

PENN Medicine



NO PLACE LIKE HOME

WHY HOME CARE
IS TRANSFORMING
THE BUSINESS
OF HEALTH CARE



AND BRINGING PATIENTS THE RIGHT CARE IN THE RIGHT PLACE



Plus: The First Year of Penn Medicine's New Pavilion
Medical Students Practice in Virtual Reality



Raising a glass: Robert H. Vonderheide, MD, DPhil, director of the Abramson Cancer Center; Susan Domchek, MD, executive director of the Basser Center for BRCA; University of Pennsylvania President Liz Magill; Mindy Gray and Jon Gray; and J. Larry Jameson, MD, PhD, executive vice president of the University for the Health System and dean of the Perelman School of Medicine.

10 YEARS OF MOMENTUM AT THE BASSER CENTER

The Basser Center for BRCA at Penn Medicine's Abramson Cancer Center is celebrating its 10-year anniversary and its success in changing how families live with inherited cancers. Ten years of progress and hope, under the leadership of Executive Director Susan Domchek, MD, and visionary guidance and philanthropic dedication of founders Mindy, C'92 and Jon Gray, C'92, W'92, has made Penn the global leader in BRCA-related research.

Today, the Basser Center is doubling down on its mission to move the needle on science once again. The Grays' new transformative gift of \$55 million to establish the Basser Cancer Interception Institute now launches the Center into its next 10 years of powerful advancement. This institute aims to do nothing less than disrupt the timeline of cancer treatment. Look for continuing coverage of these innovative efforts in future issues of *Penn Medicine* magazine.

THE BASSER CENTER'S FIRST 10 YEARS

\$175M+ PHILANTHROPIC SUPPORT **5K+** DONORS ACROSS THE WORLD



80

Grants Awarded at Penn and 30 Institutions Worldwide



Key Research Leader in FDA Approvals for PARP Inhibitors, BRCA-related Breast, Ovarian, Pancreatic, and Prostate Cancers



Education Outreach to **1,500+** Synagogues and Men, Latino, Black Communities



Innovative Clinical Trials including a vaccine to prevent BRCA-related cancers



170+ Council and Board Members



DEPARTMENTS

- Left THE PREP**
10 Years of Momentum at the Basser Center
- 2 EDITOR'S NOTE**
The Future is at the Four Sites of Care
- 3 VITAL SIGNS**
Medical Communications Research, Resident Diversity
- 12 MEDICINE PLUS**
Calming the 'Climate Talk'
- 38 DEVELOPMENT MATTERS**
Closing the Gaps in Care for the Caregivers
- 42 ALUMNI NEWS**
Alumni Progress Notes and Obituaries
- 48 FUTURE PROGNOSIS**
Doctoring in the Digital Space



PENN MEDICINE

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14 No Place Like Home *By Jen A. Miller*
Home health care is evolving from convenience to a crucial edge for the future of medicine.

28 The Pavilion: A Day in the Life
By Rachel Ewing and Meredith Mann
The newest state-of-the-art inpatient building at Penn Medicine is a daily hub for the world's most advanced health care in a setting that inspires serenity and comfort.

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The Future is at the Four Sites of Care



Close your eyes and picture the future of health care. Is it a Star Trek technology vision — handheld tricorders that heal wounds and diagnose infections instantly, a 3D scan of a tumor instantly projected in midair?

A lot of future forecasts tend to focus on technology. We've heard plenty in the past few years about how the COVID-19 pandemic accelerated and expanded telemedicine everywhere. Tech companies, as the story goes, are nipping at the heels of the health care industry, hoping to “disrupt” the traditional ways of providing care. At Penn Medicine's new inpatient Pavilion, opened last fall, part of the excitement indeed comes from cutting-edge technologies that enable everything from minimally invasive surgeries to controlling the electronic privacy glass in patient rooms.

But if you ask Kevin B. Mahoney, CEO of the University of Pennsylvania Health System, the future isn't about technology. It's about “meeting people where they're at.”

Unlike almost every other academic health system, Penn Medicine has invested over a span of decades in owning and excelling at what Mahoney calls all “four sites of care”: hospitals, outpatient clinics, virtual care, and home care.

For patients, that means Penn Medicine seeks to deliver care in the most appropriate setting for their needs — and often, that doesn't look like the traditional way of doing things. Why spend a night or longer in the hospital if you can visit an outpatient location to have your procedure and be home within a few hours? Why even take those hours off of work to drive to the clinic if your doctor can diagnose you and prescribe your medication after a brief video call, or if a physical therapist can come and help you do exercises right in your own living room?

This is what the future looks like at Penn Medicine: Being ready to care for patients in the right places at the right times.

In this framework, technology is still important — it pushes the boundaries of what care is possible, guiding the way to treating and curing diseases in the most advanced ways. It also changes the picture of where a person can receive the best possible care that is also most comfortable. Thanks to advances in telemedicine technology, virtual care and remote monitoring continue to grow in popularity while

improving outcomes. With high-tech portable infusion pumps, more patients can conveniently and safely receive biologic infusions and chemotherapy infusions — for cancer and multiple sclerosis, for example — at home. Advances in surgical technologies help explain why procedures, from knee replacement to cataract removal, that used to require a hospital stay are commonly done in just a day now.

Lots of other factors shape the future, too. Insurance companies pay more for some types and sites of care than for others, and market factors like hospital closures and mergers affect how many patients line up in need. These are all elements that Penn Medicine is working to adapt to, as well.

By operating all four sites of care as an integrated system, we're poised to provide each patient care across settings that are seamlessly connected — maximizing comfort and convenience, increasing access, and controlling costs — even as the future brings changes we can't yet anticipate.

In this issue, we take a detailed tour of two of the four sites of care: Home care, the focus of our cover story (p. 14) is a growing part of Penn Medicine's operations that patients are increasingly finding a comfortable complement to their care at other sites. Turn the page, and a feature photo essay (p. 28) shows a typical day in the life of the Pavilion, the new inpatient facility at the Hospital of the University of Pennsylvania, where patients go when they need the most complex and advanced treatments and surgeries for cancer, neurological and cardiovascular conditions, and more. A year after its opening, teams in the Pavilion continue to break new ground every day.

As you read, keep in mind this larger context: The hospital and home aren't discrete domains, but different places in a journey toward a changing future. At Penn Medicine, you can be assured that the future of health care will meet you where and when you need it.

RE

Rachel.Ewing@penmedicine.upenn.edu

WELCOME, CLASS OF 2027!

The newest cohort of medical students reflects the Perelman School of Medicine's emphasis on diversity and inclusivity.



► See also “Representation Matters,” about the new group of interns, page 8.

1, 2, 3: IMPaCT

There's a new name to the game of learning to become a physician at the Perelman School of Medicine. PSOM has adopted the title “Integrating Medicine Patient Care Transitions,” or IMPaCT, for the medical school's curriculum. The change simplifies the module structure used in the past, organizing the existing sequence and content of courses into clear groupings of pre-clerkship, clerkship, and post-clerkship phases to better delineate the passage of learning from the classroom to the clinical setting.



► A new virtual reality component now helps students practice. Read more on page 48.



A HEALTHY COMMUNITY STARTS HERE

A visionary public health campus in West Philadelphia is improving access to care and prevention.

Nathaniel Williams is quick to say that he received good care at the now-defunct Mercy Philadelphia Hospital at 54th Street and Cedar Avenue in Cobbs Creek, the West Philadelphia neighborhood where he has lived his entire life.

But Williams, who is nearly 60 and diabetic, is just as quick to say that the care he currently receives at the PHMC Public Health Campus on Cedar — an innovative collaboration between Penn Medicine and the not-for-profit Public Health Management Corporation located in the grand old Mercy building — is the best he's ever had.

Williams now sees a primary care physician from Penn Medicine's Department of Family Medicine and Community Health, at a PHMC-run health center in the building; most patients there live within a 10-block radius. It's one of a comprehensive set of improvements to build an innovative public health campus whose emphasis is addressing social determinants of health and making preventive care easy to access.

"For the community, the change is for the better," Williams says. "It may be the same building, but it's not the same hospital."

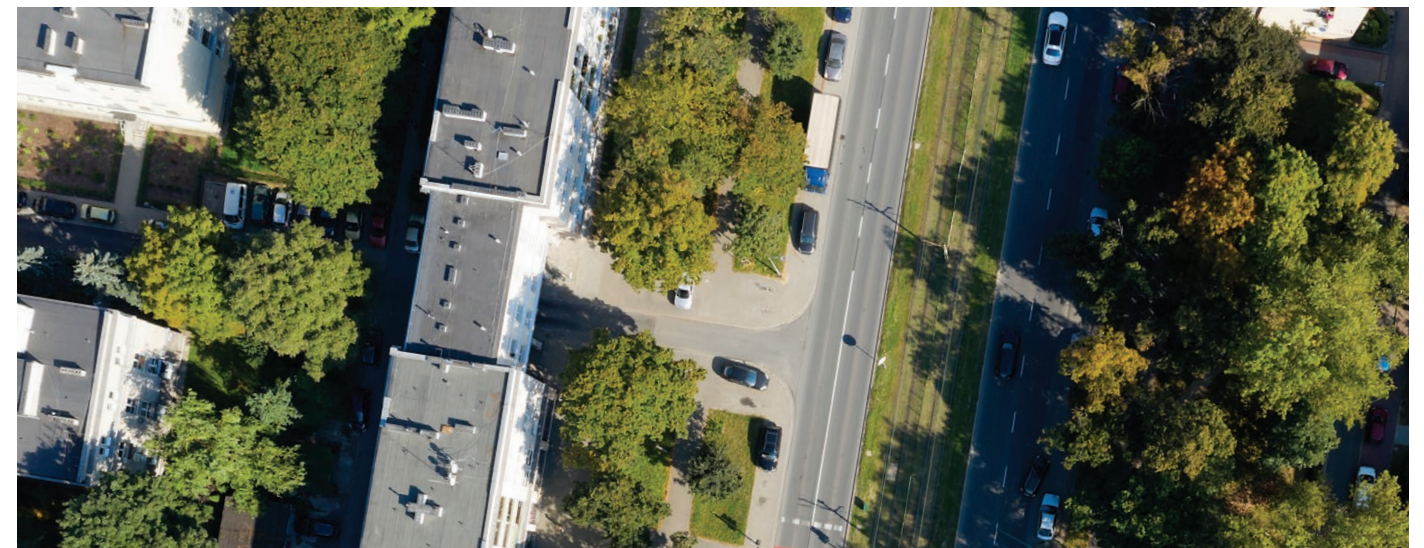


880 WAYS TO MAKE AN IMPACT

For 10 years, the Penn Medicine CAREs grant program has supported volunteerism.

Barbershops and church basements. Roller derby rinks and a refugee health clinic. The places where you can find people from Penn Medicine giving back and making a difference in their local communities are as varied as you can possibly imagine.

Penn Medicine provides financial support to help staff, faculty, and students to extend their impact on the community through the Penn Medicine CAREs grant program. The grants of up to \$2,000 each allow recipients to purchase supplies or other resources for their outside volunteer efforts. Celebrating 10 years this year, the program has provided more than \$880,000 in funding in over 880 awards to support service initiatives across the region and around the globe. It is on track to surpass 1,000 total grants awarded in 2023.



HUMAN/NATURE

Can trees and fields save lives?

A new community-academic collaborative is betting that they can.

Deeply Rooted is a community-driven program drawing on the research of Assistant Professor of Emergency Medicine Eugenia South, MD, MSHP. Her findings that cleaning and "greening" abandoned lots reduce gun violence and self-reported levels of depression are now the basis of an intervention to improve the lives of people living in West and Southwest Philadelphia.

By increasing greenspace, offering community grants, providing career development, and promoting environmental justice, this partnership between the Penn Urban Health Lab and over 13 community and faith-based organizations, aims to reduce violent crime, improve public health, and reverse health inequities, all of which are effects of structural racism on neighborhoods that have experienced disinvestment. The team plans to green over a million square feet of vacant lots.

Deeply Rooted launched in May 2022 with multi-million dollar investments from both Penn Medicine and Children's Hospital of Philadelphia, with the Pennsylvania Horticultural Society serving as the lead strategic greenspace implementation partner.



Representatives from Penn Medicine, CHOP, and community organizations celebrated the launch of the Deeply Rooted initiative in May. At center are Kevin B. Mahoney, CEO of the University of Pennsylvania Health System, and Eugenia South, MD, MSHP, director of the Penn Urban Health Lab.

Find the in-depth narrative about the transformation of the Mercy campus, explore the photo essay highlighting a decade of CAREs grants, and watch a video showcasing Deeply Rooted, and more, online at [Service in Action: CommunityImpact.PennMedicine.org](https://ServiceinAction.CommunityImpact.PennMedicine.org).

THE DATA DOCTOR

The new director of the Institute for Biomedical Informatics wants to connect the dots from patient data to better care.



Marylyn Ritchie, PhD

Growing up, Marylyn Ritchie, PhD, planned to become a doctor. But as a pre-med college student, she volunteered at a hospital and discovered the sights and smells made her stomach do somersaults. Switching gears, she pursued an interdisciplinary graduate program in biomedical research at Vanderbilt University, where she fell in love with bioinformatics — a field that uses computational analysis of large patient datasets to draw new insights in medicine.

It was the turn of the 21st Century, and bioinformatics was a brand-new field. At the time, no one — even her graduate program director — was quite sure where it might lead. “But I loved the idea of using my math skills to solve problems in genetics,” says Ritchie, who went on to earn a PhD in statistical genetics. To say it all worked out would be an understatement. Over the last two decades, bioinformatics has grown by leaps and bounds.

Ritchie joined Penn Medicine in 2017 as a professor of Genetics, and in January she was named director of the Institute for Biomedical Informatics (IBI), a group that consists of more than 70 highly interdisciplinary research labs at Penn Medicine, united in an effort to fully capture the power of data to drive discoveries and improve health.

Much of her work draws on patient data (stripped of identifying characteristics) from electronic health records,

as well as patient blood and DNA samples stored in the Penn Medicine BioBank. “Every time participating patients go in for routine clinical care, they’re populating this database of information about health and disease,” Ritchie says. “We can tap into those data to improve our understanding of the mechanisms behind disease and factors that increase disease risk in certain groups.”

