University of Minnesota medical students Ally Fuher and Zac Novaczyk examine models of the heart in the Visible Heart Lab on the Twin Cities campus.

PHOTO BY RICH RYAN PHOTOGRAPHY
Minnesota’s medical schools use a number of measures to find students who fit their missions—and who are likely to make excellent physicians.

It’s not just about the MCAT

Today’s first-year medical students tend to be different than medical students of previous generations. They’re more female, less white, older and with more varied experiences than was once the case.

Once, medical schools relied almost exclusively on academic success to sort applicants. Today, the task is more complex as they look for students who show that they can not only succeed academically but also relate to patients—and maybe make a difference in the way and the places where medicine is practiced.

The three medical schools in Minnesota use somewhat different methods to determine which applicants to admit, and their student bodies reflect missions that are unique to each school. University of Minnesota Medical School-Duluth, for example, is a leader in training physicians who will work in Native American communities. Mayo Clinic Alix School of Medicine, with a relatively small student body in Rochester, measures factors that may include socioeconomic disadvantage, military service and/or unusual paths into medicine. University of Minnesota Medical School-Twin Cities, with the largest student body, looks for future physicians who will maintain the high quality of health care in Minnesota.
Choosing medical students for admission to the University of Minnesota is a multi-step process

BY Dimple Patel, MS; Jacqueline L. Gauer, MA; and Claudio Violato, PhD

Modern admissions procedures feature varied tools and techniques for evaluating applicants to medical school. The evaluation processes are designed to select the candidates from a large pool of applicants who will be successful students and the best possible doctors. The University of Minnesota Medical School Twin Cities (UMN TC) MD program is continuously reviewing and revising its admissions process to reflect the evolving needs of Minnesota’s physician workforce, and to implement innovative state-of-the-art methods for selecting prospective medical students.

Historically, this was not always the case. The American medical schools of the past typically focused narrowly on applicants’ academic profile components, such as grade point average (GPA) and scores on the Medical College Admission Test (MCAT), as the primary criteria for admission. This made it relatively easy to reduce the large numbers of applications schools receive to manageable numbers for later stages of the selection process, which is likely to include interviews, biographical information, information about personal and professional pursuits like volunteerism and research and statements of interest.

But in recent decades, concerns have grown that this general process may not be achieving its intended goal of selecting the best potential doctors. The preliminary criteria (academic achievement, MCAT scores) are important, but they may overemphasize candidates’ ability to score high on exams and deemphasize other characteristics important to physician success, such as the ability to communicate effectively with patients or to work in an integrated healthcare team.

Many believe that it is time for American medical schools to shift their views on what constitutes good candidates from an overemphasis on academic characteristics to other important key personal characteristics.

Is it possible, however, to identify admissions characteristics such as predisposition for direct clinical care, motivation to work in underserved regions or with underserved populations, or ethical and moral reasoning capabilities? The UMN TC MD program is continuously considering such questions and exploring modern admissions methods to address these needs.

Twin Cities admissions committee review process

The MD admissions process at UMN TC consists of nine steps. Applicants begin by completing a national common application through the American Medical College Application Service (AMCAS), followed by a UMN TC MD program-specific supplemental application. Once complete, this application is reviewed by two or three members of the admissions committee to determine whether the applicant should receive an interview. When the interview is complete, the application file, including the interview scores, is returned to the Admissions Committee for a final review and vote.

Ultimately, candidates for acceptance are reviewed one final time for approval by the Admissions Executive Committee before an acceptance offer is issued.

Holistic review process

Like many medical schools, the UMN TC MD program employs a holistic review process: “flexible, individualized way for schools to consider an applicant’s capabilities, providing balanced consideration to experiences, attributes, and academic metrics. These factors are considered in combination with how the individual might contribute value not only as a medical student, but as a physician, as well.” (https://www.aamc.org/initiatives/holisticreview/).

