayo Clinic president and CEO, who gave the approval to move ahead. The EAP IRB was approved two days later, on April 1.

On April 3, the FDA announced the EAP, led by Mayo Clinic, to fill an urgent need to provide patient access to a medical product (convalescent plasma) of possible benefit. The program to increase access to investigational convalescent plasma and evaluate the safety of this experimental therapy was developed with funding from the Department of Health and Human Services' Biomedical Advanced Research and Development Authority (BARDA).

As a result of his connections, networking and curiosity about medical developments,

Dr. Joyner was placed at the helm of Mayo Clinic's convalescent plasma EAP efforts. Over five months, the program served almost 2,800 hospitals and acute care facilities and 14,000 physicians and — most importantly — more than 80,000 patients who were infused with convalescent plasma.

"I was asked, and I stepped up," says Dr. Joyner. "The Mayo brothers talked about the necessity of union of forces to advance knowledge. I have a duty to get out of my comfort zone and pitch in during a crisis. I know a lot of smart people and have access to resources because of my lab. I activated my internal and external networks, which were a force multiplier."

Mayo Clinic organized and oversaw the program's registry — enrollment and consent, and the national blood banking infrastructure to collect and distribute plasma. ▶



“That we weren’t paralyzed by the difficult circumstances and could focus on moving forward is a testament to the Mayo Clinic values.”

– Michael Joyner, M.D.

The team

In addition to his own lab team and co-workers in Rochester, including research fellow **Jonathon (Jack) Senefeld, Ph.D.** (ANES '19), Dr. Joyner involved colleagues at Mayo Clinic in Florida. **DeLisa Fairweather, Ph.D.** (CV '15), Division of Cardiovascular Disease, an expert in registration and compliance systems, along with research associate **Katelyn Bruno, Ph.D.** (CV '20), and research fellows **Stephen Klassen, Ph.D.** (ANES '20), and **Chad Wiggins, Ph.D.** (ANES '18), helped organize the infrastructure for the EAP to allow site, physician and patient enrollment. **Rickey Carter, Ph.D.** (HSR '09), Department of Health Sciences Research, brought to the team world-class skills in statistics and databases. Approximately 125 Mayo Clinic staff members contributed to the project.

Dr. Joyner says he, like many of the team members, isn't an expert in convalescent plasma or national programs such as this. Rather, his expertise is in broad-based

“Planned enrollment was 5,000 patients. We got
105,000 enrolled.”

— Michael Joyner, M.D.

scientific knowledge. “My preconceived notions about the project were, therefore, limited, which was a plus. I never thought it wasn't possible to accomplish our goal. My lab focuses on the body's response to exercise and hypoxia. Dr. Wright is a cardiologist. Dr. Fairweather is a basic scientist. We approached the problem, discussed a reasonable solution and determined how to make that happen. It was a curiosity-driven, mix-and-match approach to problem-solving on a grand scale. A true union of forces.”

The challenges

Challenges included securing funding, obtaining a supply of plasma, getting participating sites up to speed to generate plasma donations and interacting with the FDA in a compliance-heavy environment. Dr. Joyner worked 170 days in a row, eight to 20 hours a day and fell asleep at his desk more than once. He perked up for frequent 4 a.m. calls from the FDA.

“I've had a well-funded lab for a long time and have been working toward this career since I was 19,” he says. “I've also been an endurance athlete; you just get up and train and attack what's in front of you. All of those experiences prepared me well for this. I know how to reinvigorate people when there are setbacks and challenges. Stay focused on the solution, don't let the frustrations get you down and celebrate the incremental successes.”

Despite the hurdles, all the pieces came together. The first patient enrolled in the





“I’ve had a well-funded lab for a long time and have been working toward this career since I was 19. I’ve also been an endurance athlete; you just get up and train and attack what’s in front of you. All of those experiences prepared me well for this.”

— Michael Joyner, M.D.

EAP on April 3 — the same day it was announced, and the first patient was infused with convalescent plasma through the program on April 7.

“In March, amid all the worldwide fear, confusion and uncertainty about the virus, a diverse, multidisciplinary Mayo Clinic team, partnering with other institutions, worked together to facilitate early intervention and therapy for COVID-19,” says Dr. Joyner. “That we weren’t paralyzed by the difficult circumstances and could focus on moving forward is a testament to the Mayo Clinic values. We had a tremendous team that went all out to make it work. We developed wonderful, lasting alliances and friendships in a pressure cooker environment.”

The evidence

Dr. Joyner describes a banner day in late May when the team started to analyze data from infused patients and realized the treatment seemed to be safe and effective.

In an August report, “Effect of Convalescent Plasma on Hospitalized Patients with COVID-19: Initial Three-Month Experience,” Mayo Clinic concluded that the timing of plasma transfusions in a cohort of 35,322 patients was associated with lower mortality. The cohort included a high proportion of critically ill patients, with 52.3% in the ICU and 27.5% receiving mechanical ventilation at the time of transfusion. In a subset

of 3,082 patients, researchers found lower mortality associated with plasma transfusions that contained higher levels of antibodies against the virus that causes COVID-19.

On Aug. 24, the FDA announced Emergency Use Authorization (EUA) of convalescent plasma, stating that the program determined that convalescent plasma treatment demonstrated improvement in health and mortality rates. Enrollment in the EAP terminated four days later.

“In the course of our work on the EAP, Mayo Clinic and our collaborators observed potential signals of efficacy among a diverse population and chose to share the data,” says Dr. Joyner. “We hope the safety findings and possible efficacy signals inform the body of knowledge about the use of convalescent plasma to modify the course of COVID-19.”

Dr. Joyner says the program is the largest study ever on the safety of convalescent plasma as a therapeutic option. In addition, the EAP was highly successful in enrolling racial and ethnic minority participants and women — groups historically underrepresented in clinical trials. Most of the participating patients were at community-based facilities and in rural locations and otherwise might not have had access to an experimental therapy.

Mayo Clinic is focused on curating and mining the data it has collected — a process Dr. Joyner said will take several years. When is the optimal time to administer the therapy in the course of the disease? What levels of antibodies in convalescent plasma were most therapeutic? Which patients will benefit? In addition to addressing these questions, Mayo is collaborating with other organizations to make next-generation products from convalescent plasma, and conducting trials of monoclonal antibodies — commercially available products similar to convalescent plasma.

Dr. Joyner says he was delighted with the role Mayo Clinic trainees, whose normal lab and clinical duties were reduced due to the pandemic, played in the EAP. “They stepped up. Early on, clinical trainees helped recruit local plasma donors. And our talented Ph.D. trainees brought a lot of problem-solving to the table. While I may be the face of the project, it was definitely a team effort. Being an extrovert, I rallied the team with the advice of Hall of Fame basketball coach John Wooden: ‘Do not let what you cannot do interfere with what you can do.’

“Planned enrollment was 5,000 patients. We got 105,000 enrolled. I think we did it.” •



Antibody testing

Queen of Serology

Elitza Theel, Ph.D.,
finds her voice

“We took the time to identify the best tests available at the time. We didn’t relax Mayo’s exacting standards just because we were in a pandemic.”

– Elitza Theel, Ph.D.

Elitza Theel, Ph.D. (CM '12), Division of Clinical Microbiology and director of the Mayo Clinic Infectious Diseases Serology Laboratory, oversees antibody testing for infectious pathogens at Mayo Clinic and Mayo Clinic Laboratories. In eight years as lab director, she has evaluated 60 to 70 antibody tests. She specializes in vector-borne illnesses. During the 2016 Zika virus outbreak, her lab was one of the first to implement testing for the infection using the Center for Disease Control and Prevention’s (CDC) diagnostic assay — a career highlight. She was working to implement the first diagnostic assay for Powassan virus, an emerging tick-borne virus, when COVID-19 struck.