Advances in the field are making it easier than ever to make sense of complex patterns. “Now the technology exists to look across multiple domains of molecular and cell biology at once, and the computational infrastructure is more advanced than it’s ever been,” Ritchie says. “It’s a perfect storm for asking exciting questions that weren’t possible even 10 years ago.”

In a recent study, she and her colleagues combed health records to look for a gene known to be associated with rare genetic syndromes. They found that different variations in that same gene may be linked to common diseases like diabetes and high cholesterol. Other work is looking at heart failure to determine whether there are distinct subgroups of patients who might have unique risk factors or disease trajectories, or who respond to different treatments. “Heart failure is one example, but with bioinformatics we can do this with any complex disease,” Ritchie says.

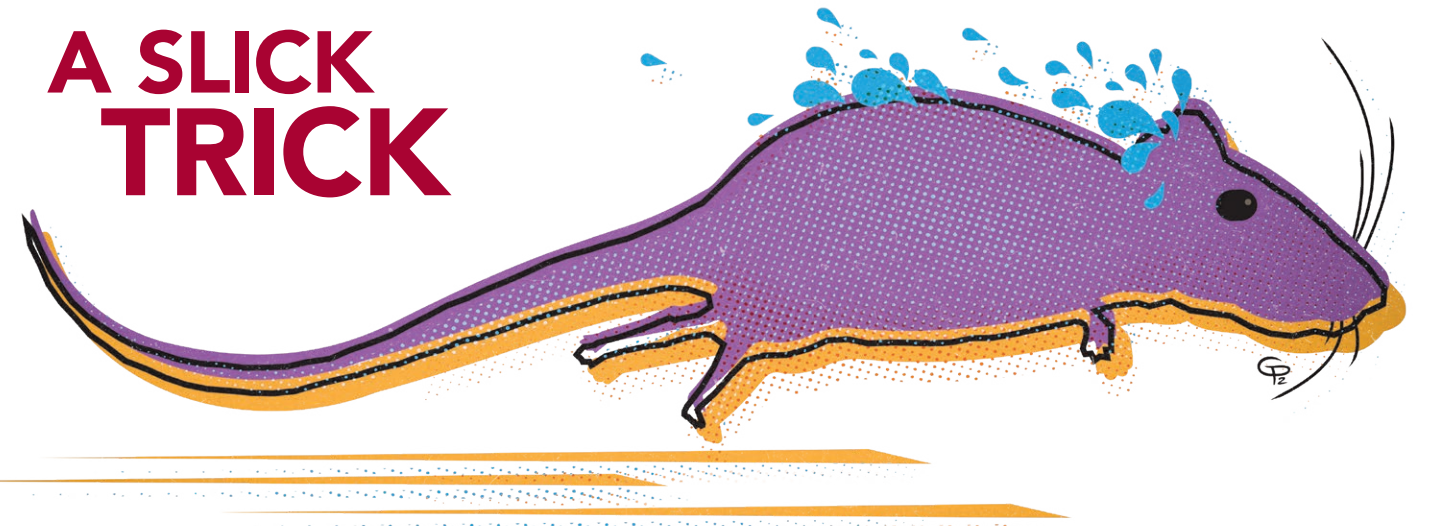
As she takes the helm at IBI, Ritchie hopes to help Penn Medicine elevate its status as a learning health system that uses data to inform clinical research and, ultimately, improvements in clinical care. To get there, she’s working to establish a broader network of informaticians across the organization. “Building networks and communities is one of the joys of my job,” she says.

That joy extends to mentoring students and junior faculty — a role that, as a first-generation college student, Ritchie takes seriously. While passionate about her research, she’s also mindful of setting a good example for her mentees. She carves out time to spend with her husband and two teenage children, and shares tips for creating work-life harmony on her podcast “CALM: Combining Academia and Life with Marylyn.”

Taking time to recharge means she brings her best self to work to advance the goals of IBI and Penn Medicine. “The mission of IBI is to use the power of data to drive discoveries and improve health at the individual, community, and population level,” she says. “We’re in this period of time where the technology exists to do transformational research in bioinformatics. And Penn has all the pieces to be one of the leading learning health systems in the country.”

— Kirsten Weir

A SLICK TRICK



Greasy mice that “sweat” fat are leading Penn researchers to the top of the STAT Madness heap — and to potential new areas of discovery.

Researchers at the Perelman School of Medicine may have accidentally stumbled upon an unlikely holy grail for obesity-associated diseases — “sweating” out fat.

And this “so crazy, it just might work” discovery earned them first place in this year’s STAT Madness competition for the biggest breakthroughs in science and medicine.

“It was too far-fetched for us to go there to begin with,” says the study’s lead author, Taku Kambayashi, MD, PhD, an associate professor of Pathology and Laboratory Medicine, as he describes the project which initially sought merely to reduce obesity-related disease complications in mice.

The research, published in *Science* last year, involved injecting overfed mice with a cytokine molecule called thymic stromal lymphopoietin (TSLP), with the goal of blocking obesity-induced inflammation and thus lowering the risk of insulin resistance and other health problems.

The researchers found that TSLP-treated mice were indeed less likely to develop conditions like diabetes, atherosclerosis, and fatty liver disease (FLD). They also noticed that after four weeks the mice, who’d been fed a high-fat diet were no longer obese — despite the fact that they were eating 20 to 30 percent more than control mice. Not only that, their fat cells shrank and lost the fat content, to the point of causing hypothermia.

“We went through a lot of detective work” to tease out the mechanism for the weight loss, chuckles Kambayashi — measuring the mice’s metabolism, and even analyzing the caloric content of their waste.

Kambayashi’s team finally took a good, hard look at their subjects — and found the answer literally slipping right through their hands. “They were greaseballs, very slimy, kind of like an eel,” he says. “We had ignored it because we didn’t know what it meant.”

Shaving the mice and testing their fur revealed the mystery substance as sebum—the body’s fatty, oily skin protectant. It turns out that TSLP activated T cells in the immune system, which migrated to sebaceous glands and kicked sebum production into overdrive. In lay terms, the mice were “sweating” fat out as fast as their bodies could produce it.

The researchers confirmed this new hypothesis by administering TSLP to mice engineered without sebaceous glands; they saw no change in the subjects’ weight. Further, they transferred TSLP-activated T cells to TSLP-naïve mice, and sure enough, this group started shedding fat.

The findings earned the team a spot earlier this year in STAT Madness, a “March Madness” bracket-style competition sponsored by the media company STAT. Kambayashi and his colleagues not only got 71 percent of the 350,000 votes cast to win the bracket of 64 entries, they also walked away with “audience favorite” honors at the STAT Breakthrough Science Summit.

Winning the competition only conferred bragging rights, but also helped the research generate interest from venture capital firms. Currently, Kambayashi is working to establish real-world applications in humans through a company he co-founded, Abrax Japan, which plans to launch Phase 1 safety clinical trials in Australia next year.

While ramping up TSLP’s effects could translate into human weight loss of a pound a week, Kambayashi is setting his sights squarely on direct health benefits, rather than weight loss itself, to start. He thinks the agent could be useful in reducing FLD, type 2 diabetes, cardiovascular disease, and other comorbidities of obesity.

Even more promising, he suggests, is its potential for improvement in skin conditions such as eczema, dry skin, and even dry eye. As opposed to slathering on emollient-rich lotions as treatment, Kambayashi points out, in these conditions, helping the body generate more of its own oil-rich sebum would be “really curing the disease from the inside out.”

— Meredith Mann

REPRESENTATION MATTERS

Penn Medicine welcomes its largest and most diverse intern class ever.

When he started his visiting clerkship in Penn Medicine's Department of Family Medicine and Community Health in September 2021, Joseph Laseter, MD — then a fourth-year student at Case Western Reserve University School of Medicine — was surprised to attend routine “social rounds” during which clinicians would discuss patients’ lifestyles, support systems, and financial security.

“That was unheard of to me — the fact that we would work not only to provide good care, but also to understand the home lives of our patients, who are predominantly Black, because of the impact on their health,” recalls Laseter, now a Family Medicine intern at PSOM.

Laseter, who is Black, credits Penn's Visiting Clerkship Program for Underrepresented Minority Medical Students, which is sponsored by the Alliance of Minority Physicians at Penn Medicine and Children's Hospital of Philadelphia, with cementing his resolve to train at Penn. Programs like this one, designed to draw resident candidates from backgrounds underrepresented in medicine (UIM), are part of a three-pronged approach the Penn Medicine Graduate Medical Education Office has been using in recent years to increase diversity among its interns, residents, and fellows.

These efforts have proved successful; the 247 newly minted MDs who began their internship year at Penn this summer represent the largest group the institution has ever welcomed. They are also the most diverse, with 67 interns, or 27 percent, coming from UIM backgrounds, which include Black, Hispanic, Latino, Native American, and Pacific Islander. This is a slight rise from 2021 and an 8-percent jump from 2020.

“People who come from different backgrounds enrich the learning environment for everybody, plus we have an institutional responsibility to make sure we provide opportunities for all qualified individuals to train here,” says Jeffrey Berns, MD, vice president and associate dean for Graduate Medical Education. “And just as importantly, our patients want and need to be taken care of by people who understand them and have had experiences like theirs.”

Concerns about a lack of diversity in medicine have persisted for decades. Physicians from minority populations tend to care for more underserved individuals, including immigrants and patients who are sicker, poorer, and uninsured. And studies consistently show that patients have better outcomes,



Cary Aarons, MD, MEd

comply more with medical recommendations, and are more willing to participate in clinical trials and research when their doctor shares their background. Still, the field has been slow to diversify, and although UIM individuals make up one-third of the U.S. population, they currently represent less than 15 percent of the nation's resident workforce.

For these reasons, Berns and his GME colleagues have prioritized bringing more UIM residents to Penn. In addition to expanding pathway programs for UIM students from other medical schools — like the visiting clerkship Laseter completed — they are doing targeted outreach at national meetings and residency fairs. A third strategy has involved overhauling the criteria by which they evaluate program applicants.

To support these efforts, PSOM created a new position a few years ago, Assistant Dean for Graduate Medical Education and Director for UIM Affairs, now held by Cary Aarons, MD, MEd, a professor in the Division of Colon & Rectal Surgery and until recently program director for the General Surgery residency. Aarons describes the revised applicant selection process as “less metric and more holistic.”

“Historically, people have focused on things like USMLE board scores or publications or what medical school someone went to,” Aarons says. “Now, in addition to academic excellence, we're looking at all of the things that would



make a candidate a wonderful addition to our programs: their intellectual curiosity, their life experiences, their overall distance traveled — things that are harder to quantify but that help us bring in excellent candidates with diverse backgrounds.” It's an approach to creating a cohort of physicians who are not only diverse according to demographics, but also in terms of the way they think and see the world.

Diversity, equity, and inclusion (DEI) initiatives have been prioritized from multiple angles across all of Penn Medicine with support from senior leaders, Aarons notes, and the efforts to diversify resident classes permeate through all of the individual programs.

“Knowing how many people are really invested is helpful and speaks to where the institution as a whole is on improving the diversity of our workforce,” Aarons says.

Throughout the last two GME application and interviewing seasons, Berns partnered with several faculty and the Alliance for Minority Physicians to offer virtual “meet the family” gatherings where UIM faculty, fellows, and residents would answer questions about life at Penn Medicine from medical students applying for internships and residents applying for fellowships. Aarons emphasizes that many students and young physicians thrive when training under faculty members who have similar backgrounds to their own. Mikiko Thelwell, MD, an intern in Psychiatry, says she applied to train at Penn because she was able to identify a prospective mentor immediately.

“I am a queer Black woman originally from Atlanta, and I am a first-generation Jamaican American. I wanted to come to Penn because I felt completely seen,” Thelwell says. “Having Dr. [E. Cabrina] Campbell in a leadership position in the department — I knew there was someone who understood my intersectionality. Seeing myself represented made me want to be here.”

For the first time since 2019, this summer the GME office hosted in-person orientations for incoming house staff on campus. The largest orientation session, held June 17, also featured a panel of some of Penn Medicine's UIM faculty and residents across several specialties.

“While we have a focus on increasing representation, simultaneously we also have to think about providing a framework for mentorship and promoting an environment that is inclusive. That was the genesis of this panel,” explains Aarons, who served as moderator. “It's one thing to say we want to attract most talented applicants, but in parallel we need a mechanism for making sure they are supported. One way we can do that is by introducing them to a cohort of more senior UIM residents who can speak to their experiences and potentially serve as mentors.”

The Alliance of Minority Physicians, which recently celebrated its 10th anniversary, and the Penn Medicine LGBTQ+ House Staff Association, which launched last year and has over 80 residents and fellows currently, serve a similar purpose. Thelwell has engaged with both organizations and deems them “essential.”

“These groups and their events allow folks to find each other and create community,” she says. “They give us support networks where we otherwise might be marginalized and separate from each other.”

— Karen L. Brooks

THE PENN MEDICINE BLUEPRINT FOR RESIDENT DIVERSITY

Representation of residents from UIM groups at Penn Medicine has steadily increased from 8.7% of matched candidates in 2015 to 27% this year due to intentional efforts year after year. An article published in the journal *Academic Medicine* in November 2022 provides a detailed blueprint and recommendation to adopt similar efforts in other programs nationwide.

FOR YOUR INFORMATION

New research institute aims to improve medical communication.



Anne Cappola, MD'94, ScM, had a light-bulb moment the day one of her patients referenced a dubious website and requested nonstandard testing and therapies for her thyroid disease.

Medical experts needed to find better ways to communicate accurate information and counter misinformation, thought Cappola, a professor of Endocrinology, Diabetes, and Metabolism and an associate editor for the *Journal of the American Medical Association*. And she was going to help them do it.

"I started thinking about the disconnect between what I see as an editor of these rigorously reviewed journal articles and the papers patients were printing from the internet and bringing to clinic," she says. "There is this flow of medical information from journals to the media to patients themselves, and there are clearly problems along the way."

To pinpoint those problems, Cappola dreamed up — and launched — an academic center unlike any other she was able to identify nationwide: the Penn Medical Communication Research Institute (PMCRI), a collaboration between the Perelman School of Medicine and the Annenberg School for Communication. Since its kickoff with a medical misinformation-focused symposium in October 2021, the PMCRI, which Cappola directs, has awarded funding to five

pilot projects, each exploring a different facet of medical communication and comprising at least two investigators from different schools or departments.