For every application cycle, the UMN TC MD program receives more than 4,000 applications, and conducts holistic review for applications that meet a minimum MCAT threshold. Selection criteria beyond the MCAT and grade point average (GPA) are set based on an individual school’s mission and priorities. For the UMN TC MD program, those additional criteria primarily include contributions to diversity, human service, medically related experience and research experience.

In 2013, the Association of American Medical Colleges (AAMC) conducted a survey of medical school admissions officers, asking them to weight the importance of various application factors utilized in the decision-making process. Within the academic domain, the MCAT, cumulative grade point average, trends in academic performance and post-baccalaureate performance were all rated as important or very important. Within the domain of experiences, admissions officers rated health care experience, community service, experience with underserved populations, demonstration of cultural awareness and leadership activities as important or very important. Public medical school admissions officers rated U.S. citizenship and state of residency as important or very important; for private schools, these two attributes were rated as medium and lowest importance respectively. Both public and private medical schools rated first-generation college status, race/ethnicity and socioeconomic status as of medium importance.
In 2017, a similar survey was conducted with the UMN TC MD Admissions Committee. Overall, the admissions committee gives almost equal weight to an applicant’s experiences, attributes and metrics. When considering an applicant for an interview, MCAT score and medically related community service are given the strongest weight, followed by the applicant’s demonstration of cultural awareness, GPA and non-medical community service. The committee also places weight on an applicant’s state of legal residency, giving MN residents preference. Other important factors include an applicant’s responses to ad-

**STEP 1**
Candidate completes and submits common application through AMCAS.

**STEP 2**
Initial screen of application. Candidate offered UMN TC supplemental application.

**STEP 3**
Candidate completes and submits supplemental application.

**STEP 4**
First review by 20-3 committee members to determine whether candidate receives an interview.

**STEP 5**
Candidate participates in multiple mini interview (MMI) program on campus.

**STEP 6**
Candidate’s complete file, including MMI rating, reviewed by three committee members.

**STEP 7**
Committee vote

**STEP 8**
Final decision of accept, waitlist or deny

**STEP 9**
Final application review and decision approved by Admissions Executive Committee (AEC).

**MEDICAL STUDENT PROFILE**

**SRUTHI SHANKAR**
FIRST-YEAR STUDENT AT UNIVERSITY OF MINNESOTA MEDICAL STUDENT-TWIN CITIES CAMPUS

From a very young age, Sruthi Shankar knew she wanted to be a doctor. When her family moved from India to Singapore without any other family nearby, their physicians provided support and medical care during impactful moments of their lives. Shankar spent middle school and high school in St. Cloud, where she earned a bachelor’s degree in biomedical science and biochemistry from St. Cloud State University.

**What drew you to medicine?**
My maternal grandmother was passing away from breast cancer while my mother was having my sister. Her OB/GYN was someone who really was there for her and helped her through that. She still talks about that experience to this day. I also had an amazing pediatrician in Singapore. I just remember his presence and warmth. And I was always really drawn to science. There were many times when I tried to do other things that weren’t medicine, but then I would know it wasn’t for me.

**What was appealing about the University of Minnesota?**
Science is science, so medical schools distinguish themselves through the programs and avenues students can take. University of Minnesota has the rural medicine program and the metro program, where you do rotations in urban areas, and a lot of strong support for student success.

(continued on page 17)
ditional application questions that focus on contributions to diversity, overcoming challenges and demonstrating resilience. Post-interview, the Admissions Committee weighs the interview performance and score the strongest, followed by MCAT and medically related community service. Other factors (e.g., cultural awareness, non-medical community service and research) are also considered in the context of holistic review.