Dr. Theel remembers when the severity of COVID-19 dawned on her. She was traveling with her family to an infectious disease conference in Hawaii via Seattle during the first week of March.

“We took a lot of precautions, but I think a sense of fear and dread really hit me when I saw my 4-year-old daughter crawl on the floor of the Seattle airport and touch everything within reach,” she says. “Seattle already had a lot of cases at that point. Then three days into the trip, my 7-year-old son developed a fever, and I was convinced he had COVID-19. There was a lot of discussion about the virus at the conference, but neither panic nor pandemic status had set in. When I returned to the lab on March 9, we decided that it was time to start developing and evaluating antibody tests for SARS-CoV-2. While I didn’t anticipate this sort of testing being used as a diagnostic — we do not typically diagnose respiratory viral infections with antibody tests — we correctly predicted that antibody testing could play other roles, such as identifying past infection for prevalence studies and identifying donors for convalescent plasma therapy.” ▶



More than
200
different antibody tests
developed worldwide —
a record for an
infectious disease

260k
COVID-19 antibody
tests performed in nine
months in Mayo Clinic
Laboratories

Sample acquisition, test evaluation

The first challenge in evaluating antibody tests, which detect the immune response to the virus, was sample acquisition.

“Without true positives, you can’t evaluate how well a test performs. In early March, we didn’t yet have a lot of COVID-19 patients at Mayo,” says Dr. Theel. “Everyone involved, including Mayo leaders at all levels throughout the enterprise, scurried to contact colleagues around the country in search of serum samples from patients with confirmed SARS-CoV-2 infection. Everyone was incredibly collegial and willing to share samples. It took us only a couple of weeks to get what we needed.”

As soon as word of the emerging virus spread across the world, companies began developing antibody tests, including companies that had never before made an antibody test. In short order, the global market was flooded with more than 200 tests — a record for an infectious disease.

Dr. Theel’s lab logged long hours over the next four weeks to evaluate all available serologic assays to select the best one

to implement for clinical use. Over the next four months, her laboratory assessed more than 15 antibody assays from commercial manufacturers — some with emergency use authorization (EUA) from the Food and Drug Administration (FDA) and some without. Performance ranged from excellent to abysmal, bringing to the forefront the importance of rigorous test evaluation before implementation in the clinical laboratory, according to Dr. Theel. “There was great variability in test accuracy. Unfortunately, there were multiple stories of labs purchasing antibody tests without first rigorously evaluating them, and losing a lot of money on inadequate tests. We took the time to identify the best tests available at the time. We didn’t relax Mayo’s exacting standards just because we were in a pandemic.”

First of thousands

Mayo Clinic Laboratories was the first clinical reference lab in the U.S. to offer commercial antibody testing — initially two tests without FDA EUA. That changed when the FDA reversed course and required EUA for COVID-19 antibody



Elitza Theel, Ph.D., worked day and night to allow Mayo Clinic to offer high-quality commercial antibody testing. Her two young children spent 10 weeks with their grandparents, who oversaw their online schooling so Dr. Theel could focus on her work.

tests. Mayo now offers one antibody test for Mayo Clinic Laboratories and a different test for the internal practice, both with FDA EUA and equivalent performance characteristics. Each is based on a different SARS-CoV-2 protein.

“Both the FDA and CDC advised of the possible necessity of testing samples by one test followed by another test if the first was positive, in an effort to minimize false positive results. That was one reason we chose to maintain two tests,” says Dr. Theel. “All Mayo Clinic Health System locations have Roche instrumentation, so we decided to use the Roche test internally to maintain standardization across locations. The commercial test we offer is the Ortho Clinic Diagnostics assay.”

Dr. Theel cites April 6, the day Mayo’s first antibody test for COVID-19 went live, as a good day. “Our tremendous efforts to validate a test under the very tight time line paid off,” she says. Nine months later, Mayo Clinic Laboratories had performed more than 260,000 COVID-19 antibody tests across the internal practice and reference

laboratory. While this number is lower than the millions of diagnostic tests performed for COVID-19 to date, the information that antibody tests provide is different and, importantly, not diagnostic — the focus for this pandemic has really been on those diagnostic tests. The role of antibody testing will likely evolve, especially once vaccines are available.”

In the spotlight

Dispelling misconceptions and dampening early excitement about antibody testing became a priority. “We educated the public about antibody testing and reeled in the expectations that being antibody-positive meant you were protected against reinfection. Although we anticipate that antibodies will provide some level of immunity, we didn’t know how protective they would be or how long that would last. At one point, I was doing four to six national media interviews per day. Never in my wildest dreams did I imagine there would be so much interest in antibody testing about anything. My friends actually started calling me the Queen of Serology as a result of all the media attention.” ▶



“We always talk about teamwork, but we’ve never been put through the wringer or tested to the degree we were in this situation.”

– Elitza Theel, Ph.D.

In addition to evaluating COVID-19 antibody tests for testing of serum samples, Dr. Theel and her team, alongside **Dietrich Matern, M.D., Ph.D.** (LABM ’99), and his team in Mayo’s Biochemical Genetics Laboratory, developed an antibody test that can be used with dried blood spots. This test was applied in the Mayo Clinic employee COVID-19 screening project. Rather than use venipuncture, the testing process used a finger prick and filter paper to check for the presence of antibodies. Drs. Theel and Matern continue their work to identify an optimized version of this test, in part, to meet demand from universities and companies that want to determine seroprevalence.

Dr. Theel says she’s optimistic about the next six to 12 months, predicting a lot of good news — including therapeutic options and vaccines. And those kids of hers who crawled on the airport floor and

developed a fever? She sent them away to her parents’ home in Indiana for 10 weeks in the spring.

“I couldn’t do their online school and work 12 to 14 hours a day,” she says. “I worked from 7 a.m. to 7 p.m., ate dinner and then answered emails until midnight some nights. I even had to post an away message because I was inundated and replies were significantly delayed. Ultimately, I realized that I couldn’t do it all and, as my mother told me, I didn’t have to. The kids had an amazing time with their grandparents. One day, I hope they’ll understand the choice we had to make. I hope they’ll be proud of me and inspired to make a difference in whatever field they end up in.”

Silver linings

Dr. Theel emphasizes that this wasn’t a one-woman show. “It has been the most successful team effort I have ever been part of. Everyone on our Infectious

“We educated the public about antibody testing and reeled in the expectations that being antibody-positive meant you were protected against reinfection.”