"The purpose of this is not for me to do my own research, but to get others across Penn engaged in medical communication as its own research discipline," Cappola says. "The beauty of allowing people to work on what they want to work on is in the creativity and originality of the ideas that came through. If I had suggested topics myself, I could not have come up with the things they did."

Although medical misinformation has dominated global conversations since the emergence of COVID-19, Cappola conceptualized the PMCRI in late 2019 and never intended it as a response to the pandemic. Still, given the timing of its launch, she was not surprised when several faculty members submitted coronavirus-centered proposals. One of those selected for pilot funding came from Jessica Fishman, PhD, an instructor of Psychiatry with appointments in PSOM and Annenberg who is also director of Penn's Message Effects Lab, which supports clinical researchers in using social psychology to develop health-related behavioral interventions.

With a goal of increasing COVID vaccination rates in lower-income communities, Fishman and her PMCRI

co-investigators — who span PSOM, Annenberg, and Penn Nursing — are partnering with the Philadelphia Department of Public Health to test varying messages with unvaccinated residents of West Philadelphia. Many public health communication campaigns have backfired because they failed to base their interventions on scientific evidence, Fishman says, citing the famously unsuccessful DARE (Drug Abuse Resistance Education) campaign of the 1980s. She wants to prevent other health professionals from making similar mistakes.

"If you don't use science to determine the right set of beliefs to focus on when you communicate, you're missing opportunities," she explains. "The Institute is a way to build more bridges between the Penn schools and do this scientific matchmaking, so we can bring all our different training together

"If you consult 'Dr. Google,'
there are even problems when you
access correct information."

to address questions collaboratively and collect empirical evidence before an intervention is launched."

In Fishman's case, that evidence will show which vaccine myth-busting strategies are most effective with the demographic her group is studying: presenting a myth followed by a fact; sandwiching myths between facts; presenting facts only; and flagging myths only. "Then, down the line, we can also see whether the communication strategy that works the best for COVID vaccination will also apply to other vaccines, like the flu and HPV [human papillomavirus]," she says.

A second COVID-related project, led by investigators from the School of Nursing and the School of Engineering and Applied Sciences, is testing vaccine messaging among parents of young children — but the remaining three PMCRI pilots vary significantly. One is exploring ways to motivate more Black parents to enroll their children in clinical trials (Fishman is also supporting that effort); another aims to reduce race and gender biases among resident physicians; and the third is assessing targeted health care advertising online.

Ari Friedman, MD'16, PhD, an assistant professor of Emergency Medicine, is spearheading the web advertising study alongside Matthew McCoy, PhD, an assistant professor of Medical Ethics and Health Policy. The ubiquity of internet data tracking piqued Friedman's interest during his residency, when he was alarmed that declining his Web browser's "cookies" — which trap and save details about a user's activities — barred him from accessing content on many reputable sites, even those associated with the nation's most prestigious medical journals.

As co-leaders of the Penn-CMU (Carnegie Mellon University) Digital Health Privacy Initiative, Friedman and McCoy

have since completed multiple studies mapping tracking across health-related web pages and have reported that a striking 98 percent of them integrate third-party data requests.

"What are the implications of that?" Friedman wants to know. "If you search for a disease or medication, are you shown more ads for pharmaceutical products and devices? How about for non-FDA-regulated nutraceuticals and sham cures that are expensive and a waste of your money?"

Funding from the PMCRI will support Friedman and McCoy in building a tool to correlate people's web-browsing histories with the type of health-related ads displayed in their browsers and social media accounts, as well as to classify those ads according to their inclusion of accurate information, misinformation (inaccurate content), and disinformation (deliberately deceptive content). Identifying these potential barriers to good communication is important, says Friedman, because "the whole web ecosystem of medical information is more complicated than most people realize."

"If you consult 'Dr. Google,' there are even problems when you access correct information," he notes. "Say you visit the Mayo Clinic homepage, which is a wonderful source of generally reliable information. The Mayo Clinic homepage has advertising trackers on it, meaning if you read about a particular condition, as a result, you may be targeted [by third parties] for some commercially motivated or not-well-vetted information that ends up causing you to doubt the facts you just read."

Cappola shares Friedman's concerns about the threats posed by ambiguity and conflicting sources. Many patients come to her for second opinions, she says, unconvinced that their first physician advised them appropriately — but she rarely finds a reason to change their medications or order new tests.

"All I do is present the same information in a way that they understand it and feel heard," she says. "Their doctors were not bad doctors — they were recommending the right things but communicating in a way that their patients just didn't buy it."

This fall, Cappola plans to host another PMCRI symposium, followed by a second round of project funding, open to applications from faculty from any Penn school. The aim is that research findings will help improve patients' health literacy over time.

"This is not about getting up and saying, 'We are the source of good information,'" she explains. "It's about doing rigorous research and applying known principles in communication to find out how we can best inform people and affect their health in a positive way. If we just focus on the medicalization of things and not the communication part of our work, we are never going to deliver the care that we want to."

— Karen L. Brooks

Calming the 'Climate Talk'

By Koren Wetmore

Photo by Peggy Peterson



After years of studying the environment's impact on health, Jeremy Wortzel, MD'22, MPH'22, encountered something new: climate anxiety in children.

His fiancé, Lena Champlin, came home troubled about a conversation she had with a little girl while doing outreach work at the Academy of Natural Sciences of Drexel University. Champlin had asked the child what she knew about climate change. Before the girl could answer, her caregiver said, "Oh, no. We don't talk about that."

Wortzel realized then that the caregiver's reply echoed his experience discussing difficult subjects in therapy sessions with parents and their children. "A parent will lean over and say, 'We're not talking about death or divorce' because those are topics we tend to shield young people from," he said. "But this time it was climate change."

Then a third-year medical student at the Perelman School of Medicine (PSOM) who planned to specialize in psychiatry, Wortzel was intrigued. So he dug into the scientific literature and found that climate change not only proved hard to talk about but also created anxiety in children and adolescents. He further learned that few resources existed to guide age-appropriate conversations on the subject.

"The narratives around climate change traditionally places the entire burden on fixing the problem on the

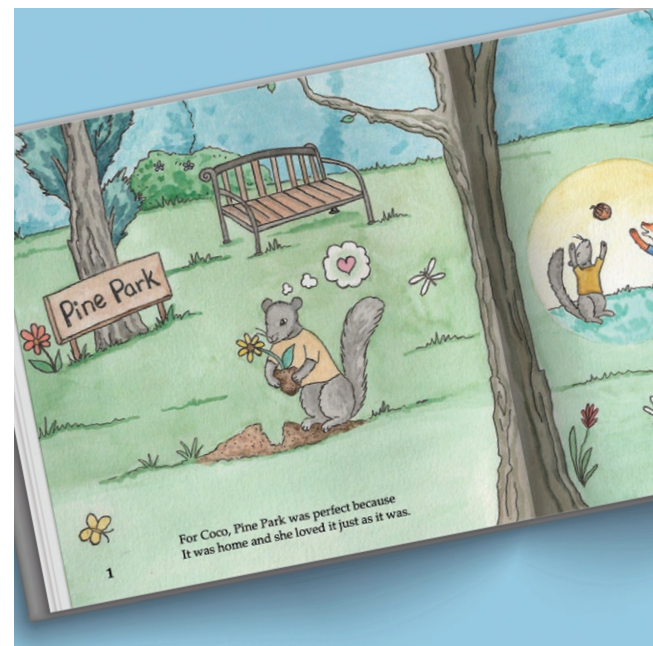
younger generation. We tend to say 'my generation messed up, good luck fixing it,'" he said. "Lena and I wanted to reframe that to something more empowering."

That goal led the couple to co-author a children's book to help parents, teachers, and therapists have what they call 'The Climate Talk' with children.

Their book, *Coco's Fire: Changing Climate Anxiety into Climate Action*, depicts the journey of a young squirrel named Coco. It addresses Coco's fears about climate change, offers tips for reducing anxiety and suggests actions that even a young child can take.

Environmental Influence

Wortzel first began thinking critically about the health effects of a person's environment — indoor, outdoor, and social — when still an undergraduate at Brown University. While there, he landed an internship with the Green & Healthy Homes Initiative, a nonprofit focused on creating



Wortzel and Champlin carefully considered the images in the book, which Champlin illustrated, to ensure they would inspire climate action rather than fear.

healthy, energy-efficient homes for low-income and immigrant families. The work placed him in conversations with politicians, social workers, and physicians who sought to "use medicine to write prescriptions for healthy homes and communities."

The experience inspired him to pursue an MD/MPH to better understand the connections intersecting psychiatry, social justice, and environmental health.

As a student at PSOM Wortzel did research on the relationship between socioeconomic disparity and asbestos exposure with the Center of Excellence in Environmental Toxicology. He also got involved with the Covenant House youth homeless shelter in Philadelphia, working with children who had been exposed to both chemical toxins and physical and emotional abuse.

"It showed me the incredible influence of environmental determinants on mental health as well as the power of resilience in young people. A young person could walk into the clinic burdened by their life experiences and through this magic of therapy — talking, listening, and seeing them as they are meant to be seen — they can begin to overcome and work through some of those traumas."

In a similar way, *Coco's Fire* provides another tool clinicians can use to help children overcome an environmental stressor, said Wortzel, who began his residency this summer in Psychiatry on the Child Track at Brigham and Women's Hospital in Boston.

Working Together

Collaborating creatively with his fiancé came naturally to Wortzel, who confesses their shared apartment displays many of the couple's past craft projects.

It was the COVID-19 pandemic that altered their experience — for the better. Working remotely removed the time lost to commuting, giving them more time together. Plus, the book gave them the opportunity to create something positive together during a very challenging time.

"It's an emotionally challenging topic, so it was essential to have a partner who inspires and supports you," Champlin said.

It was also vital to consult with experts who could ensure their book's content was developmentally and age appropriate.

The couple reached out to the Group for the Advancement of Psychiatry's (GAP) Climate Committee, which agreed to collaborate with them on the project. Together with GAP's team of mental health professionals and educators, they revised and shaped the manuscript.

"We thought a lot about the images used in storytelling, because they can influence climate fears or climate action," said Champlin, who also illustrated the children's book.

"Many of the pictures associated with climate change focus on forest fires or show a lone polar bear stranded on an ice cap. These images increase fear in young children."

They tested their materials using focus groups that included teachers, environmental scientists, therapists, parents, and their target market — children ages 6-10.

After an 18-month collaboration, they finalized their text and illustrations and published *Coco's Fire* in October 2021. A majority of the sales proceeds (65 percent) will help support research on climate change and mental health — an area where Wortzel's connections continue to deepen.

The project linked him to a vast network of professionals from GAP, the American Psychiatric Association, the Climate Psychiatry Alliance, and the American Academy of Child and Adolescent Psychiatry.

"For many years I felt alone in thinking about these more nuanced issues of mental health. Now I realize there's a growing community of psychiatrists and pediatricians who care about how the environment shapes our health and development," he said.

Coco's Fire has received praise from a variety of readers. Parents, grandparents, and teachers have sent grateful email messages, along with photos of children reading the book. Members of the mental health community have lauded its value and welcome it as a much-needed resource for parents wanting to have "The Climate Talk" with their children.

"The power of this book is that it starts a dialogue," said Wortzel. "One that will shape a future generation's approach to addressing climate change."

► Read this story online at PennMedicine.org/magazine/Coco



NO PLACE LIKE HOME

HOME HEALTH CARE IS EVOLVING FROM CONVENIENCE TO A CRUCIAL EDGE FOR THE FUTURE OF MEDICINE.

AND BRINGING PATIENTS THE RIGHT CARE IN THE RIGHT PLACE



GP

By Jen A. Miller

Photos by Peggy Peterson
and Graham Perry

Robin and Lauren Magaziner got the bad news at just about the same time. After a relative learned that her breast cancer was tied to having a *BRCA1* gene mutation, the New Hope, Pa. mother/daughter pair also underwent genetic testing, and found that they, too, carried the harmful mutation.

Along with other elevated cancer risks, a *BRCA1* mutation brings a 55 to 72 percent chance of developing breast cancer over an individual's lifetime, according to the National Cancer Institute. The Magaziners came to the same conclusion: Rather than having what Lauren calls a "ticking time bomb" in their bodies, they both underwent double mastectomy with DIEP flap breast reconstruction, which uses abdominal tissue in place of implants.

Lauren, an author of middle-grade fiction, went first, in March 2022 and mother Robin, a retired school teacher, six weeks later. Each accompanied the other to appointments prior to surgery, providing shoulders to lean on at every step of their shared journey. Afterwards, instead of repeatedly driving from their remote Bucks County home to their surgeon's office in West Philadelphia, they both also received regular visits from Erin McCarthy, RN, NP, registered nurse case manager with Penn Medicine at Home. McCarthy did everything from adjusting medication to checking and eventually removing their surgical drains. One time, when Robin developed an open wound, McCarthy used telemedicine to contact her surgeon so they could, as a team, examine and address the problem.

"Erin reached one of my doctors right away, and I was able to get medicine quicker because of her," said Robin. "She was able to get the care I needed before it got worse."

Having care at home saved the Magaziners time and stress after major surgery. "I loved that I was able to do this right from the house, because otherwise we'd have to drive 40 minutes and then wait in a doctor's office," said Lauren.

"Longer in traffic!" Robin interjected.

Plus, "during recovery, I didn't feel comfortable being in the car because the seat belt pulls on your chest and stomach," Lauren said.

"The vibrations from the car can make it painful," Robin added.

Penn Medicine provided nearly 730,000 home care visits for patients like Lauren and Robin Magaziner in the 2021 fiscal year. The push towards offering patients more clinical care inside their homes and outside of medical offices had begun before the COVID-19 pandemic. But COVID turbocharged the progress and prompted even more expansion of services offered.

"Home care has always been possible, but before the pandemic we hadn't had such a big driver to make this shift in care," said Joan Doyle, RN, MSN, MBA, CEO of Penn Medicine at Home. COVID became that driver. "It made us re-think who needed to be in the hospital. Patients, especially those who are chronically ill and/or are immunocompromised, re-evaluated whether they really wanted to go to a clinical care setting at all," she said. "There was an increased openness from providers and patients to see if this could work."