The new MCAT
The MCAT has a long history of use as one component of the application process at the majority of U.S. and Canadian medical schools, but it has evolved over those 90 years. Since the MCAT was first developed, it has undergone five major revisions, with the sixth and current version (the “New MCAT”) launching in 2015. Prior to this, the MCAT had been last updated in 1991. The subsections of the New MCAT include Biological and Biochemical Foundations of Living Systems (BBFL), Chemical and Physical Foundations of Biological Systems (CPBS), Psychological, Social and Biological Foundations of Behavior (PSBB) and Critical Analysis and Reasoning Skills (CARS).

The New MCAT reflects changes across premedical and medical education, and the increasing diversity of patient populations and health care delivery. Like the old MCAT, the New MCAT is designed to test basic science competencies, reasoning and critical thinking skills, but it also includes a new section testing sociocultural and behavioral concepts that influence patient outcomes. The New MCAT also serves as a tool to influence the cur-

### TABLE 1

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ricular and co-curricular experiences of premedical students.

The early MCAT exams (1920s–1960s) focused on memory and scientific vocabulary. Later versions also tested scientific problem-solving and then concepts in the behavioral and social sciences. The New MCAT shifts the focus from testing what students know to testing how well they use what they know. The New MCAT represents an attempt to assess the highest levels of problem-solving and scientific thinking.

**Multiple Mini Interviews (MMI)**
The UMN TC MD program has implemented new admissions methods assessing communication skills, cultural awareness and teamwork. U.S. and Canadian medical schools have increasingly adopted the multiple mini-interviews (MMI) method, in which applicants work through a series of brief, semi-structured stations and are assessed by trained raters. As the use of the MMI has expanded, research evidence indicates that the MMI has adequate reliability and evidence of validity as a medical school selection criterion. Researchers have generally found that the MMI demonstrates good job relatedness and acceptability, particularly among candidates. The evidence also indicates that MMI scores are not biased by gender, socioeconomic status, race or other characteristics.

Beginning with the admissions cycle for the matriculating class of 2017, the UMN TC MD program implemented this new format for interviewing applicants. Previously, the UMN TC MD program had followed a traditional interview model, conducting two hour-long interviews for each candidate. In the new MMI model, applicants rotate through a circuit of eight seven-minute stations, each designed to measure certain important factors that are theoretically determined to be valuable for success in medical school and as a physician.

The stations used by the UMN TC MD program were developed by a company called ProFitHR. They were selected through an iterative process and evaluated through an iterative process and evalu-
On the Cover

MEDICAL STUDENT PROFILE

WHITNEY LLOYD

FIRST-YEAR STUDENT AT UNIVERSITY OF MINNESOTA MEDICAL SCHOOL, DULUTH CAMPUS

Whitney Lloyd returned to her small-town roots by opting for University of Minnesota Medical School’s more intimate Duluth campus. A native of Stewartville, near Rochester, Lloyd majored in biochemistry at the University of St. Thomas, where she was an All-America volleyball player. Though she was interested in engineering and other STEM fields, Lloyd decided to follow her parents into medicine to use science to help people.

What interested you in the University of Minnesota Medical School in Duluth?

I’m Native American and I appreciate the emphasis on that, as well as the focus on rural medicine. I was really excited to learn more about medicine and Native Americans and some of the health disparities, and how I could maybe help with that. That appealed to me. When I came up here, it was a really tight-knit commu-

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favorable as other schools, and only 7.0 percent found their experience to be less favorable than other schools (23.2 percent indicated that this question did not apply to them, likely because UMN TC MD was the only program at which they interviewed).

Focus on diversity and inclusion
A total of 51,680 people applied to medical school in the United States in 2017, according to the AAMC. That year, 21,338 applicants matriculated to a medical school and, for the first time, the percentage of women was slightly higher than that of men: 50.7 percent. The UMN TC MD Program has seen a higher percentage of women in the matriculating class on and off since 2007. The 2017 matriculating class saw the highest percentage of women—60 percent—in recent years. Increasing the number of medical students from broadly diverse backgrounds is vital to meeting the Medical School’s mission and serving an increasingly diverse patient population. The UMN TC campus has seen an increase in representational diversity since 2013 and continues to develop unique mechanisms to ensure the enrollment of students who demonstrate cultural awareness from personal lived experiences and intentionally secured professional experiences.