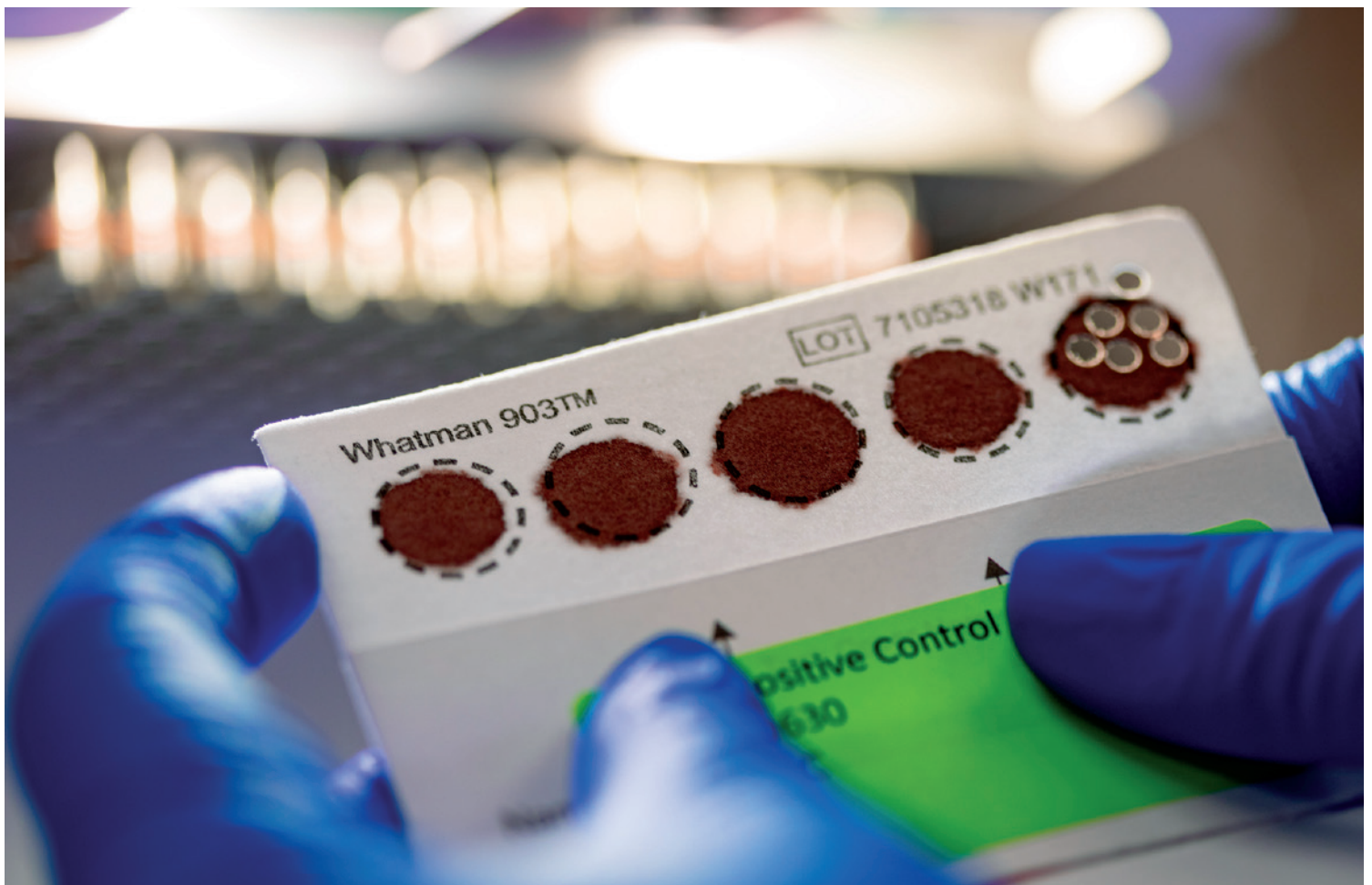
— Elitza Theel, Ph.D.

Diseases Serology team and everyone who was pulled in from other labs sacrificed, and our efforts have been appreciated by the organization. Mayo leadership has been nothing but supportive. We always talk about teamwork, but we’ve never been put through the wringer or tested to the degree we were in this situation. This experience has made it very clear that we have the right people in the right positions. The cross-lab relationships that we built with people that we probably wouldn’t have had the opportunity to work with in a non-COVID-19 environment are priceless.”

Another silver lining in the pandemic is that Dr. Theel says she grew personally and professionally. “I’m fairly early in my career and not someone who has typically been outspoken or even interacted with top leadership at Mayo — I never really had a reason to. This pandemic pushed me out of my comfort zone and into the spotlight due to my position and expertise. There were definitely moments when I wondered if I would succeed and meet expectations. But I quickly learned to speak up and express myself in a way to ensure that we were providing the best advice and pursuing the best target. Ultimately, I found my voice.” •

Opposite: Elitza Theel, Ph.D., in her lab with team members Bethany Nandy, Marisa Sorenson and Joel Christenson.

Below: Elitza Theel, Ph.D., and colleagues developed an antibody test that can be used with dried blood spots.





Neutralizing antibody test

John Mills, Ph.D., goes back to his roots

At 11 p.m. on a Saturday in late March 2020, **John Mills, Ph.D.** (CLCH '15, CMG '17), co-director of the Neuroimmunology Laboratory at Mayo Clinic, went to the Advanced Diagnostics Laboratory in Discovery Square in downtown Rochester. "The parking lot was empty, and I didn't see a single person on the streets," he says. "It was surreal. The building was dark, and I was alone in the lab, masked, wearing a face shield and manipulating virus. Everything was dead, but the virus was live."



Dr. Mills doesn't normally perform testing in his lab, but these weren't normal times. His team was working 24 hours a day, seven days a week, to develop a COVID-19 neutralizing antibody test. To give his team members a break and keep experiments running around the clock, he worked some of the late shifts.

"Neutralizing antibody assays are manually intensive and require certain steps at precise times," says Dr. Mills. "A clinical lab director doesn't usually perform experiments, but it was all hands on deck."

This lab director also doesn't usually work on emerging viruses. Dr. Mills' lab focuses on antibody tests for autoimmune neurological disorders. He was tapped for this project due to his technical experience with live cell bio-assays.

"We were excited to be tasked with this project, in part, because there was

no testing like it in the U.S. at the time, making it intriguing," says Dr. Mills. "I enjoy a challenge."

A challenge indeed. It typically takes a year to develop, validate and offer a new test such as the one Dr. Mills' lab brought to Mayo. His team did it in less than two months.

To offer one of the first neutralizing antibody assays in North America, Mayo Clinic worked closely with Vyriad, a clinical-stage company that develops virus-based therapeutics. Vyriad's founders include Mayo Clinic's **Stephen Russell, M.D., Ph.D.** (MMED '98), the Richard O. Jacobson Professor of Molecular Medicine; and **Kah Whye Peng, Ph.D.** (MMED '02) — both in the Department of Molecular Medicine. Their expertise in engineering recombinant viruses was priceless in producing the pseudovirus for the assay. ▶

It typically takes a year to develop, validate and offer a new test such as the one Dr. Mills' lab brought to Mayo. His team did it in less than two months.

The gold standard

The initial plan for Mayo's neutralizing antibody test was to support the Food and Drug Administration's Convalescent Plasma Expanded Access Program (EAP) that Mayo Clinic oversaw (page 22) — to determine the efficacy of convalescent plasma treatment. After people with COVID-19 around the country donated plasma that was used to treat patients in the program, Mayo's test evaluated whether those who received convalescent plasma with higher titers of neutralizing antibodies had better outcomes than those who received lower titers.

"We were under intense pressure to support the convalescent plasma EAP as soon as our test was validated," says Dr. Mills. "Before becoming involved in the EAP, we had tested hundreds of samples over a month. Then, we were asked to test 1,000 samples in a month, then 5,000 samples in three weeks, then 10,000 samples in two weeks. Our assay wasn't built to hold up to that stress. It was a crazy time, trying and wanting to meet all of the government's expectations. I'd never experienced such

a high pressure situation in my career. Most people would describe me as calm. I didn't feel that way on the inside."

A less immediate role for the assay is in vaccine clinical trials — to determine if vaccines elicit an immune response that could prevent the virus from attaching to cells. This type of test is the gold standard for determining a vaccine's efficacy. Several companies involved in vaccine trials send participants' samples to Mayo Clinic for analysis.

"Our team went above and beyond my expectations to support an important national program and vaccine research. We breathed a collective sigh of relief when we tested the last of the EAP samples."

— John Mills, Ph.D.