It did work — and it's sticking around. The Centers for Medicare and Medicaid Services (CMS) expects home care expenditures to reach \$201 billion by 2028, a 73 percent increase from 2020. This explosive growth has been enabled by both patients' and providers' desire to do at-home care, plus COVID-driven investments and advances in technologies for telehealth and remote patient monitoring.

Not only has the shift to care at home been better for patients, but it also keeps hospital beds open for very sick patients at a time when many acute care hospitals are closing, and cuts down on health care costs. A 2018 study published in the *American Journal of Medicine*, for example, found that home health care saved \$15,233 per patient for the first year after discharge from the hospital, across specialties.

For a patient receiving a complex medication infusion at home, such as a cancer therapy, a broader array of home care is also available to meet their needs, like physical and occupational therapy, said Sarah Johnson, MBA, chief operating officer for Penn Medicine at Home. It helps practitioners get "eyes on a patient in their home and maybe see if there are stressors we can address," she said. "You can find out about something you didn't know before because their cancer team only interacted with them in at the doctor's office."



Lauren Magaziner, an author of middle-grade fiction books, had a preventive double mastectomy after learning she had a *BRCA1* gene mutation. Penn Medicine Home Care nurse Erin McCarthy, RN, NP, provided follow-up care at home.

Complex Care with Fido by Your Side

Health care at home is nothing new. Midwives have been helping women give birth in their home beds for centuries. The town doctor routinely made house calls. Hospice care, when appropriate, can be given in the familiar setting of a patient's home, with friends and family around.

While it grows from an old tradition, home care today spans a number of specialties and treatments that are far more complex than imagined in days past. Among the more recent additions: cancer treatments, which in the U.S. have historically been delivered in outpatient or hospital care settings.

In late 2019, the Penn Center for Cancer Care Innovation at the Abramson Cancer Center and the Penn Center for Health Care Innovation brought together a multidisciplinary team of experts to explore if home cancer treatment could — for appropriate drugs and patient populations — take the place of inpatient or outpatient infusions of chemotherapy and other drugs. They decided to pioneer a new program — Cancer Care at Home — which was the latest of many innovation efforts at Penn Medicine aiming to safely deliver health care in settings that patients found more convenient, at lower cost. The team focused on safety and ensured that the care delivered at home during infusion of cancer drugs was just as safe and effective as administration in the clinic. And they took advantage of the fact that Penn Medicine at Home had cared for patients with cancer for the past two decades — delivering IV fluids and other treatments — even if it was brand new to actually administer cancer drugs in the home.

Very soon after the program's official launch in February 2020, the COVID-19 pandemic made scaling it a matter of urgency. During the first month of the Cancer Care at Home program before the pandemic arrived, nurses with Oncology Nursing Society certification treated 39 patients with breast cancer, prostate cancer, and lymphoma, who can receive seven different cancer treatments at home.

“Once COVID hit, we had a lot of outpatient areas that were limiting the number of people — if any — who could get into a facility, so we shifted as many treatments as we could into the home setting,” Doyle said.

When stay-at-home orders were issued in March 2020, Cancer Care at Home was prepared and scaled the program nearly 700 percent — in just six weeks.

“Penn’s Cancer Care at Home program showed that it was safe and effective to receive cancer drugs from the comfort of your own home in a familiar environment, even with your dog sitting right next to you,” said Justin Bekelman, MD, a professor of Radiation Oncology, Medicine and Medical Ethics and Health Policy and director of the Penn Center for Cancer Care Innovation. “The pandemic pushed us to scale up quickly, which helped us truly see how wide this program could go. It’s now a standard of care at Penn



The Magaziners' two cats helped them recover at home, too.



Robin Magaziner, a retired schoolteacher, had a prophylactic double mastectomy and breast reconstruction six weeks after her daughter, Lauren. Nurse Erin McCarthy helped both of them review medications, checked on wounds, and removed their surgical drains.

Medicine to administer cancer drugs at home for appropriate patients.”

The result is a win not just for patients themselves, but also for the health care system, which operates more efficiently when there’s more capacity to care for those patients who truly need to be in an inpatient and outpatient facility. And it cuts down on costs — for patients and their insurance companies — by shifting care into a lower-cost setting.

Innovations and Growth

Penn Medicine is a place known for its inventions and “firsts” — the first medical school in the nation, first hospital, first FDA-approved cellular and gene therapies, mRNA technology underlying the first COVID vaccines, and many more. In the late 1960s, one of those firsts became the earliest antecedent to what is now known as Penn Medicine at Home.

In 1968, physicians at the Hospital of the University of Pennsylvania (HUP) were caring for a 36-year-old woman with metastatic ovarian cancer. Her tumor was inoperable, and she was gravely ill, unable to eat. A young surgeon, Stanley Dudrick, MD’61, GME’67, and his mentor, Chief

of Surgery Jonathan Rhoads, MD, had recently invented feeding technology that would soon revolutionize medicine: total parenteral nutrition (TPN), or intravenous feeding. Working with the hospital’s pharmacists and alumni physicians in the patient’s home town, they were able to discharge her to receive TPN at home, 120 miles from the city, to spend her final six months with her husband and young children.

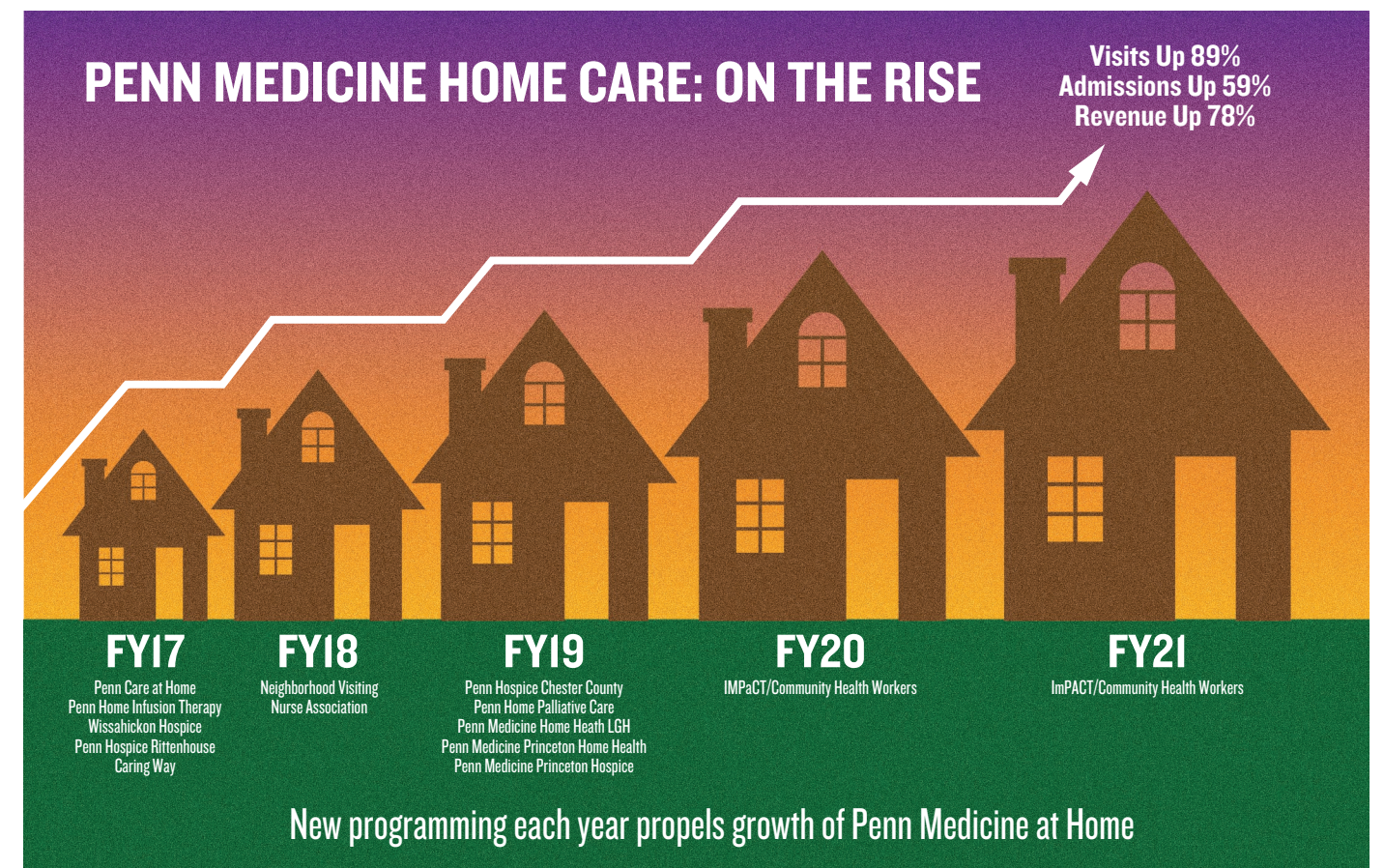
A little over two decades later, in the early 1990s, James L. Mullen, MD’67, approached Doyle, who was then a nurse manager at HUP, to ask her to help him run the hospital’s nutrition support service and start a home infusion company. They started with about 50 patients at the launch of Penn Home Infusion Therapy — a service that today cares for more than 2,500 patients at any given time.

Over the 30 years since, Penn Home Infusion Therapy has coalesced with a wide range of other services and programs under the umbrella of Penn Medicine at Home: home health, hospice, palliative care, and the community health worker program. In that time, Penn Medicine has also expanded its scope of services beyond the established home care specialties of skilled nursing; medical social services; home health aides; and physical, occupational, and speech

therapy. In total, Penn Medicine at Home has 980 direct employees, not including office support staff.

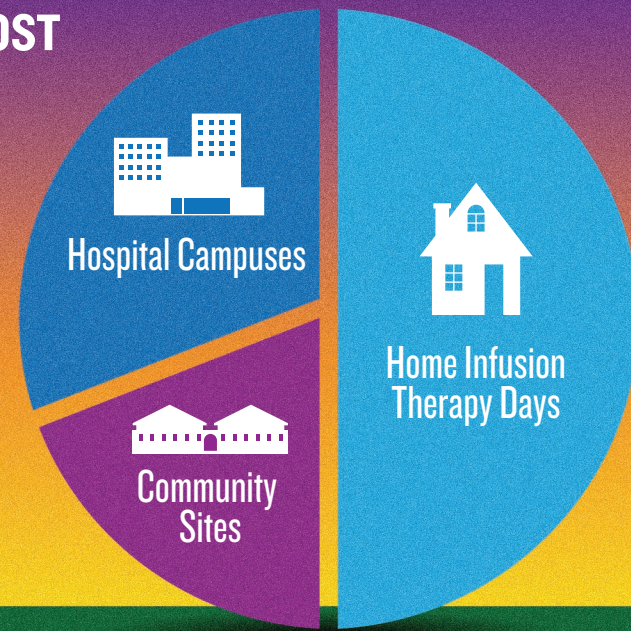
Clinical teams from across specialties at Penn Medicine have particularly worked to expand and innovate in recent years by running pilots, like Cancer Care at Home, and studies to determine how to safely provide more complex medical care in patient’s homes. They’ve integrated technological advances such as telehealth and remote monitoring tools, to provide a seamless experience for patients who either stay in their homes or go through transitions between inpatient and outpatient settings, telehealth, and home-based care as an integrated part of care at Penn Medicine. The services today span and connect to all six of Penn’s hospitals across the region, from Lancaster County in central Pennsylvania to Princeton in central New Jersey.

“A patient anywhere in the Penn Medicine system, we are able to provide care for that patient at home,” Doyle said at a Health System town hall event this spring. “I believe it is a



PENN MEDICINE DELIVERS MOST INFUSION THERAPY AT HOME

Outpatient Infusions and Chemotherapy, FY22



Penn Medicine delivers substantially more chemotherapy and biologic infusions in patients' homes than in outpatient clinics based at hospital or community locations. Kevin B. Mahoney, CEO of the University of Pennsylvania Health System, describes this pattern as "dramatic" and "unusual." "This really will be part of the secret to our success as we go forward."

huge differentiator for Penn Medicine to have such a strong home care program that can provide an array of services."

Then there is the chart that Kevin B. Mahoney, CEO of the University of Pennsylvania Health System, says he thinks about every day. At the livestreamed town hall event this spring, Mahoney projected it on the screen during his opening remarks, describing the growth and importance of home care for the entire 47,000-person Penn Medicine workforce. Three groupings of vertical bars show how many infusion therapies the health system provided at different outpatient settings in the last four years — advanced treatments such as chemotherapy and biologic medications. At the left, a group of dark blue bars show about 30,000 outpatient infusions per quarter at Penn's hospital campuses. The center cluster shows that a more modest number of infusions occurs at community sites. And then the third cluster of bars towers over the others, showing home infusion therapy days — consistently far exceeding infusions delivered in either type of outpatient clinic, quarter after quarter, and growing.

"This is dramatic. This is unusual," Mahoney said, adding that other health systems in the region don't follow this pattern. "This really will be part of the secret to our success as we go forward."

Right Care, Right Place

Patients can now receive complex care at home for a broad array of treatments that — long ago or just recently — were only offered in clinical settings. Penn Home Infusion Therapy can treat patients for hemophilia; provide parenteral and enteral nutrition; infuse intravenous gamma globulin to treat autoimmune diseases, and colony stimulating factors for leukemia and bone marrow transplant patients; manage pain; and administer IV fluids, antibiotics, and biologic therapies for diseases from Crohn's disease to multiple sclerosis.

"We have specially trained pharmacists that participate in patient care and monitor those [home care] patients' treatments," said Doyle. Nurses are trained specifically to do infusion therapies and have access to pharmacists 24 hours a day.

The benefits of receiving care at home can be broader than one might expect from a simple change of venue from a medical office. Treatment at home can also ease some of the added burdens that aren't side effects from medications. It's what Bekelman calls "time toxicity," which is "the amount of time it takes just to be on the receiving end of all these medicines that can be truly life-saving and life extending." Requiring patients to come to clinical settings also increases out-of-pocket costs for travel, parking, time away from work and, in some cases, arranging and paying for childcare.

Penn's Cancer Care at Home has already been shown to cut down on trips patients need to make for clinical services

and time spent in the hospital. Patients with breast and prostate cancer were saved 12 outpatient visits per year — for injections they would typically need to receive every few months, for up to 10 years for breast cancer patients. Patients with aggressive lymphoma spent 25 fewer days admitted to the hospital when they were able to receive a combined-drug therapy infusion at home.