Characteristics of the classes of 2021 and 2022
The classes of 2021 and 2022 include 175 students each, with 167 of them MD students. The eight other students in each class are students in the UMN TC joint MD/PhD program. Minnesota residents make up 83 percent of each class, while nonresident students represent 10-15 other states across the United States. Women are 60 percent and 54 percent of the classes of 2021 and 2022 respectively. Approximately 35 percent of each class was made up of students from different multicultural backgrounds. Only 11 percent of the class of 2022 identify as first-generation college students, a decline from 19 percent in the previous class. The average age for both classes is 24 years.

WHITNEY LLOYD (continued from previous page)
nity—there are only 65 people in the class—so I felt right away that it had a sense of community. To me, that was really important.

How did you approach applying for medical school?
I looked at a lot of different schools and it was difficult to choose where to apply. I’d be happy to go to a lot of different places. But I got it narrowed down. I applied to 18 schools for my primary application and 12 for my secondary, then I had four schools where I interviewed and three acceptances. It was really nice to be able to have a choice.

What was it like to go through the admissions process?
You always feel like you’re being evaluated and doubting yourself. But it’s having the confidence that what you want to do is go into medicine. You have to believe in yourself and believe in your application. It’s nice that we have great schools in Minnesota and you can’t make a wrong choice. It’s finding something that’s a good fit for you. I feel like I did and I’m really happy about it.

What about the interviews?
When I interviewed at the University of Minnesota-Twin Cities, we had a one-on-one for half an hour with a professor and mini-interviews with 10 people. It was sometimes difficult because I didn’t know if they got to know things about me during five minutes. I liked the one-on-one interview. For the Duluth interview I had two hour-long interviews with a family physician and a professor who is Native American, and I had lunch with some of the first-year students. Then, when I got accepted, I got a phone call, which was really nice.

How has your first year gone so far?
It’s been really good. I was pretty nervous at first. You hear it’s like drinking from a firehose. But I can say that everyone is here to help you and students collaborate. They really do encourage the rural part. We’ll have different lectures on chemistry and then a family physician comes in to talk about agriculture and farm accidents. We have clinical half-days, and then eight weeks where we get to stay with a rural family physician. I think I’m going to the White Earth Reservation, so that’s really nice.

Any idea what you’d like to do as a doctor?
I really like working with kids. They have a lot of resilience and it’s a really fun environment. You can’t be too serious. But I’m open-minded because there are different areas of medicine that I haven’t been involved with. I’m excited about the experiences we have here. We get to work with Native Americans. Since my mom’s side of the family is from Alderville, a First Nation in Canada, they have universal health care and don’t have a lot of the same struggles people have here. That will be interesting to learn about.
Conclusions
Many factors can help in the selection of a potentially successful medical student and future physician, including intellectual ability, demonstrated by test scores and grades, and personal attributes, like communication and teamwork skills, cultural awareness, resilience, leadership, ethical and moral decision-making and critical thinking abilities. A medical school admissions process should aim to assess all of these factors and others through diverse means. These factors potentially can predict the success of a future medical student and physician; an admissions process that includes the assessment of these attributes produces a much needed diverse student population and subsequent workforce that will serve the demands of an increasingly diverse patient population in Minnesota and beyond. 

Dimple Patel, MS, is associate dean of admissions at the University of Minnesota Medical School-Twin Cities. Jacqueline L. Gauer, MA, is a research and data analyst. Claudio Violato, PhD, is professor and assistant dean of assessment and evaluation.