Stephen Russell, M.D., Ph.D., and Kah Whye Peng, Ph.D., collaborated with Mayo Clinic via Vyriad, a company they co-founded.

Eyes on the future

Dr. Mills attributes the success of supporting the EAP to those who dedicated themselves to the project, including Mayo's Neuroimmunology Laboratory, Advanced Diagnostics Laboratory and Infectious Diseases Serology Laboratory (page 29). "Everyone was motivated to make it succeed and sacrificed for the project," he says. "I think our team saw my sense of urgency and dedication to the assay and wanted to go out on a limb for me. Knowing this was an institutional priority gave them energy and passion. Our team went above and beyond my expectations to support an important national program and vaccine research. We breathed a collective sigh of relief when we tested the last of the EAP samples."

Now, with several other neutralizing antibody tests on the market, Dr. Mills' team is working on a new, more robust version of Mayo's test in collaboration with Vyriad. The hope is that the revamped assay will require fewer manual interventions and be more automated, allowing greater testing

capacity and improved performance to help meet the demand to test more than 1 million samples being collected as part of ongoing vaccine trials.

Playing a hands-on role in the lab brought Dr. Mills back to his roots. "Going in late at night to do assays is something I did as a fellow at Mayo Clinic," he says. "I come from a scientific background, but I don't actually get to do the science myself anymore. I felt that old scientific curiosity boil up to the surface. It felt good to know I still have the passion to put on a lab coat — and a face shield, in this case — and do the bench work that drives science."

As a result of the EAP, Mayo Clinic is now moving toward building a critical biorepository of more than 10,000 samples from convalescent plasma donors. Dr. Mills says those samples will come in handy for accelerating future test development and research — now and in future pandemics. As will his passion to do science. •

Tested
1k
samples in one month

then
5k
samples in three weeks

then
10k
samples in two weeks



Medical school education

‘Necessity is the mother of invention’

Mayo Clinic Alix School of Medicine faculty and administrators got word in mid-March 2020 that they’d need to transition curriculum from face-to-face to virtual in a matter of days and temporarily remove all medical students from the clinical environment. Leaders also needed to locate and facilitate the safe return of students who were traveling for selectives throughout the U.S. and abroad in the midst of pandemic-related travel bans.

How challenging is it to change a ship’s course in three days? With close cooperation between the education and practice shields and an adaptable student body aware of Mayo’s commitment to keep them and patients safe, not so difficult.

“Despite constraints imposed by the pandemic, we’re committed to ensuring that our students receive all of the necessary experiences to prepare them for residency, and we’re responsible for helping keep them safe,” says **Darcy**

Reed, M.D. (MED ’00, I ’03), senior associate dean of Academic Affairs, Mayo Clinic Alix School of Medicine. “We’ve never lost sight of these priorities. Necessity is the mother of invention — we had no choice but to figure out how to adapt. Our success is a testament to the teamwork and collegiality for which Mayo Clinic is so well known.”

Swap this for that

Various schools in the Mayo Clinic College of Medicine and Science were already familiar with online learning. The pandemic hastened and amplified its use. The medical school went entirely online for two months — from the end of March through the end of May. All in-clinic experiences for medical students were postponed.

Medical school staff and faculty had to transition teaching to a virtual format. Simultaneously, they focused on

determining which courses and electives best lent themselves to virtual instruction, moving to the downtime period the courses that could be taught virtually and freeing up time later for in-clinic experiences. Faculty changed the order of courses to deliver virtual classroom-friendly material during the two months that students were not in clinic.

Numerous faculty members stepped up to help create new virtual courses that had not been taught remotely, such as clinical pharmacology and electrocardiogram interpretation. “We’re incredibly grateful to the faculty who went above and beyond to ensure our students continued to have a robust, meaningful curriculum,” says Dr. Reed.

To sustain essential clinical experiences, clerkship directors across the three Mayo Clinic Alix School of Medicine campuses created hybrid clerkships in which students participated in virtual learning

for one-third of the clerkship, followed by traditional clinical experiences for the remaining two-thirds of the time. For example, students spent two weeks studying obstetrics and gynecology online and then transitioned to the practice for four weeks of in-person labor and delivery, clinic and surgery experiences.

“We worked hard to retain as much of the in-person clinical experiences as possible,” says Dr. Reed. The hybrid clerkships allowed the school to avoid delays in training and preserved the valued in-person clinical learning.

Fourth-year students had already completed most of their core clinical experiences when the pandemic struck. Remaining clinical electives were transitioned online, and students in the class of 2020 graduated on time. Both Match Day and graduation ceremonies were virtual.

The pandemic also disrupted high-stakes standardized examinations for students across the country, including unanticipated closure of testing centers and examination cancellations. To address this, Mayo Clinic Alix School of Medicine arranged for students to take Step 1 and Step 2 Clinical Skills United States Medical Licensing Examinations and subject exams (shelf exams) from the National Board of Medical Examiners on the Rochester campus.

In the fall, residency interviews across the country shifted to virtual. Instead of traditional in-person campus tours and dinners with residents, fourth-year students engaged with programs entirely online. The medical school’s Student Affairs team trained fourth-year students for online interviews.

Dr. Reed says regular, open communication led by Senior Associate Dean for Student Affairs **Alexandra Wolanskyj-Spinner, M.D.** (I ’95, HEMO ’98), has been important to keep students informed about the rapidly changing situation. This includes a weekly newsletter and interactive town halls focused on curriculum and policy updates, COVID-19 and wellness.

“We are grateful that our students have been able to complete their clinical rotations and subinternships in person and progress on time, with no gaps in their education.”

– Darcy Reed, M.D.

Return to clinic

June 1 was a big day: students were allowed back in the clinic across all Mayo locations, with Mayo Clinic safety protocols in place. According to Dr. Reed, this happened faster than at many other medical schools. “We worked closely with the clinical practice to ensure students could re-enter the clinic safely.

“We are grateful that our students have been able to complete their clinical rotations and subinternships in person and progress on time, with no gaps in their education.”

Courses that were previously held in classrooms or lecture halls remain virtual, including clinical anatomy (page 40). Students have resumed training in the Multidisciplinary Simulation Center to the degree possible with pandemic restrictions.

“Everyone is eager for a return to a face-to-face environment — that’s where the joy of teaching and learning is,” says Dr. Reed. “But for the time being, we need to continue in a virtual model. Despite the upheaval, our students have progressed admirably and, together, we’re rapidly learning how to effectively teach and learn in our virtual curriculum. Once the pandemic has passed, I have no doubt we’ll continue to use virtual learning strategies that increase flexibility for students and faculty.”

To those who bemoan any deviations from traditional medical education as objectionable, Dr. Reed points out the unpredictability inherent in the profession. “Medicine is uncertain and can be uncomfortable at times. That includes having to wear personal protective equipment, socially distance and learn in a virtual format. Our students have the unique opportunity to experience firsthand the Mayo Clinic values in action. These students have demonstrated adaptability, flexibility, grace and extraordinary professionalism in working through change in an unprecedented time. Although this is a challenging period in their education, what they’ve learned will undoubtedly strengthen them as they develop into outstanding future physicians.” •



Above: Senior Associate Dean for Student Affairs Alexandra Wolanskyj-Spinner, M.D., keeps students informed through interactive communication.

Opposite: As Senior Associate Dean of Academic Affairs for Mayo Clinic Alix School of Medicine, Darcy Reed, M.D., played a key role in transitioning medical school curriculum from in-person to virtual in just days.

Anatomy education

Leveraging new- world technology

to elevate an old-world subject



Anatomy — especially dissection lab — is said by many to be the cornerstone of medical student education. When you can't have the traditional curriculum in the customary way due to a global pandemic, does the entire structure come tumbling down?