Breast reconstruction patients at Penn like Lauren and Robin Magaziner need 58 percent fewer clinic visits in just the first 30 days after discharge, according to a study Penn researchers published in *NEJM Catalyst*.

Safe and effective home care at Penn Medicine has also had a big boost from combining advances in technology including clinical equipment and telehealth — and parlaying them into permanent modes of treatment in combination with in-person care at home.

Treatment at home can ease some of the added burdens that aren't side effects from medications. It's what Cancer Care Innovation Center Director Justin Bekelman calls "time toxicity."

Advanced infusion pumps make it possible to provide controlled medication at home as safely as in the hospital, even when administered by patients themselves.

A growing number of Penn Medicine at Home patients receive equipment that monitors their vital signs and symptoms to augment their scheduled in-home visits and telemedicine visits with a nurse from a virtual case management team. Nearly 700 telehealth devices have been deployed to patients' homes. Penn Medicine Home Health has provided telehealth monitoring for more than 11,000 unique patients since the start of the pandemic, totaling more than 100,000 virtual visits.

Heart failure patients can have their weight and blood pressure taken at home and reported back to their care team virtually. Home palliative care patients are also treated through remote monitoring and then virtual visits. Post-surgical patients like the Magaziners are prompted to send text messages to update their care team about surgical drain output so their drains can be removed, at home, at the right time.

For Akilah Johnson, CPhT, who works as a pharmacy technician at HUP and has had kidney disease since her early teens, dialysis today is something she can do while she sleeps thanks to Penn Home Dialysis, a home care program

that operates separately from Penn Medicine at Home. The small machine she uses for peritoneal dialysis is digitally connected to her care team. "They have a better picture of what your dialysis cycles look like at night and make adjustments so treatments are better geared toward what you need," she said.

The ongoing improvements to remote monitoring technologies have helped to expand home care to help sicker patients than was possible in the past; they enable care teams to stay connected and know when a patient needs further intervention at home or truly needs to come to the hospital.

It's clear that many patients already prefer to receive care at home.

"For a lot of patients it's absolutely the convenience factor," said Home Care COO Sarah Johnson. "Schlepping to a clinic for your injection every month might not seem like a big deal, but if you get that injection at home, you're not going into a hospital and exposing yourself to the hospital environment when your immune system is compromised." For patients who receive continuous treatments like infusions, "how nice for you to be able to get your treatment at home and not be in a hospital bed," she added.

"It's deeply patient-centric care," Bekelman said. "It's making a world of difference to patients who have already been through a lot."

Connecting in the Community

Penn Medicine physical therapist Renee Jones, PT, DPT knows the importance of helping patients, especially seniors, with addressing real-world challenges within the context of where they'll be facing them: mostly in their homes. She has exclusively provided in-home care for 12 years, primarily in geriatrics. Many of her patients are homebound, and she's often helping them after they have been discharged from the hospital. A lower limb amputee herself due to a birth defect and then a car accident, she knows the importance of physical therapy and how it can help someone adapt to their world after a major physical change.

At-home care means helping patients live in their home by working within their environment, not a facsimile of it. "When you're in the hospital and having therapy, they have mock stairs. They have a mock washing machine. But when you're in someone's home, you're actually seeing what the challenges are, in real time," she said. Sometimes she can



Physical therapist Renee Jones, PT, DPT, helps Valerie Simon practice physical exercises on her front porch in Southwest Philadelphia.

suggest making changes to the home environment, something as simple as rearranging furniture, to make living in that space easier for a patient. “I can address whatever issue they have in terms of their function in their home because I am there in the home,” she said.

She will also go over a patient’s medications and make sure that they are being taken appropriately. On one recent visit, Jones found out that a patient was taking a medication that had expired in 2004, and that the patient stored the rest of their medication loose in a plastic bag. That

prompted a telehealth visit with the patient’s doctor. Jones has also had patients on oxygen swear that no one in the home smokes, only to find an ashtray in the living room.

Jones works in the same community where she lives in Southwest Philadelphia, and knows she’s bringing Penn’s high level of care to patients who may not have the means and resources to travel back to a clinical care setting for physical, occupational, speech, or other kinds of therapy after a hospitalization.

“We get a view that no other clinician gets,” she said. “We see challenges, we see changes, we see declines, we see improvements. Since we’re in the home, we catch a lot of things.”

Community health workers — another important faction of Penn Medicine’s home care work force — are particularly attuned to helping patients deal with challenges in their daily lives that impact their health. The Penn Center for Community Health Workers, which now sits under the umbrella of Penn Medicine at Home, was initially established nearly a decade ago by Shreya Kangovi MD, MS, an internal medicine physician and researcher from Penn’s Perelman School of Medicine. The center hires and trains non-medical professionals from the community to work long-term with patients to help them manage and prevent chronic disease and its complications. The program is one of the largest and most comprehensive in the field and a national model for promoting health equity, preventing hospitalizations, and reducing health care costs. For individual patients, especially those from marginalized backgrounds or experiencing poverty, it’s a rare opportunity to build real trust with a person connected to the health care system.

As Ernest Gardner, a senior community health worker, described at the spring Health System town hall, sometimes it takes time to get a patient to feel comfortable opening the door to their home. Gardner gradually built trust with one such patient, who had been repeatedly admitted to the hospital for chronic obstructive pulmonary disease (COPD), especially in the summer months. “I visited his home in 90-degree weather,” Gardner recalled. “All he had was a box fan for ventilation and cooling, so that definitely contributed to his COPD exacerbation.” Gardner shared that information with the patient’s primary care practitioner — and ultimately she purchased an air conditioner for her patient.

Penn is also using partnerships to help its community-based workforce have the most impact, and extend to other sites where patients live which might not be customarily thought of as “home.” For example, an influx of severely ill COVID-19 patients who were nursing home residents in 2020 provided an impetus for Penn Medicine to forge stronger connections with nursing homes, initially in West Philadelphia. Penn Medicine at Home stepped in to sustain health and prevent the need for hospitalization. With grant funding from the state of Pennsylvania, Penn Medicine at Home has expanded its partnerships to 800 long-term care facilities across the region, not only advising on COVID response as it did from the early days of the pandemic, but also working with facilities on quality improvement to improve care for residents and staff satisfaction.

During the COVID vaccine rollout, the health system’s effort to get shots into peoples’ arms in the most convenient places, from churches to recreation centers, also extended into the home. Penn Medicine partnered with the Philadelphia Department of Public Health to give about 5,000 COVID vaccines to people in their homes, many of them home-bound seniors, and became the largest home provider of vaccines in the city.

Challenges on the Road Ahead

As much as some patients benefit from receiving care at home, it’s not right for everyone right now. About 3,000 of Penn’s cancer patients receive care or supportive services in their home, but that only accounts for about 20 percent of patients receiving cancer care from Penn Medicine.

“Patients who receive really complex chemotherapy can’t really do that at home,” said Home Care COO Sarah Johnson. “For many of our patients, we want them in a hospital suite with access to rapid response in case they need it.”

In order for a patient to receive cancer treatments at home, they must “have a low risk of adverse events, have tolerated the treatment, and are likely to continue to tolerate the treatment well,” Bekelman said. Their cancer drug must also be easy to transport and then refrigerate at the right temperature at home, if necessary.

Medical providers also have to account for what is involved if an adverse event does happen. “Some of these side effects are things patients would experience in the clinic — the same at home. If a nurse can help with those in a home care set-



ting, then there's no reason we can't administer it at home," he added.

Safety is also a concern for clinicians, especially for those traveling to patients' homes in areas with high crime rates. Home care staff wear a device with a button that, when pushed, immediately connects them to security. That person can listen in and call 911 if necessary. Staff are also trained on safety protocols and, if desired, can request that security personnel accompany them to home appointments.

"It's exceedingly important that we do everything we can to make sure our staff is safe when going into people's homes," said Doyle.

Penn also faces the same staffing shortages that have hit health care systems across the country, and without enough staff, home care services can't happen. "The last two years have been extremely hard and challenging on our entire

Keeping patients at home means that hospital facilities have more space for those patients who truly need to be there. Home care can relieve bottlenecks in access to specialists, too.

team," said Doyle, including on nurses, therapists, social workers, physicians and leaders.

"We recognize that the job is hard and it requires commitment and dedication, so we're looking at ways that we can accelerate recruitment and improve retention — all those things that make an organization an employer of choice," she said.

While retaining the home care work force is crucial, so is making sure that their work is adequately funded. Home care services often fall outside typical health insurance payment models, yet health systems providing this care must find ways to be reimbursed, and not burden patients. In some cases, Medicare patients are charged higher out-of-pocket costs for not coming into a facility, said Bekelman.

While CMS is anticipating a major jump in at-home care spending, "payment methodology for home services should be expanded to allow for services outside of what they accommodate now," said Doyle. "I'm hopeful these models will start to shift for home services so we can get paid for many of the treatments we want to provide that aren't provided for under current regulations."

Expanding the Business

Despite the complexity of who is going to pay for these services, administering them in the home does reduce costs, especially for cancer and infusion therapies. When patients are cared for at home, they don't require a facility charge because the facility is their own personal space.

Keeping patients at home also means that hospital facilities have more space for those patients who truly need to be there. That was crucial in the first surge of the COVID-19 pandemic. "We were worried that our health system, like many health systems in the country, would be over capacity," Doyle said. By ramping up home care services, thousands of patients with less-acute COVID-19 infections were able to receive care at home through remote patient monitoring and expanded delivery of things like oxygen and infusions into the home care setting. At the same time, existing and expanded home-care and telemedicine programs helped patients with other conditions receive the care they needed outside of the hospital.

Even without a COVID surge driving demand for hospital space, it's still good business sense to sustain and expand capacity at the health system's facilities. Hospital closures across the region have already increased demand for the remaining inpatient beds, and industry experts anticipate more closures in the years ahead. For Penn Medicine, additionally, home care can relieve bottlenecks in access to specialists. For example, the Plastic Surgery department developed the Connected Approach to Recovery home-care program that Lauren and Robin Magaziner used, in part, to free up physicians' time spent in follow-up appointments. At the time, demand was so high that fewer than half of new patients, many of whom were newly diagnosed with breast cancer, could get an appointment within two weeks.

In the years ahead, Penn Medicine's expansion of acute care offerings for patients in their homes is likely to continue — more patients, with more conditions, and more types of medications.



James Whalen receives home visits from local student nurses who train through the Penn Medicine at Home program Senior HealthLink, which is designed to check in on senior clients and ensure they can maintain their health safely at home. At the same time, the next generation of nurses gains experience in the growing area of home care. Read more about Senior HealthLink at Service in Action: CommunityImpact.PennMedicine.org.

Bekelman expects that the types of cancer drugs they can give at home will expand, especially as the FDA greenlights more at-home administration. Several monoclonal antibody and other targeted therapy cancer treatments approved by the FDA in the last two years, for example, can be administered at home.

Penn Medicine at Home is further making strategic investments in expanding home infusion therapy across the region, with the integration of Horizon Healthcare under the full ownership of Penn Medicine Lancaster General Health (LGH) in January 2022. It was formerly jointly owned by LGH with Penn State Health and Tower Health. Horizon provides home infusion and enteral nutrition services in over 40 counties throughout Central and Eastern Pennsylvania. The collaboration between Horizon and Penn Home Infusion teams is still in early stages, Doyle said, but it has exciting potential both in terms of sustaining a wide

geographic reach for Penn Medicine patients to receive home infusion across the region, and in terms of building a deep bench of highly skilled home infusion staff.

Penn's kidney care programs, which already include at-home care for many patients, are expanding and innovating, too. In March 2022, Penn Medicine formed a joint venture with Nashville-based Evergreen Nephrology. The program has contracted with CMS to provide value-based care for Medicare patients with advanced chronic kidney disease or who are on dialysis, with the goal of reducing the need for emergency department visits and hospitalizations. Penn Medicine is the first academic medical center to partner with Evergreen, and the payment model is intentionally designed to improve patient outcomes while reducing costs. It will provide in-home and other support services, encourage



During physical therapy appointments at home, Renee Jones helps Valerie Simon practice toward her ultimate recovery goal after a hip replacement: being able to walk to the corner store and cross the street before the light turns red, using a cane rather than a walker.

and facilitate use of home dialysis, include initiatives to delay the need for dialysis, and expedite access to kidney transplants.

That means more patients like pharmacy technician Akilah Johnson will stay out of the hospital and receive the care they need at home while waiting for a transplant — something that has made a big difference for Johnson, who has dealt with kidney disease most of her life and had two prior transplants. She started receiving dialysis at home for the first time just as she was starting ninth grade. As a result, she didn't have to take time off school for dialysis treatments, or travel to and from a dialysis center several times a week. Johnson was able to graduate high school on time, earn a college degree in biology, and start a career in the medical field, all without her life revolving around treatments for her chronic illness every other day.

The value of that convenience at any stage of life is hard to overstate. As the baby boomer generation continues to enter its geriatric years, the aging population has become a large driver of Penn Medicine's ongoing efforts to expand home care. About 10,000 baby boomers are turning 65 every day at the same time that the number of hospital beds across the country is declining, according to a *Journal of General Internal Medicine* study. The study also found that rates of diabetes, cancer, and obesity are higher in baby boomers than previous generations, which may in turn increase health care demands. Baby boomers are expected to push healthcare spending to \$6 trillion by 2027, according to CMS.

A 2021 NORC at the University of Chicago study found that 88 percent of respondents would prefer to receive any ongoing assistance care as they age at home with loved ones. The survey also found that about half of respondents think Medicare should have a large responsibility for paying for ongoing living assistance, and a similar percentage expect to rely on it as they age.

"We are really focused on figuring out where we're going to care for the aging population," Doyle said. "And most of those people want to stay home."

Penn Medicine at Home runs a small geriatrics-focused program in West Philadelphia which leaders hope to expand to meet needs in other areas. For patients, mainly seniors, who need primary care but are unable to travel to a clinic — and who can't have all their needs met through telemedicine — a small primary care at home program may be tapped for expansion. There's also an initiative to bring Penn Medicine physicians to retirement communities to make care more accessible. And Senior HealthLink, a program that pairs nursing students from local universities with home care nurses, offers patients in Chester County with ongoing monitoring and consultation to ensure they will stay healthy after they no longer need skilled nursing care at home.