References

Admissions process at UM-Duluth reflects its mission
BY SUZY FRISCH

At the University of Minnesota Medical School-Duluth campus, the admissions process is rooted in its mission to improve health care access and outcomes in rural Minnesota and Native American/Alaska Native communities. This objective gets woven into its selection decisions, with consideration of these additional factors for candidates:

• Potential for practicing in rural Minnesota.
• Potential for serving Native American communities.
• Potential for practicing in family medicine.

Overall, the admissions process in Duluth works to evaluate applicants’ commitment to delivering compassionate and quality patient care, a high degree of personal integrity, and skill in communicating with diverse groups.

Candidates must be able to demonstrate their motivation to practice family medicine in rural Minnesota or provide health care to Native American communities. In addition, the admissions committee assesses candidates’ qualifications through recommendations, on-site interviews, undergraduate achievements, and other post-secondary experiences.

This focus results in a medical school campus that is flush with students who are from hometowns smaller than 20,000 people (81 percent) and students who are under-represented in medicine, such as Native Americans (11 percent). In fact, the campus ranks number-two in the nation for graduating Native American physicians. Other emphases for the medical school include first-generation college students and those from economically disadvantaged backgrounds.

Students may apply to both University of Minnesota Medical School campuses, but they pay two separate application fees. They fill out the American Medical College Application Service (AMCAS) application, similar to the common application for undergraduate programs. Each campus has its own supplemental application. At Duluth, the supplemental application includes additional questions to answer and a request for three letters of recommendation.

The committee uses the recommendations to evaluate candidates’ academic capabilities and potential to become a family medicine physician in rural Minnesota or for Native American communities. Duluth suggests a mix of letters such as those from a science faculty member, a supervisor from a work or volunteer experience, and a someone who represents applicants’ interests in rural or family medicine.

Next, the admission committee reviews the applications and determines who will receive one-on-one interviews with two members of the admissions committee. That committee includes medical school faculty, staff, and community representatives. Ultimately the committee makes its decision six to eight weeks after a candidate’s interviews.

This keen focus on training future primary care physicians and providing care in rural communities has borne fruit for the Duluth campus. To date, 47 percent of its graduates matched into family medicine residencies, compared with 9 percent nationally, and 67 percent matched into primary care medicine. In addition, 44 percent of alumni practice in communities with populations under 20,000—compared with about 8 percent of physicians nationally. In addition, 66 percent of alumni practice medicine in Minnesota.
Mayo Clinic looks for different kinds of diversity

BY SUZY FRISCH

The Mayo Clinic Alix School of Medicine admissions process reflects the Mayo Clinic’s deep commitment to providing the best care to every patient, through integrated clinical practice, education, and research. It aims to create holistic classes that embody diversity of all kinds to better serve patients who mirror that diversity.

The variation Mayo seeks is itself diverse, encompassing applicants from wide-ranging backgrounds. It includes groups that are underrepresented in medicine, geographic variation, military service, the path someone took to medical school, socioeconomic disadvantages or first-generation college students.

In general, Mayo values very high academic achievement and test scores, a depth and breadth of activities covering the gamut of interests, and a significant commitment to serving people, says J. Michael Bostwick, MD, a psychiatry professor and senior associate dean of admissions. Those interests can entail leadership, research, artistic or athletic endeavors, an exploration of medicine or work experiences.

“It’s highly selective. We start with 8,000 applications—5,000 to the Minnesota campus and 3,000 to the Arizona campus,” he says. “At many stages and as they get interviews, I tell students that no matter what happens, they already have been chosen from among a large group of initial applications and they should be pleased and encouraged.”

Students use AMCAS to apply to one or both campuses, paying application fees for each. Those who are selected

MEDICAL STUDENT PROFILE

VIVEK SOMASUNDARAM
FIRST-YEAR STUDENT AT MAYO CLINIC ALIX SCHOOL OF MEDICINE, MINNESOTA CAMPUS

Vivek Somasundaram wanted to pursue a career that would allow him to improve the quality of people's lives. After majoring in biomedical engineering at University of North Carolina–Chapel Hill, he realized that he would rather administer treatments to patients as a physician than develop devices as an engineer. Somasundaram sought a smaller program with a collaborative sensibility, and he moved to Minnesota from his native North Carolina to obtain it.