The answer is no.

Implementing 10-year plan today

Before the pandemic, Mayo Clinic's Department of Clinical Anatomy was looking at restructuring its anatomy education as part of Mayo Clinic's 2030 strategic plan.

"We were contemplating how to advance anatomy to the next level by incorporating tools such as 3D models and virtual reality, while reimagining and repurposing dissection as the basis for anatomical study, research and innovation," says **Nirusha Lachman, Ph.D.** (ANAT '07), chair, Department of Clinical Anatomy, Mayo Clinic in Rochester. "When the pandemic hit, our longer term plan suddenly became our immediate plan. We weren't prepared for such a drastic overhaul of tradition, just as our students weren't prepared to embrace the radical transition to a hands-off approach in learning anatomy. They wanted the traditional curriculum and voiced their resistance to anything they perceived to offer less."

Dr. Lachman says that students having watched "The First Patient," an independent documentary about the anatomy curricular experience at Mayo Clinic, and having heard about the transformative experiences of second-

and third-year medical students reinforced that opposition to change.

"The dissection portion of anatomy curriculum has been a mainstay for at least 400 years. Understandably, students felt they were going to miss out on an experience everyone else had — an experience they believed was their rite of passage and now another casualty of the pandemic. The students' voices echoed our own. However, limited laboratory space, increase in student numbers due to

"It was clear that 2020 would not offer a traditional anatomy experience. Instead, 2020 would offer a remote, technologically enhanced experience that combined synchronous and asynchronous learning opportunities within an authentic anatomy curriculum."

— Nirusha Lachman, Ph.D.

new programs in the Mayo Clinic College of Medicine and Science, and other factors made it impossible to function within a traditional curriculum while maintaining pandemic restrictions. It was clear that 2020 would not offer a traditional anatomy experience. Instead, 2020 would offer a remote, technologically enhanced experience that combined synchronous and asynchronous learning opportunities within an authentic anatomy curriculum."

Revamping the curriculum was no small feat. Dr. Lachman, her teaching faculty and physician partners went back to the drawing board and reimagined the approach to teaching a classically designed subject.

"Our knowledge and understanding of anatomy is limited only by the tools that limit its discovery," says Dr. Lachman. "In a world increasingly driven by technology, bringing an old-world subject into a new-world platform requires a challenge ▶

Nuts & bolts

Anatomy curriculum retained all of the basic, familiar elements, with only a delay in the timing of the dissection experience. High-quality, high-definition video technology was key to providing maximum value from dissection.

Components of the new curriculum included:

- Didactic material presented via Zoom and Blackboard, a virtual learning environment; recorded for student reference.
- Radiology instruction conducted virtually, with faculty sharing screens to discuss clinical cases. Students presented simulated telemedicine consultations supported by anatomy and radiology.
- Hands-on ultrasound instruction involved trios of students working with a teaching assistant — all in personal protective equipment (PPE) and with physical distancing.
- Dissection livestreamed with anatomy and embryology discussion; recorded for student reference.
- Student participation in optional anatomy lab rotations to review tagged structures and discuss with teaching assistants and faculty.
- Focus on nontechnical skills activities and assessments.
- Focus on patient-centered learning.
- The restructured anatomy curriculum also applied to Mayo Clinic School of Health Sciences students in physical therapy, physician assistant and surgical first assistant programs.

of traditional thinking about teaching anatomy, relinquishment of comfort zones, and shift in paradigm about what worked and what could work even better.

“As teachers of clinical anatomy, our ultimate goal is to offer anatomy for everyday practice in a curriculum that combines technical and nontechnical competencies to enhance patient care. The pandemic prompted us to leverage existing technologies, partner with clinical experts, capture enhanced anatomical data from Mayo Clinic body donors and offer our students a point of view of anatomy yet to reach the market.”

Robert Morreale, chair, Division of Biomedical and Scientific Visualization, Department of Education Administration, says Mayo Clinic is fortunate to have deep experience in clinical anatomy and anatomy education. Dr. Lachman has 30 years of experience in clinical anatomy, including associate editor of *Clinical Anatomy Journal*; current associate editor of *Anatomical Sciences Education Journal*; and a fellowship with Robert Aclands, M.B.B.S., author of “Acland’s Video Atlas of

Human Anatomy.” Her colleague **Wojciech Pawlina, M.D.** (ANAT ’99), is a former assistant dean for Mayo Clinic Alix School of Medicine’s Curriculum Development and Innovation; co-author of “Histology: A Text and Atlas, with Correlated Cell and Molecular Biology”; and editor-in-chief of *Anatomical Sciences Education*. **Sebastian Cotofana, M.D., Ph.D.** (ANAT ’20), is a trauma surgeon with doctoral research degrees in anatomy and microanatomy, a leading researcher in facial anatomy and expert in virtual teaching platforms.

Virtually succeeding

The resulting new curriculum was primarily remote. Dr. Lachman points out that remote doesn’t necessarily mean impersonal. “Of course, due to COVID-19 restrictions, face-to-face interaction between learners and instructors was limited, but we found ways to maintain personal connectivity. In addition to online instruction, we had regular Zoom meetings to touch base and reflect on their experiences in the course. We dedicated time to discuss ethics and humanity in learning from our donors and reflect on professional identity formation.

“That said, it appears that the lack of face-to-face interaction didn’t affect overall performance in the course. Compared to the past traditional curriculum, students in this course scored 2 to 3 percentage points higher on the final exams. In other words, the structure didn’t tumble to the ground with the alteration in its foundation. We are encouraged by the evidence that anatomy can be effectively learned through a remote and virtual platform. We will examine student feedback and other data to determine how we will continue to offer anatomy education at Mayo Clinic. We intend to share our findings with other medical schools.”