This generation overwhelmingly wants to age at home (77 percent of people 50 and over according to AARP), which programs like Penn's enables.

For Valerie Simon of Southwest Philadelphia, returning home from the hospital after breaking her hip this summer was only the first step toward staying there. A retired grandmother with Parkinson's disease, Simon has a particular destination in mind in her recovery: the corner store just a short distance away, so close it's visible from her front porch. Before this most recent fall, if she needed an onion or a half dozen eggs, she could walk there using just a cane that she could carry down the stairs herself. Now, she relies

"We are really focused on figuring out where we're going to care for the aging population," said Joan Doyle, MSN, MBA, CEO of Penn Medicine at Home. "And most of those people want to stay home."

on a walker that is too bulky to hold while gripping the stair railing, and she gets fatigued trying to cross the busy street before the light turns red.

If she were going to physical therapy appointments in a clinic, Simon would still do the same exercises for strength, endurance, and balance that Renee Jones does with her at home. But she wouldn't get the real-world practice she does with her home-care physical therapist at her side.

On a recent crisp September morning, after leaning on her sturdy stone porch post for balance during her strength exercises, Simon navigated the uneven sidewalks with Jones at her side. Jones then helped her repeatedly practice stepping up at the curb's edge in front of the store to ensure she knows how to avoid tripping. Along the way on the slow, careful walk, the two laughed and joked like old friends.

When they arrived back at Simon's front steps, she sat on her walker to rest for a few moments. She was tired — she wasn't yet able to do all she hoped for, or to do it on her own — but most importantly, thanks to Jones' attention to the exact care she needed, in the place where she needed it, she was getting there. And she was home. ▢

► [Read this story online with related links and videos at PennMedicine.org/magazine/homecare.](https://www.pennmedicine.org/magazine/homecare)

THE PAVILION

A Day in the Life

In late October 2021, the new, state-of-the-art inpatient building at the Hospital of the University of Pennsylvania (HUP) welcomed its first patients. In the year since then, on any given day, hundreds of people — patients, staff, and visitors — come to the Pavilion for the world's most advanced health care in a setting that inspires serenity and comfort.

The 17-story building on Penn Medicine's West Philadelphia campus, which includes 504 private patient rooms and 47 operating rooms, is an expanded footprint of HUP. The Pavilion houses inpatient care for cardiology and cardiac surgery, medical and surgical oncology, neurology and neurosurgery, thoracic, vascular and transplant surgery, and it is now home to HUP's emergency department.

In the center of a vibrant clinical and research campus, the Pavilion was designed to bring clinical care and research together, and to be a centerpiece of Penn Medicine's world-class expertise in bold approaches to treating diseases.

A "future-proof" building with flexibility to adapt to changing needs was the goal in designing the building. That flexibility was put to the test during the Pavilion's first year of operation, as the Omicron variant of COVID-19 first surged within a few months of opening. To meet those patients' needs, a unit in the building was converted to all negative-pressure rooms.

But the future that the Pavilion heralds is truly just beginning, and the promise of that future is evident in the buzz of activity every day: It's the warm greeting between colleagues in the lobby. It's the confident stitching of a surgical resident who has just helped a patient breathe in new life from healthy new lungs. It's the glint of hope in the eyes of the grandfather whose lymphoma has resisted chemotherapy, who will now use his body's own immune cells to fight the cancer and win. It's the next discovery being made across campus today that will save lives tomorrow, right here.

Watch online: Get a soaring view of the Pavilion in an Emmy award-winning soaring drone tour of the building.
[PennMedicine.org/magazine/Pavilion2022](https://www.pennmedicine.org/magazine/Pavilion2022)



From the Outside, In

An acre of greenery surrounds the Pavilion, which has achieved LEED Healthcare Gold Certification for the overall sustainability and energy efficiency in the building's design. The building is the largest certified project in the world to achieve Gold certification or higher in LEED v4 Healthcare (the latest LEED Healthcare rating system version).

The green spaces include both green roofs and ground-level gardens including the Harrison Garden (above), an area filled with native plants that connects the Pavilion to the Penn Museum.

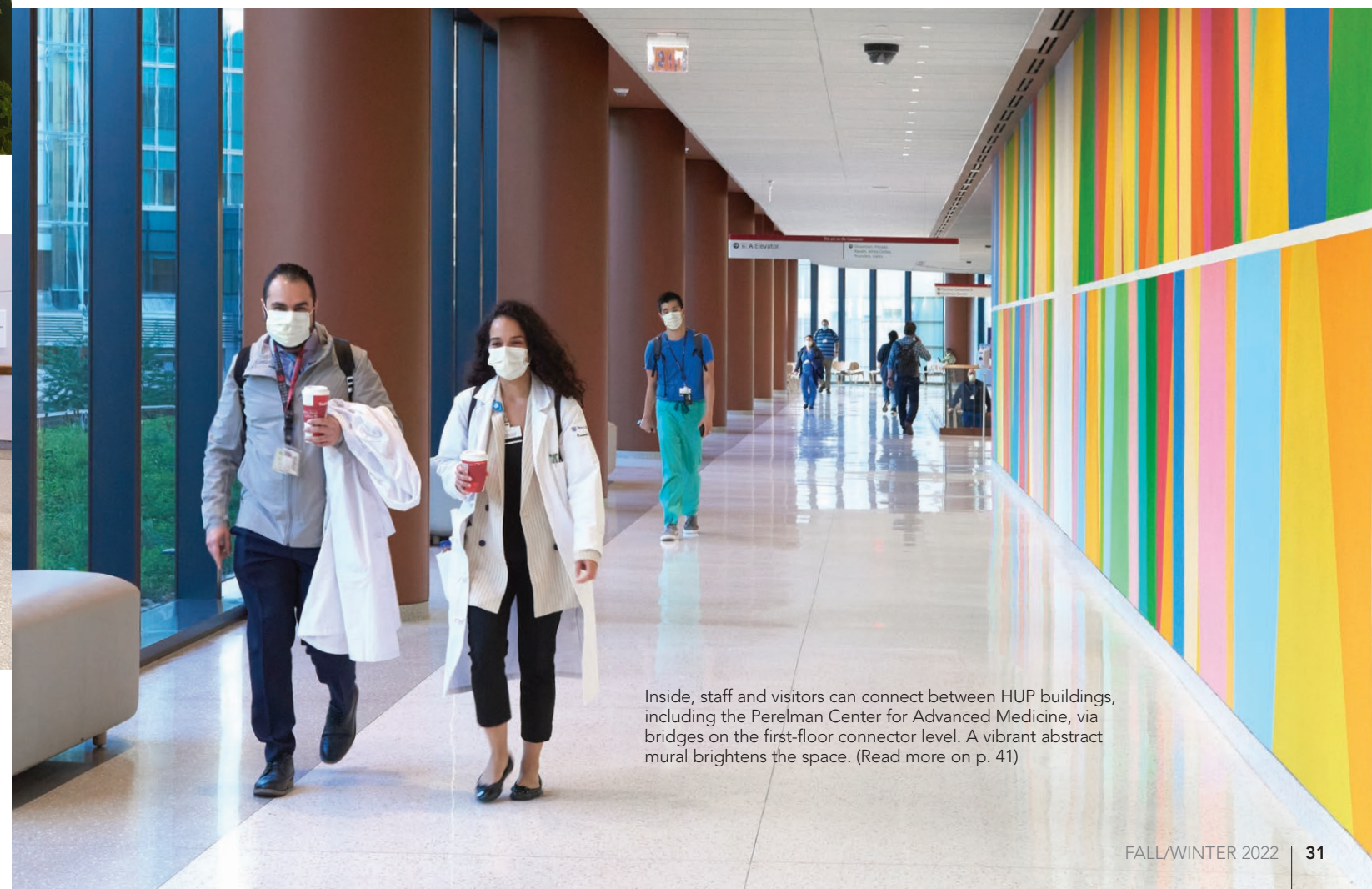
The native and hardy species of plants used in these landscaped areas require minimal watering and maintenance. Overall, the energy efficiency efforts inside of the Pavilion are anticipated to save more than 14 percent in annual energy costs compared to merely a code-compliant hospital. The building itself also uses 100 percent outside air through its HVAC system, using energy recovery wheels as a tool to transfer heat and humidity in order to maintain fresh ventilation while reducing the loss of energy.



Visitors receive a warm welcome in the ground floor lobby, where patient ambassadors greet those who enter the hospital from a spiral-curved wooden desk. Designed by the Pavilion's architecture firm Foster + Partners, the white oak desk was built in Maine at the boat shop of Rockport Marine together with craftspeople from furniture maker Thos. Moser.



The Discovery Walkway, lined with benches and plantings, is a new main artery for commuters to the HUP campus. From the Penn Medicine SEPTA regional rail station, a new bridge spans Convention Avenue toward a Pavilion entrance. The walkway runs between the Pavilion building and Penn Museum to connect to a new pedestrian crosswalk to the original HUP inpatient buildings at 34th and Spruce Streets.



Inside, staff and visitors can connect between HUP buildings, including the Perelman Center for Advanced Medicine, via bridges on the first-floor connector level. A vibrant abstract mural brightens the space. (Read more on p. 41)



A High-Tech Home Away from Home

One day after receiving a bone marrow transplant, Peggylee Giles finds a respite in the many creature comforts of her room at the Pavilion. Her daughter, Jessica Swal, is able to work remotely from her mother's hospital room to keep her company during her extended stay in the Richard N. Berman Bone Marrow Transplant Unit.

"I'm not dying, that's for sure!" says Peggylee Giles, explaining her choice to wear sparkly sandals the day after receiving a bone marrow transplant in mid-August. The transplant came one week into her second extended stay at the Pavilion for acute myeloid leukemia; she expected to be confined to her hospital room for at least a month longer.

Features of the room that improve comfort and safety during an inpatient stay are especially critical for patients like Giles. During an extended stay after a bone marrow transplant, her immune system is not just weakened, but essentially regrowing from scratch. Amenities as simple as a pass-through supply cabinet that can be re-stocked with medications and linens from the outside, make a big difference.

There's a fold-out couch by the window where her daughter can keep her company while working remotely, as well as high-tech amenities at her fingertips.



Poppy Bass, senior project manager in Penn Medicine Information Services, demonstrates the technology available in the foot wall of each patient's room.

IRIS — a 75-inch screen and smart board is more than just a large-screen TV at the foot of her bed. The technology gives patients comfort controls for the room's lighting, shades, and temperature. IRIS is also integrated with the health care experience. It shows information about each member of the health care team and displays their name, photo, and job role, as they enter the room. Physicians can project patient scans onto the screen to engage the patient and their family in discussions of their treatment.

And it lists each patient's daily schedule and a daily goal. For Giles, on this day, that's a continuing celebration from yesterday: Happy birthday to her new bone marrow cells!

Across the spectrum of cancer care, bringing together all of HUP's inpatient cancer services to one location in the Pavilion is streamlining patient care. If patients experience any serious side effects or infections during their treatment, they benefit from critical care support and a dedicated oncology intensive care unit. Care teams can respond quickly, recognize signs and symptoms, and get patients the more advanced care they need quickly, including, if needed, a move to the nearby oncology intensive care unit. Patients can be treated with personalized CAR T cells, and they can take part in clinical trials for the next advancements of CAR T and other innovative therapies that may be manufactured in Penn's connected facilities.

Guiding Light



The Pavilion's hybrid operating rooms enable surgeons and physicians to work side-by-side and perform image-guided surgeries, like those using FORS, with greater precision. Above and at right, Darren Schneider, MD, chief of Vascular Surgery and Endovascular Therapy, performs an endovascular procedure using FORS.

Imagine performing a delicate, complex surgery like an aortic aneurysm repair without using X-rays to see inside the patient's vessels and move instruments and devices where needed.

In fact, endovascular procedures like this are happening every day in the Pavilion. Fiber Optic RealShape (FORS) technology, a new platform from Philips, renders 3D views in real time using fiber optics, without using radiation. It works by sending pulses of light through hair-thin optical fibers that are integrated within the instruments themselves. This significantly reduces radiation exposure for patients, physicians, and staff; enhances precision for minimally invasive procedures; and shortens the length of time in the OR.

At the Pavilion, Penn Medicine is one of only five U.S. sites premiering the cutting-edge FORS technology, and is also participating in clinical studies to evaluate its impact on procedures and guide improvements.

FORS is one of the marquee technologies in use at Penn Medicine's first-of-its-kind Aorta Center, which provides interdisciplinary care for patients with aortic conditions, including access to cutting-edge clinical trials. And it is just one



of the advances in heart and vascular care at the Pavilion. For the first time at HUP, teams from Cardiac Surgery, Vascular Surgery, and Cardiology are co-located, which provides multiple opportunities for collaboration and integrated care — including for surge and overflow planning and cross-training nurses in all three specialties. To keep staff trained in the latest technical and non-technical skills, a dedicated heart and vascular simulation center is embedded on the same floor as the Heart and Vascular intensive care unit.

Eyes on the Brain

Research and clinical care in neurology and neurosurgery are unified at the Pavilion. The 12-bed Epilepsy Monitoring Unit (EMU) has double the capacity of the former EMU space, and it's paired with a state-of-the-art clinical control room (below) where EEG technologists and neurologists provide continuous monitoring of epilepsy patients for seizure activity. Nearby, a dedicated Human Neurophysiology Research Laboratory is geared toward research and the development of new technologies based on insights from monitoring activity deep in the brain.



Fp2 - F4
F4 - C4
C4 - P4
P4 - O2
Fz - Cz



FEATURE

A dedicated MRI for neurology and neurosurgery research is a major convenience for patients who are participants in clinical research that involves frequent or repeated brain scans. The scanner is within easy reach of patients' rooms, often on the same floor, rather than a greater distance across the hospital.





Saving Lives with Scalpels

Robert R. Redfield, III, MD, FACS, leads a laparoscopic surgery on a living kidney donor.



The Pavilion's spacious operating rooms allow large teams to work together. These rooms were also built with future needs in mind, with panels that can be swapped out for installation of the latest technology.



Most commonly living donors and their recipients have their surgeries in adjacent operating rooms. Here, Redfield carries a donor kidney to the recipient's OR.