Did you go right from college to medical school?
Following college, I went on to complete a post-baccalaureate program at Virginia Commonwealth University, where I took graduate-level courses. I did not get much exposure to many biology courses as an engineering major, so this program allowed me an opportunity to see if I enjoyed the content covered in medical school while gaining more clinical exposure. Then I returned to work as program administrator for the same organization.

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VIVEK SOMASUNDARAM (continued from previous page)

How did you approach applying to medical school?
Rather than casting a wide net, I focused on applying to medical schools that I had a strong interest in attending. This could stem from the mission of the school, the culture and environment, availability of research opportunities and/or its location and proximity to my family. I applied to 12 schools in total, interviewed at five, and was accepted to four.

Why were you interested in Mayo medical school?
I wanted a medical school that had an environment of collaboration, teamwork and frequent interaction with faculty. This, combined with the opportunity to work with and learn from world-renowned clinicians and unparalleled research opportunities, made Mayo Clinic School of Medicine a place where I felt that I could thrive.

What stood out to you about Mayo’s admissions process?
Mayo Clinic made it very clear that they wanted us to let the admissions office know if we were very interested in attending Mayo through a “letter of intent.” This was something that other schools did not encourage or even accept during the admissions cycle.

What was the interviewing process like at Mayo?
One thing I remember vividly about my interview day was that I had a question that my interviewer, Dr. [Phil] Fischer, said he would research and get back to me about. I was expecting an email from him in the days or weeks after the interview because I knew he had a very busy schedule. During my afternoon interview, my second interviewer had been in communication with Dr. Fischer and already had an answer for me. Dr. Fischer’s actions showed how much he cared and were indicative to me of the level of involvement of the faculty and staff in helping medical students achieve their goals.

What has the first year been like so far?
It’s been great! The people in my class along with my M2 and M3 “med sib” mentors really have formed a strong support system. My interactions with faculty have also greatly enhanced my learning experiences, particularly in anatomy. During dissection, we would often have clinicians in the lab showing us the clinical applications of the structures we were covering that day. This gave me perspective on why we were learning the structures and made the material more exciting. The faculty have also been helpful outside the class. When I first moved in, my professor’s husband helped me put up blinds in my apartment because I did not have any power tools. Little actions like these have helped me adjust to life in Minnesota and made me feel a part of the Mayo community.

What plans do you have so far for your medical career?
I think I want to pursue a specialty with a procedural component but I’m still keeping an open mind because it’s still early!

for the secondary application also may consider applying to Mayo’s Florida Focus (2+2) program in Jacksonville. For that option, students start their medical education in Minnesota or Arizona and complete their studies in Florida.

To find the ideal class of roughly 100 students, Mayo first selects 300 to 350 candidates for interviews on each of its campuses in Rochester and Phoenix, plus another 80 in Jacksonville. It’s a time for interviews and for applicants, physicians, staff and students at Mayo to get to know each other.

“We’re going for a group of people who ultimately are interesting people who can get along with one another,” Bostwick says. “It’s not a perfect science, but we get a sense of them from their recommendation letters and activities and interviews and how they interact with everyone. We get a sense of how they will do as a class.”

Applicants have two interviews each, with a faculty member and either a staff member, medical student or community member. The interviewers report to the full committee of about 15-25 people. Then the committee gives each applicant a composite score. After benchmarking students and having ample discussion about candidates throughout the process, the committee makes decisions about its first group of admitted students. All the while, Bostwick says, they work toward the goal of creating a balanced class that reflects Mayo’s goals. MM

Student work in the Visible Heart Lab at the University of Minnesota.

PHOTO BY RICH RYAN PHOTOGRAPHY