Seeing anatomy in new ways

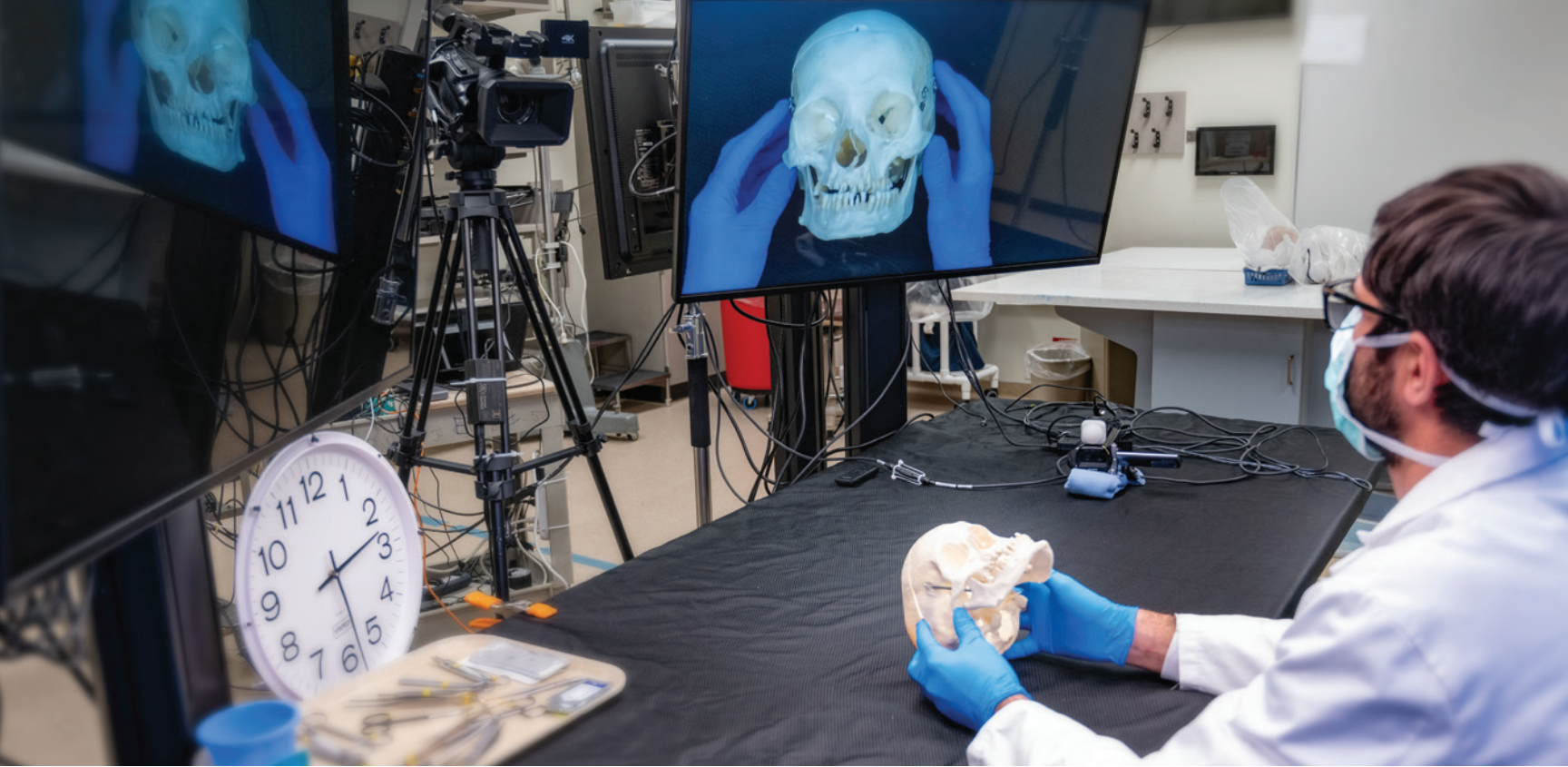
And just how was cadaveric anatomy using dissection taught in the remote platform?

The restructured curriculum did not include student dissection of cadavers. Rather, high-quality dissection was performed daily by faculty members and livestreamed for students in interactive, synchronous remote sessions. Students reviewed donors’ CT scans and medical histories to enhance learning.



Left: Nirusha Lachman, Ph.D.

Opposite: Sebastian Cotofana, M.D., Ph.D., demonstrates anatomy of the facial skeleton to build on understanding of the soft tissue layers.



The Department of Radiology and Division of Ultrasonography led the curriculum related to learning anatomy through medical technologies. Live transmissions of anatomical demonstrations were recorded for students to review as many times as needed. Data was captured using high-definition photography and videography, with multiple overhead, handheld, 3D and endoscopic cameras in a makeshift recording studio in the anatomy lab.

The cadaver experience wasn't lost to students. In groups of four and following COVID-19 restrictions, students had access to prosected material in the anatomy lab. Students who wish to participate in hands-on dissection can register for a weeklong, team-based course during selectives — one- to two-week blocks during which students choose areas to focus on for professional and personal exploration. In their fourth-year, students can opt for electives in more specialized areas of anatomical study.

Dr. Lachman says the pandemic-necessitated curriculum redo wouldn't have been possible without Mayo's multidisciplinary team approach. "Our talented colleagues were eager to jump in and make sure we didn't miss a step in the critical education of our medical students.

"Our outstanding surgeons and physicians joined in the virtual classroom and live lab transmissions to offer clinical input and add to teaching discussions. Despite their restricted schedules, clinicians helped ensure that the anatomy curriculum remained vibrant. They also created short recordings of cases, highlighting relevant anatomy. As a result, students saw anatomy in ways they wouldn't have otherwise."

Will future anatomy curriculum for Mayo medical students follow this structure? Dr. Lachman says her team is excited to maintain elements of the new curriculum that proved to be more effective and impactful than what is included in the traditional curriculum. "While dissection will hold its position as a gold standard for anatomical discovery, the opportunities to learn anatomy transcend a singular approach.

"Mayo's President and CEO **Gianrico Farrugia, M.D.** (I '91, GI '94), always says, 'The time to evolve is now — the train has already left the station.' Having to respond to the pandemic and revise curriculum allowed us to create something we could have only imagined — leveraging new-world technology to elevate an old-world subject." •

"We are encouraged by the evidence that anatomy can be effectively learned through a remote and virtual platform."

— Nirusha Lachman, Ph.D.



On the shoulders of
giants

'I want to do what he does.'

When **Essa Mohamed, Ph.D.** (BMS '18, CTSA '18), heard **Lewis Roberts, M.B., Ch.B., Ph.D.** (I '95, GI '98), Mayo Clinic Division of Gastroenterology and Hepatology and the Peter and Frances Georgeson Professor of Gastroenterology Cancer Research, speak about liver cancer and hepatitis in the Somali population at a community meeting in 2011, he wanted to work with him. Three of Dr. Mohamed's grandparents have had liver disease, which disproportionately affects Africans and Asians.

"I was doing research in a lab at Mayo Clinic but hungered to work with disease populations in a way that impacts people's lives," says Dr. Mohamed, who is from Somalia but grew up in Rochester, Minnesota.

Fast forward to Dr. Mohamed volunteering in Dr. Roberts' lab and then choosing him for his mentor during his Ph.D. program in the Mayo Clinic Graduate School of Biomedical Sciences clinical and translational science track. Dr. Roberts connected Dr. Mohamed with resources, helped him build networks of researchers around the world, introduced him to contacts at the Centers for Disease Control and Prevention (CDC), and encouraged him to write grants.

Dr. Mohamed collaborated with Dr. Roberts on research that explores the higher incidence of liver disease among African (i.e., Somali, Ethiopian, Liberian and Kenyan) and Asian (i.e., Hmong, Cambodian, Vietnamese and Laotian) immigrant populations in Minnesota. With Dr. Roberts' help, Dr. Mohamed built a consortium of 21 clinics and hospitals in nine African countries for a research study that collected and analyzed data from more than 2,500 liver cancer patients.

Dr. Mohamed is now a postdoctoral fellow in the Mayo Clinic Department of Cardiovascular Medicine and funded through a National Institutes of Health T32 training grant in lung physiology and biomedical engineering. He says Dr. Roberts has been an ideal mentor. But that's not the full picture.

"He tries to make sure the people around him are healthy and well. I now know that no matter where I am or what I need, he's there for me."

— Essa Mohamed, Ph.D.

In 2016, Dr. Mohamed experienced several traumatic incidents — an uncle died, and a cousin and a fellow Mayo Clinic trainee died by suicide.

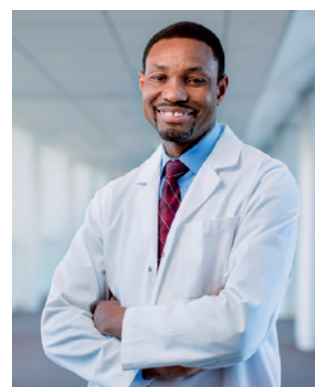
"I'm normally happy, energetic and outgoing, but I withdrew," says Dr. Mohamed. "It didn't affect my work, but it certainly affected my demeanor."

Dr. Roberts noticed.

"He asked me to meet several times, and I put him off," says Dr. Mohamed. "One day we were face to face, and he insisted on talking. I've always been the person who helps and comforts others, so it was hard to let myself be vulnerable. I was in denial about how those deaths affected me. Over several meetings, I opened up to Dr. Roberts, who made me realize it's OK to get help when bad things happen. I got therapy and gradually felt lighter and less gloomy."