While many hospitals place their operating rooms in dim interior spaces, the Pavilion's OR floors are situated along hallways bathed in natural light from large windows that overlook the medical and university campus and the city skyline.

Natural light streams through the large windows lining the hallway as the patient is rolled to the operating room. A surgical nurse meets him at the sliding door, introduces herself, and asks him to confirm his name and what surgery he is about to receive. Today, he's donating a kidney for his cousin — she lives nearby, he flew from several states away — and the procedure will be done laparoscopically, through a small incision. He rolls into the room, and after he is positioned and under anesthesia, the lights dim. Robert R. Redfield, III, MD, FACS, surgical director of Penn Medicine's Living Donor Kidney Transplant Program, then gets to work.

Penn Medicine has been a leader in transplant surgeries for more than half a century. Each newly transplanted organ in the Pavilion's ORs adds a new page to that storied history.

The Pavilion's 47 large operating rooms have space for large surgical teams and large equipment such as surgical robots. All living organ donation surgeries here are performed laparoscopically in order to ease the process and minimize scarring and recovery for donors, and a growing number are being performed using surgical robots whose tiny instruments, inserted through the small incision, are maneuvered

by the surgeon working at a console. It's just one aspect of the Penn Transplant Institute's focus on encouraging living organ donation by enhancing the so-called #pennlivingdonor experience. A new Center for Living Donation at HUP is likewise designed to help make donation as smooth as possible, from the convenience of telemedicine for evaluation appointments, to local accommodations for donors who travel to Philadelphia.

Mind and Spirit



An installation of objects from the University of Pennsylvania Museum of Archaeology and Anthropology in the Pavilion's ground floor lobby shows some of the ways humans around the world have addressed healing, nourishment, and protection from illness from the ancient past to the present. This bronze cupping vessel is a reproduction of an ancient Roman artifact originally found in Pompeii and used to bring blood to the surface to draw out impurities or "balance the humors."



Nigerian-born, Philadelphia-based artist Odili Donald Odita (pictured) created the vibrant mural that spans the 50 feet in length on both the first and ground-floor levels. Titled "Field and Sky," the mural is designed to "create an exterior space within an interior," Odita says. "Each shape creates an individual landscape."

The hospital is a place to heal, and at the Pavilion that sense of healing comes in part from the tranquility and inspiration of the surrounding art. A soaring two-story sculpture in the lobby by artist Maya Lin, titled "Decoding the Tree of Life," captures light in its glass spheres and captures the imagination and calls to mind outstretched tree limbs, the structure of DNA, and the branches of the Schuylkill River. "I want to make you aware of your surroundings in the Pavilion, in this beacon of scientific advancement, connecting you to the physical and natural world around you while symbolizing the very essence of life," Lin said.

View this story online and explore Penn Medicine's Pavilion playlist on YouTube to hear from Maya Lin about "Decoding the Tree of Life," explore the technologies in use in the Pavilion, and more. Visit [PennMedicine.org/magazine/Pavilion2022](https://www.pennmedicine.org/magazine/Pavilion2022)

CLOSING THE GAPS IN CARE FOR THE CAREGIVERS

ELI CAPLAN'S MISSION TO END THE SUFFERING CAUSED BY ALZHEIMER'S



Janet Caplan

It's a story known all too well by every family living with Alzheimer's disease. Janet and Eli Caplan's story began like this: "No one knew what was wrong with her."

With symptoms manifesting over years, various physicians were offering different diagnoses. For example, during one winter vacation in Palm Beach, as they were readying for bed, Janet saw Eli and asked, "Who are you?" She took a beat and said, "I think you're my husband. I'm not sure." The doctor believed it was caused by anxiety.

"The doctors would see her at times when she was somewhat alert," Eli recalls. "But I saw things that no one ever saw."

Referred to (now Emeritus Professor of Psychiatry) Steven Arnold, MD, of the Penn Memory Center, she would receive a more comprehensive battery of tests. He told Eli that Janet was suffering from Alzheimer's disease.

"Oh my God, I feel so sorry for her," Eli recalls saying, to which Dr. Arnold countered, "I feel more sorry for you."

Janet would be under the care of Penn Memory Center Co-Directors Jason Karlawish, MD, and David Wolk, MD, while Eli received support from Executive Director Felicia

Greenfield, MSW, LCSW. But as Janet's condition progressively worsened, Eli would find how critically he needed that support network to grow.

An Indescribable Journey

Among the members of that network was a neighbor who helped Eli bring in a professional caregiver. How quickly a loved one's needs can escalate is stunning, and soon he would need her assistance 24 hours a day, seven days a week. It can wear out even the most dedicated caregivers.

"Yeah." He pauses. "I just can't describe it. It's something you just can't describe. The whole family, everybody associated with the loved one, gets it, no matter how wealthy you are. I couldn't do anything without my aide." Their presence allowed Eli the time and space to care for himself: taking appointments with Greenfield, having the occasional meal out.

His thoughts began to turn toward others trapped in the same situation with fewer resources and financial assets. "What of all these people who can't get out of the house?" he recalls asking Greenfield. "My heart bled for them."

No Caregiver Left Behind

To know the roots of Eli's compassionate spirit, there is the story of his family's business and their philanthropy. Keystone Weaving Mills, the family business based in Lebanon, Pa., was co-founded by Eli's grandfather, Julius, and father, Penn alumnus Hyman Caplan, W'23; Hyman also would establish the Julius H. Caplan Charity Foundation, and it has given more than \$9.2 million to a variety of organizations, including Penn Medicine. And it was during Eli's turn at the helm of Keystone that he made news in 1997. After a fire devastated the mills, he announced that he would keep all 85 of his employees on the payroll until



Eli Caplan

most of the 97 looms — made in and imported from Europe — could be replaced.

It should be little surprise, then, that Eli would be deeply troubled by the significant gap in care to support family caregivers. In 2016, the Caplans established the Caring Difference Fund, which allows the Penn Memory Center to make immediate investments in human capital: social workers, a patient navigator, interns from Penn's Master of Social Work program. That, in turn, provides the capacity to deepen expertise, expand its programming, and leverage additional funding from foundations. The Janet Caplan Endowed Fellowship Fund serves to memorialize Eli's late wife. Like the Caring Difference Fund, the Caplan Fellowship puts a focus on the Penn Memory Center's people, accelerating the recruitment and training of early career physicians so they can gain experience — and work to transform — dementia care.

Eli has hosted several fundraising events for the Center, and there's a moment from one such event he'll never forget. "Somebody heard my name, and he asked, 'Are you Eli Caplan?' I said yes, and he hugged me," Eli recalls. "And I wondered, 'Why are you hugging me?' He said, 'I'm with my wife all the time, and there would be no place to go for breaks or support if it weren't for you.'"

Meeting Deeply Personal Needs on a National Scale

According to the Alzheimer's Association, more than 11 million Americans provide unpaid care for people with Alzheimer's or other dementias; in 2021, they provided more than 16 billion hours of care valued at nearly \$272 billion. This is for the more than 6 million Americans currently living with Alzheimer's — by 2050, that number could reach 13 million.

"You can imagine how much money you need to raise, so our family's goal," Eli continues, "is to get other philanthropists to join our ranks to help hire really good technicians, therapists — provide social benefits for all the people. There's no place in the world like Penn and the Penn Memory Center. I don't think there's a better place you can go, and that is why I think people will get the most benefit for my giving here."

The Penn Memory Center's team-based approach and innovative support programs have guided patients and families throughout their journeys, raising the bar for excellence in compassionate, human-centered care. You're invited to contact Paige O' Malley at 267-838-0660 or pomalley@upenn.edu to learn how to make your gift to the Caring Difference Fund or toward any of the Center's other priorities.

Special Online Coverage: Medical Alumni Weekend

It was during the presentation of the 2022 Alumni Awards that co-emcee Marty Kanovsky, M'78, INT'79, RES'81, FEL'83, aptly stated, "Our alma mater continues to excel because we're 'standing on the shoulders of giants' and the history our alumni have helped build." This year's Medical Alumni Weekend programming both celebrated Penn Medicine's history and offered glimpses of the future — including the recently-opened Pavilion at the Hospital of the University of Pennsylvania.



Check out some favorite moments at [PennMedicine.org/magazine/MAW2022](https://www.pennmedicine.org/magazine/MAW2022)



You can enjoy recorded livestreams of events and visit Class pages by selecting "Medical Alumni Weekend 2022" from the Perelman School of Medicine Alumni web site (www.med.upenn.edu/alumni).



Video of the full Class of 2022 commencement ceremony is on the Perelman School of Medicine's Facebook page (@PerelmanSchoolofMedicine).



The smiles are always sunny as our alumni stroll down Locust Walk and make their way to the picnic on Hill Square.

Send your progress notes and photos to:

Donor Relations
Penn Medicine Development and Alumni Relations
3535 Market Street, Suite 750
Philadelphia, PA 19104-3309
medalum@dev.upenn.edu

1980s

Bruce Tsang-Tang Liang, MD, GME'85, has been named interim chief executive officer and executive president of Health Affairs at the University of Connecticut Health System. Liang will continue to serve as dean of UConn School of Medicine, a position he has held since 2015, and the Ray Neag Distinguished Professor of Cardiovascular Biology and Medicine. Prior to UConn, Liang was an associate professor of Medicine and Pharmacology at the Perelman School of Medicine.

1990s

Elizabeth A. Tarka, BA'88, MD'92, GME'99, has been appointed chief medical officer at XyloCor Therapeutics, a clinical stage biopharmaceutical company developing novel gene therapies for cardiovascular disease. Prior to joining XyloCor, she served as chief marketing officer at Idera Pharmaceuticals and vice president of Clinical Development at Complexa, Inc.

Ben H. Park, MD'95, PhD'95, GME'01, has been appointed director of the Vanderbilt-Ingram Cancer Center (VICC). Park is a Cornelius Abernathy Craig Professor of Medicine at Vanderbilt School of Medicine and has held multiple leadership roles. Previously, Vanderbilt, Park was at the Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins.

2000s

Jan Boswinkel, MD'01, senior vice president of Children's Hospital of Philadelphia, has been named chief operating officer of

the Middleman Family Pavilion, the new CHOP hospital in King of Prussia, PA. Boswinkel has served in several leadership roles at CHOP since 2001, including chief safety officer, vice president of Medical Operations, and section chief of Inpatient Services.

Mollie V. Leoni, BA'99, MD'05, has been promoted to senior vice president of Clinical Development at Kura Oncology, Inc., a clinical stage biopharmaceutical company that specializes in cancer treatment developments. Prior to joining Kura as vice president of Clinical Development in February 2020, Leoni served as executive director of Medical Science for Kyowa Kirin.

Christian A. Dankers, MD'07, MBA'07, has been appointed associate chief medical and quality officer for The Chartis Group, which provides comprehensive advisory services and analytics to the healthcare industry. Dankers joins Chartis Mass General Brigham, where he served as an associate chief quality officer.

Anand J. Shah, MD'07, GME'10, has been appointed operating advisor to Clayton, Dubilier & Rice (CD&R), a private investment firm. In this role, Shah will work with CD&R's healthcare team to source new investments and advise the fund's healthcare businesses. Shah is a former deputy commissioner for Medical and Scientific Affairs at the US Food and Drug Administration.

OBITUARIES

1950s

Richard B. Shepard, MD'53, GME'60, a cardiothoracic surgeon; Feb. 5.

While serving in the U.S. Army, Shepard was an engineer with the Manhattan Project Special Engineer Detachment and part of the Radiological Safety Section testing the atomic bomb in the Pacific. After discharge, Shepard attended the Perelman School of Medicine, where he earned his medical degree, completed a General Surgery resi-

dency, and served as surgical chief resident. He joined the department of Surgery at the University of Alabama (UAB) at Birmingham and worked in Cardiothoracic Surgery. In addition he chaired a committee at NASA to select scientific experiments for the space shuttle. After retirement from active practice, he continued to research and publish as an emeritus professor of Surgery at the UAB Heersink School of Medicine.

Leonard S. Ross, MD'54, a radiologist; Mar. 9.

After earning his medical degree, Ross served as Captain in the U.S. Army Medical Corps, first as a reservist at Fort Devens, MA before fully enrolling and transferring to the U.S. Army Hospital at Fort MacArthur in Los Angeles. He eventually accepted a position as a radiologist at Tufts New England Medical Center Hospital in Boston. Ross later formed his own practice, Quincy Radiology Associates, serving at Quincy City Hospital, where he was chief of Radiology.

John R. Campbell, MD, GME'59, a pediatric surgeon; Feb. 1.

Campbell earned his medical degree from the University of Kansas Medical School and served in the U.S. Navy as a lieutenant commander and chief of Dependent Surgery at the U.S. Naval Hospital in Portsmouth, VA. He completed his pediatric surgery residency at Children's Hospital of Philadelphia under Dr. C. Everett Koop. Campbell practiced for more than 30 years as head of Pediatric Surgery at Oregon Health & Science University and chief of Pediatric Surgery at Doernbecher Children's Hospital.

1960s

Helen Davies, PhD'60, professor of Microbiology and associate dean for Student and Housestaff Affairs; Mar. 23.

Davies joined Penn's faculty as an assistant professor of Physical Biochemistry, becoming the first



female faculty member of the department. Two years after being promoted to associate professor, she chaired Penn's Morgan State project, a collaboration with the predominantly Black Morgan State University in Baltimore. She became a full professor of Microbiology in 1982, again the first woman to do so. From 1991 to 1995, Davies served as associate dean for Student Affairs at the Perelman School of Medicine, and in the 2000s she served as the Ombuds of the school.

She was named a fellow of the American Association for the Advancement of Science in 2002. Davies won Penn's Lindback Award in 1977 and the Perelman School of Medicine's Distinguished Educator Award in 1989. She won the Medical Student Government Award for Basic Science Teaching more than 30 times and was the first woman to be recognized with the American Medical Student Association's National Golden Apple for Teaching Excellence.

In 1976, she became secretary of Penn's Faculty Senate. The next year, Davies served on the Task Force on Black Presence at Penn and on the Provost's Committee for Safety and Security for Women, which later became a council committee that she chaired. During the 1980s, she also chaired the University Council's Committee on Research, and a decade later, she chaired the Committee on Pluralism.