"It would be easy for an academic mentor to not address what you're going through personally. Dr. Roberts isn't that person. He tries to make sure the people around him are healthy and well. I now know that no matter where I am or what I need, he's there for me. He feels like family. A true mentor cares about you holistically and builds you up academically and personally. I aspire to be that mentor for others."

As Dr. Mohamed prepares for a career in academic medicine, he wants to become a mentor, advocate and clinician-scientist like Dr. Roberts. "I want to be able to do what Dr. Roberts does," he says. •



Top: Essa Mohamed, Ph.D.
Bottom: Lewis Roberts, M.B., Ch.B., Ph.D.

Opposite: Essa Mohamed, Ph.D. (right), says Lewis Roberts, M.B., Ch.B., Ph.D. (left), feels like family. "A true mentor cares about you holistically and builds you up academically and personally."

Mayo Clinic Update

We wanted to bring you robust coverage of pandemic-related happenings at Mayo Clinic, which means we didn't have space for news items in this issue.

Visit alumniassociation.mayo.edu and newsnetwork.mayoclinic.org for news about Mayo Clinic alumni and Mayo Clinic.



Obituaries

David Ahlquist, M.D. (MED '77, I '80, GI '83), died Nov. 1, 2020.

William Battaile, M.D. (PATH '59), died Dec. 18, 2019.

Robert Beckenbaugh, M.D. (OR '71), died April 24, 2020.

Leo Black, M.D. (I '65), died Oct. 19, 2020.

James Brownfield, M.D. (OPH '70), died Feb. 8, 2018.

Robert Burns, M.D. (OR '61), died Aug. 6, 2019.

Mariano Caceres, M.D. (S '69), died April 30, 2020.

Kenneth Cichosz, M.D. (ANES '65), died April 30, 2020.

Bernard Clowdus, M.D. (S '55, I '61), died March 11, 2020.

Jack Cohen, M.D. (PLS '66)

Ean Crennell, M.D. (ANES '61), died Feb. 15, 2020.

Timothy Dalton, M.D. (S '59, ANES '61), died Jan. 25, 2020.

William Daniel, M.D. (S '87), died Aug. 13, 2020.

Leroy Dart Jr., M.D. (NS '67), died Dec. 21, 2020.

Jasper Daube, M.D. (NPHY '70), died April 18, 2020.

Guy Dewees III, M.D. (I '68, RHEU '69), died Oct. 13, 2019.

Lane Dickinson, M.D. (I '56), died June 17, 2019.

William Dunlop, M.D. (S '56), died March 28, 2019.

Jay Ellison, M.D., Ph.D. (MGEN '01), died June 19, 2019.

Richard Emslander, M.D. (I '62), died Dec. 10, 2020.

George Facer, M.D. (ENT '68), died Sept. 24, 2020.

Charles Farmer, M.D. (I '64, NEPH '65), died April 29, 2019.

Hubert Frohmuller, M.D. (U '63), died Oct. 5, 2018. *Dr. Frohmuller of Würzburg, Germany, received the Mayo Clinic Distinguished Alumni Award in 2006.*

James Gay, M.D. (SGPA '84), died March 2, 2016.

John (Toby) Glass, M.D. (PMR '76), died Dec. 19, 2019.

Bernard Gottlieb, M.D. (DERM '63), died July 25, 2020.

Donald (Ross) Halliday, M.D. (OR '64), died July 31, 2017.

Norman Hill, M.D. (NS '58), died Jan. 18, 2020.

Otis Houser, M.D. (RD '68), died April 15, 2020.

David Ingram, M.D. (I '61), died March 6, 2020.

William Johnson, M.D. (I '57), died Aug. 16, 2020.

H. Royden Jones Jr., M.D. (N '72), died June 4, 2013.

Ryo Katori, M.D. (PHYS '68), died Jan. 5, 2015.

Arthur Kirchner, M.D. (I '69, RADO '71), died Jan. 3, 2019.

John Kuglitsch, M.D. (I '72, GIM '73), died Nov. 1, 2020.

S. Kim Kwang, M.D. (BIOC '64), died July 30, 2019.

Donald Layton, M.D. (N '61), died March 8, 2020.

Phil Manning, M.D. (I '54), died Oct. 10, 2019.

Benjamin McCallister, M.D. (I '65), died May 13, 2012.

Benjamin Medley, M.D. (S '70, RD '76), died Jan. 16, 2003.

John Mielke, M.D. (I '63, NEPH '65), died Nov. 4, 2020.

George Morrow Jr., M.D. (I '57), died May 5, 2020.

Gerald Mullin Jr., M.D. (I '62), died Dec. 13, 2019.

Donald Norris, M.D. (PD '71, PDOL '73, PDHE '74), died April 26, 2020.

Samuel Obetz, M.D. (I '64, P '67, CAP '68), died Sept. 25, 2020.

Philip (Jack) Osmundson, M.D. (I '59), died Sept. 19, 2020.

Joseph Parker Jr., M.D. (PATH '68), died May 3, 2019.

Eugene Parr, M.D. (OR '60), died Nov. 19, 2019.

Sidney Phillips, M.D. (PHYS '65, I '66), died Nov. 9, 2019.

Charles Porretta, M.D. (S '53, OR '57), died Nov. 7, 2020.

William Prickman, M.D. (OPH '63), died March 14, 2020.

Hugh Raphael, M.D. (S '65), died Jan. 7, 2020.

Charles Reed, M.D. (AIM '78), died July 24, 2020.

Paul Richter, M.D. (RD '61), died Dec. 24, 2019.

Richard Robb, Ph.D. (PHYS '73), died Aug. 29, 2020.

William Sanders Sr., M.D. (P '69), died Aug. 24, 2019.

Gilbert Santoscoy, M.D. (S '69), died Jan. 26, 2020.

Thomas Sell, M.D. (I '80), died Dec. 9, 2019.

Alan Sessler, M.D. (ANES '62), died March 18, 2020.

James Simmons, M.D. (N '58), died Sept. 7, 2019.

Rungson Sittipong, M.D. (ANES '72), died Aug. 21, 2020.

Johannes Slooff, M.D. (APATH '61), died Sept. 4, 2020.

Meredith Smith, M.D. (S '57), died Oct. 14, 2019.

John Spalding, M.D. (I '61), died Feb. 13, 2020.

Ananta Srikumpol, M.D. (EEG '72), died Aug. 6, 2019.

Deloran Thurber, M.D. (I '60), died Nov. 25, 2020.

Lloyd Wood, M.D. (PMR '66), died Oct. 29, 2020.

Charles Wright Jr., M.D. (OR '67), died Aug. 11, 2020.

Robert Wright, M.D. (RD '64), died April 28, 2020.

Donald Young, M.D. (CBCH '77), died July 4, 2020.

William Zeller, M.D. (I '49, P '52), died Sept. 19, 2019.

Alumni Center

507-284-2317

mayoalumni@mayo.edu

alumniassociation.mayo.edu

Alumni meetings & receptions

alumniassociation.mayo.edu

Alumni philanthropy

Doctors Mayo Society

800-297-1185 | 507-284-9101

doctorsmayosociety@mayo.edu

Physician referral

Arizona 866-629-6362

Florida 800-634-1417

Rochester 800-533-1564

mayoclinic.org/medicalprofs

Education verification

Mayo Clinic College of Medicine

Student Services

507-538-7129

Fax 507-538-0771

msgmeverification@mayo.edu

Patient transportation

Mayo Clinic MedAir

Mayo One

800-237-6822

mayomedicaltransport.com

Feeling out of touch with the Alumni Association?

Make sure we have your email address.

If you've registered your profile on the Alumni Association website, you can check and update your contact information: alumniassociation.mayo.edu

If you don't yet have an online profile, email mayoalumni@mayo.edu or call 507-284-2317 to update your contact information.

About the magazine

Mayo Clinic Alumni magazine is published quarterly and mailed free of charge to physicians, scientists and medical educators who studied and/or trained at Mayo Clinic, and to Mayo consulting staff. The magazine reports on Mayo Clinic alumni, staff and students, and informs readers about newsworthy activities at Mayo Clinic.

Please send correspondence and address changes to:

Mayo Clinic Alumni Center

Siebens 5-33, Mayo Clinic

200 First Street SW

Rochester, MN 55905

mayoalumni@mayo.edu

507-284-2317

Fax 507-538-7442

Executive Editor

Judith D. Anderson

Managing Editor

Melissa Abrams Caulfield

About the cover

This issue of Mayo Clinic Alumni explores ways in which Mayo Clinic touched patients and their families, physicians and scientists at other institutions around the world, government agencies and more during the first months of the pandemic.



Cover illustration by Federico Gastaldi

Mayo Clinic Alumni Association Officers

Carl Backer, M.D.

Winnetka, Illinois
President

Burkhard Wipperman, M.D.

Hildesheim, Germany
Vice President

Eric Edell, M.D.

Rochester, Minnesota
Past President

Theresa Emory, M.D.

Williamsburg, Virginia
President Elect

M. Molly McMahon, M.D.

Rochester, Minnesota
Secretary-Treasurer

Judith D. Anderson

Rochester, Minnesota
Director, Alumni Center

Executive Committee

Gerardo Colon-Otero, M.D.

Jacksonville, Florida
Ex Officio

Cody Fisher

Rochester, Minnesota
MCGSBS representative

Mitchell Humphreys, M.D.

Scottsdale, Arizona

Olayemi (Yemi) Sokumbi, M.D.

Jacksonville, Florida

Elizabeth Cozine, M.D.

Rochester, Minnesota

Eddie Greene, M.D.

Rochester, Minnesota

Kent Richter

Scottsdale, Arizona
MCASOM representative

Krishna Vyas, M.D., Ph.D.

Rochester, Minnesota
MCR-MCSGME representative

Dawn Marie Davis, M.D.

Rochester, Minnesota
Ex Officio Medical Director
Alumni Center

Bruce Horazdovsky, Ph.D.

Rochester, Minnesota

Erik St. Louis, M.D.

Rochester, Minnesota

Board of Directors

Amado Baez, M.D.

Augusta, Georgia

M. Sertac Cicek, M.D.

Rochester, Minnesota

Megan Melody, M.D.

Jacksonville, Florida
MCF-MCSGME
representative

Daniel Townsend, M.D.

Boston, Massachusetts

Robert Bratton, M.D.

Lexington, Kentucky

Sean Dinneen, M.D.

Galway, Ireland

Olufunso Odunukan, M.B.B.S.

Atlanta, Georgia

Kajetan von Eckardstein, M.D.

Kaiserslautern, Germany

Melanie Brown, M.D.

Baltimore, Maryland

Erin Gillaspie, M.D.

Nashville, Tennessee

Michael Rock, M.D.

Rochester, Minnesota

Enrique Wolpert, M.D.

Mexico City, Mexico

Molly Carnahan, M.D.

Scottsdale, Arizona
MCA-MCSGME
representative

Kyle Kircher, M.D.

Stillwater, Minnesota

David Skillrud, M.D.

Bloomington, Illinois

Elaine Yacyshyn, M.D.

Edmonton, Alberta, Canada

Daniel Chan, M.D.

Mililani, Hawaii

John Loftus, M.D.

Napa, California

Thomas Smith, M.D.

Littleton, Colorado

New mission statement debuts



The Mayo Clinic Alumni Association has a new mission statement:

Connecting our alumni and bringing Mayo Clinic values to the world.

The process to create a new mission statement originated at a 2018 strategic planning retreat for the Alumni Association Board of Directors. “We think the theme of connecting is more important than ever before, given the pandemic,” says **Carl Backer, M.D.** (MED ’80), president of the Alumni Association.

Several new board members, who hail from Nigeria, Ireland and Colombia, share what the mission statement means to them:

“The mission of the Mayo Clinic Alumni Association has never been clearer to me. It is our responsibility, now more than ever, to stand as leaders in health care, celebrating what connects us as Mayo Clinic alumni, while bringing the Mayo Clinic values that guide us to the world with intentionality and purpose. I am confident that our association will fulfill this timely mission.”

Olayemi (Yemi) Sokumbi, M.D.

(MED ’09, I1 ’10, DERM ’13)

Jacksonville, Florida

“My time in Rochester was and will always be a special time. It was unparalleled in terms of the clinical camaraderie, the sense of shared teaching and learning, and genuine interest in pushing the boundaries of care and inquiry. This sense of being part of something really worthwhile is what brings people to Mayo, and the Alumni Association helps people keep that connection. The connection is reflected well in the mission statement.”

Sean Dinneen, M.D.

(I ’91, ENDO ’94)

Galway, Ireland

“Getting together, based on our education, to show the world the meaning of our institution.”

Patricia Yugueros, M.D.

(PLS ’99, HAND ’00, PRES ’02)

Atlanta, Georgia

Tell us how you embody the Mayo Clinic values in your work: mayoalumni@mayo.edu

Mayo Clinic is committed to creating and sustaining an environment that respects and supports diversity in staff and patient populations.

Mayo Clinic

200 First Street SW
Rochester, MN 55905
[mayoclinic.org](https://www.mayoclinic.org)

©2021 Mayo Foundation for Medical Education and Research.

All rights reserved. MAYO, MAYO CLINIC and the triple shield Mayo logo are trademarks and service marks of MFMER.

alumni

ALUMNI CENTER
Mayo Clinic
200 First Street SW
Rochester, MN 55905

ELECTRONIC SERVICE REQUESTED

FIND MAYO CLINIC



Why not AskMayoExpert?

Hundreds of thousands of times since 2001, Mayo Clinic physicians have looked to AskMayoExpert for answers. Did you know Mayo Clinic alumni can subscribe to this unique online tool?

AskMayoExpert is a compendium of Mayo Clinic-vetted medical knowledge designed for use at the point of care by providers seeking answers to questions outside of their areas of expertise — the 21st century electronic version of what Mayo Clinic has done for 150 years.

“AskMayoExpert represents the agreement of stakeholders across Mayo Clinic on a given topic — Mayo’s consensus about what we believe to be the best practice,” says **John Wilkinson, M.D.** (MED '78, FM '81), a member of the AskMayoExpert Knowledge Management and Delivery Oversight Group.

Medical students, residents and fellows who trained at Mayo Clinic in the last decade are accustomed to routinely consulting AskMayoExpert. Many of those trainees have asked about continued access to AskMayoExpert after they’ve left Mayo Clinic. “They found AskMayoExpert to be indispensable in their practice,” says Dr. Wilkinson, “and we’re happy we can now provide it to our alumni via subscription.”

- Concise, online point-of-care resource
- Available 24/7/365
- Designed and used by Mayo Clinic providers
- Represents the latest Mayo-vetted expertise
- New topics added continually
- Reviewed and updated annually
- 589,189 unique visits in 2020
- 1,940 visits per day on average
- 1,356 topics, including 287 care process models (algorithms)

alumniassociation.mayo.edu/resources/ask-mayo-expert