In the late 1990s, she served on the Executive Board of Penn's chapter of the American Association of University Professors.

In 1978, the Association for Women in Science named an award after Davies and her husband, the late Robert E. Davies, the Benjamin Franklin Professor

and University Professor Emeritus of Biochemistry at Penn Vet, in honor of their contributions to advancing women in science. Twenty years later, the American Association for the Advancement of Science awarded Davies its Lifetime Mentor Award. In 2006, she received the Alpha Omega Alpha Robert J. Glaser Distinguished Teacher Award from the Association of American Medical Colleges and the Helen O. Dickens Lifetime Achievement Award from Women of Color at Penn. Davies retired in 2021. Her portrait hangs in Johnson Pavilion.

Richard I. Feinbloom, MD'60, a pediatrician and family physician; Mar. 18.

Feinbloom served as medical director of the Family Health Care Program at Boston Children's Hospital and Harvard Medical School. He co-founded the Family Practice Group in Cambridge, MA, and developed an educational model for training physicians in family practice.

Paul Anthony Selecky, MD'64, an internist; Mar. 20.

After earning his medical degree, Selecky completed his internship at the U.S. Naval Hospital in St. Albans, NY, and continued his naval duties in Pearl Harbor in Hawaii until 1968. He completed his internal medicine residency and his pulmonary medicine fellowship at Harbor-UCLA Medical Center, then joined the medical staff at Hoag Memorial Hospital Presbyterian in Newport Beach, CA as medical director of Pulmonary Medicine, the Sleep Center, and Continuing Medical Education. He also served as chair of the division of Pulmonary Medicine, the Critical Care Committee, the Healthcare Ethics Committee, and the Infection Prevention Committee. Selecky was a clinical professor of Medicine at the UCLA School of Medicine and medical director of the Respiratory Care and Polysomnography allied health programs at Orange Coast College. He was a founding member of the California

Sleep Society and started the annual Hoag Sleep Conference in 2000. His accolades include the Pottenger Award and the Volunteer Leadership Award from the American Lung Association of California. He was a Fellow of the American College of Physicians, the American College of Chest Physicians, and the American Association of Respiratory Care.

Louis H. Betz, MD'66, GME'70, an ophthalmologist; Apr. 7. Betz completed his ophthalmology residency at the Scheie Eye Institute. He served with distinction in the U.S. Navy as a lieutenant and trauma surgeon during his deployment in Vietnam. Upon his return, he founded Betz Ophthalmology Associates in Lewisburg, PA.

Thomas P. Nigra, MD'67, a dermatologist; Mar. 21.

Nigra completed his internal medicine internship under senior resident Dr. Anthony Fauci at New York-Bellevue Hospital in New York, and his dermatology residency at Massachusetts General Hospital in Boston. He also completed Berry Plan service at the National Institutes of Health. Nigra founded the department of Dermatology at MedStar Washington Hospital Center, where he served as chair for 43 years. He was awarded MedStar Washington Hospital Center's Gold-Headed Cane Award for demonstrating the highest standards of scientific excellence and integrity.

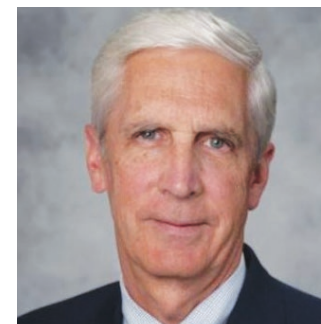
Dennis W. Cronin, MD'68, a surgeon; Apr. 1.

Cronin completed his internship and surgical residency at Penn Presbyterian Medical Center (PPMC). He was a general surgeon at PPMC and at Taylor Hospital in Ridley Park, PA, and he served as president of each hospital's medical and dental staff. Cronin also served as vice president of the department of Surgery at Taylor Hospital. His accolades include Taylor Hospital's inaugural Horace Furness Taylor M.D. Physician Service Excellence Award.

1970s

R. Michael Buckley, MD, GME'77, chair of Medicine, chief medical officer, and executive director at Pennsylvania Hospital; Apr. 9.

Buckley earned his medical degree from Yale Medical School in 1972 and completed his internal



medicine residency at University of North Carolina Hospitals in Chapel Hill, NC. In 1975, he began an infectious diseases fellowship at Pennsylvania Hospital (PAH), where he served for 40 years in leadership roles including chair of Medicine, chief medical officer, and executive director. Buckley was instrumental during the HIV/AIDS crisis in the 1980s, when PAH was among the largest infectious disease practices caring for patients with the new disease. He helped lead more than twenty clinical, multi-center trials investigating agents to treat HIV and to prevent and treat infections among HIV patients. As executive director, he oversaw the opening of Penn Medicine Washington Square, which consolidated 10 outpatient operation sites into one, as well as transformational renovations to PAH, including a state-of-the-art Electrophysiology Lab and hybrid operating room. Buckley contributed his leadership to several professional boards including the Infectious Disease Society of America. His portrait hangs at PAH.

Robert Kalter, MD'71, a pathologist; June 14.

Kalter interned at Pennsylvania Hospital and then served in the U.S. Public Health Service as a commissioned officer. He completed an Anatomic Pathology residency at Cornell and then a

Clinical Pathology residency at SUNY-Downstate. Kalter served as chief of Clinical Pathology at NYU Winthrop Hospital, chairman of Pathology at The Brooklyn Hospital Center, director of the Blood Bank at NYU Lutheran Medical Center, and as a pathologist at Maimonides Medical Center in New York—first as chief, then as chairman of Pathology and Laboratory Medicine, and finally as a consulting pathologist. After retirement, he continued to work as a per diem pathologist for Northwell Health Laboratories. Kalter was certified in Anatomic and Clinical Pathology, Blood Banking, and Immunopathology, and voluntarily recertified with the American Board of Pathology in 1997 and 2008.

1980s

Kwaku Ohene-Frempong, MD, GME'80, emeritus professor of Pediatrics and emeritus director of CHOP Comprehensive Sickle Cell Center; May 7. Ohene-Frempong earned his medical degree from Yale School of Medicine and completed his



pediatrics residency at New York Hospital, then came to the Perelman School of Medicine for his fellowship in pediatric hematology-oncology at Children's Hospital of Philadelphia (CHOP). He served at Tulane University School of Medicine, where he established the Sickle Cell Center of Southern Louisiana, and remained affiliated with Penn Medicine throughout his career. Ohene-Frempong was a leader in the decades-long Cooperative Study of Sickle Cell Disease,

which established the natural history of the disease and the basis for many of the evidence-informed guidelines still used today. The Comprehensive Sickle Cell Program at CHOP flourished under his leadership, and for 18 years received continuous funding from the National Heart, Lung, and Blood Institute (NHLBI). Ohene-Frempong launched the most successful sustained initiative to identify and treat newborns with sickle cell disease in sub-Saharan Africa, and supported colleagues in Brazil and India to establish sickle cell treatment centers around the world.

He was recognized by the American Society of Hematology in 2021 with the Henry M. Stratton Medal in recognition of his lifetime achievement in clinical and translational hematology research. He was the first civilian recipient of the Assistant Secretary of Health Exceptional Service Medal, the highest civilian award from the Public Health Service. Ohene-Frempong also served as chair of the NHLBI Sickle Cell Disease Advisory Committee, chairman of the Board of Directors of the Sickle Cell Disease Association of America, and president of the Sickle Cell Foundation of Ghana.

2000s

Paul Marten, MD, GME'08, a pediatric radiologist; Feb. 3. After becoming accredited as a CPA, Marten entered medical training, earning his medical degree from Albert Einstein College of Medicine, and completing an internship at Jacobi Medical Center and a residency in Diagnostic Radiology at Maimonides Medical Center, all in New York City. He then completed a fellowship in Pediatric Radiology at the Perelman School of Medicine. He worked as a pediatric radiologist with the Radiology Consultants Inc. at Legacy Emmanuel Medical Center in Portland, OR.

FACULTY

Valder Arruda, MD, PhD, associate professor of Pediatrics in the Division of Hematology and an original member of the Center for Cellular and Molecular Therapeutics (CCMT) at the Children's Hospital of Philadelphia (CHOP); May 20.

Born in Brazil, Arruda completed medical school at the Federal University of Triangulo Mineiro and earned a PhD in Molecular Biology at the University of Campinas. In 1997, he became a postdoctoral fellow at CHOP and subsequently rose through the academic ranks. He served as chair of the Gene Therapy and Vaccines graduate group for the Cell and Molecular Biology Graduate Group from 2015 to 2019. Arruda was an elected member of the American Society for Clinical Investigation.

R. Michael Buckley, MD. See Class of 1977.

Helen Davies, PhD. See Class of 1960.

Brett B. Gutsche, MD, professor of Anesthesia and Obstetrics and Gynecology; Apr. 13.

After earning his degree from the University of Rochester Medical School in 1961, Gutsche completed his internship and residency at the Duke University Medical Center in Durham, NC, beginning a career in anesthesiology. He enlisted in the U.S. Public Health Service and moved to Anchorage, AK. Gutsche joined the Hospital of the University of Pennsylvania in 1969, where he served as a professor of Anesthesia and Obstetrics and Gynecology until his retirement in 2013. He received countless awards, including the University of Pennsylvania's Lindback Award for Distinguished Teaching.

Rob Roy MacGregor III, MD, emeritus chief of Division of Infectious Diseases; May 12. After earning his medical degree from Harvard Medical School, MacGregor completed his internal medicine residency at Boston City Hospital and his infectious diseases fellowship at the University of Washington in Seattle. He

worked at the Laboratory of Clinical Investigation at the National Institutes of Health, where he met Richard (Dick) Root, MD. When Root was recruited to the Perelman School of Medicine in 1971, he brought MacGregor with him as faculty, and together they established the division of Infectious Diseases. In 1975, MacGregor was appointed division chief, a role he filled until 1990. He established the HIV clinical program at Penn, which was renamed the MacGregor Clinic in 1990. He eventually became emeritus professor and assumed a leadership role in the Penn Association of Senior and Emeritus Faculty, serving on the executive committee for many years. He continued to participate in the Infectious Diseases clinical conferences, including the flagship ID Management Conference, which he originally established.

Franz Matschinsky, MD, professor of Biochemistry and Biophysics; Mar. 31.

Matschinsky earned his medical degree from Ludwig Maximilian University in Munich, Germany in 1958 and moved to the United States to Washington University in St. Louis. In 1976, after fulfilling a term professorship at Washington, Matschinsky came to the Perelman School of Medicine as a visiting professor in biochemistry and biophysics, becoming a full professor the following year. He served as chair of the department during the 1980s and joined a University-wide working group on faculty development from 1988 to 1989. Matschinsky won University Research Fund grant in 1986 to study a high-field, wide-bore in vivo NMR spectrometer. In 1983, he became the director of Penn's Cox Institute of Diabetes Research, which was soon renamed the Diabetes Research Center and which was the predecessor of today's Institute for Diabetes, Obesity, and Metabolism. In 1985, he was designated the Benjamin Rush Professor of Biochemistry and Biophysics, a chair he held until 2004.

His accolades include the American Diabetes Association's

Banting Medal for Scientific Achievement and the Swedish Karolinska Institute's prestigious Rolf Luft Award, two of the highest distinctions in his field.



Neal Nathanson, MD, former chair of Microbiology, associate dean for Research, vice provost for Research, and director of the Global Health program; Aug. 11.

Nathanson was a virologist who received his bachelors and medical degrees from Harvard. He did clinical training at the University of Chicago and post-doctoral training in virology at Johns Hopkins University. Nathanson spent two years as an Epidemic Intelligence Service officer at the Centers for Disease Control and Prevention, the Polio Surveillance Unit.

Nathanson spent 22 years at Johns Hopkins University where he was a professor of Epidemiology, head of the Division of Infectious Diseases in the Department of Epidemiology, and founding editor-in-chief of *the American Journal of Epidemiology*. He then moved to Penn and served as chair of the Department of Microbiology.

Nathanson held multiple administrative positions at the University of Pennsylvania and served as director of the Office of AIDS Research at the National Institutes of Health. One of his children, Kate Nathanson, MD, is today the Pearl Bassler Professor at PSOM.

Kwaku Ohene-Frempong, MD, GME. See Class of 1980.

John Rockey, MD, PhD, emeritus professor of Ophthalmology; Jan. 22.

Rockey joined the faculty at the Perelman School of Medicine in 1962 as an assistant professor of

Microbiology. In 1969, he transferred to the department of Ophthalmology, where he was promoted to associate professor in 1970 and full professor three years later. Rockey was involved with the fledgling Scheie Eye Institute and published more than 90 peer-reviewed journal articles. He retired from Penn in 1997 and took emeritus status.

Arlyne Taub Shockman, MD, emeritus associate professor of Radiology; Dec. 28.

Shockman earned her medical degree from the Woman's Medical College of Pennsylvania in 1953 and was a fellow of the American College of Physicians and of the Philippine College of Physicians. She joined the Perelman School of Medicine faculty in 1973 as an associate professor of Radiology. Outside of Penn, Shockman worked at the Veterans Administration Hospital in Philadelphia. In 1998, Shockman retired and took emeritus status.



Frederick Anthony Simeone, MD, former chairman of Neurosurgery at Pennsylvania Hospital; Aug. 11.

Simeone passed away at Pennsylvania Hospital, a place he considered a second home. He received a scholarship to Temple University, continuing there for medical school before completing residencies at the Mayo Clinic and University of Pennsylvania. He performed research and neurosurgery as full-time faculty at Harvard University Medical School, later becoming chairman of Neurosurgery at Pennsylvania Hospital for more than 25 years until he retired in 2008. He also served as chief of Neurosurgery at Jefferson Medical College and co-authored the seminal textbook on spinal sur-

gery, *The Spine*, with the late PSOM alumnus Richard Rothman, MD, PhD.

Simeone was an elected member of both the Society of Neurological Surgeons and the American Academy of Neurological Surgeons; has a portrait at Pennsylvania Hospital; and endowed the Frederick Simeone Professor of Neurosurgery at the Perelman School of Medicine.

With 4 cars inherited from his father, Simeone amassed collection of over 75 rare antiques. He established the Simeone Foundation Automotive Museum in 2008, donating his collection of racing sports cars and automobile literature for posterity and public display. Simeone was a Major in the U.S. Army and was knighted (Cavaliere) by the president of the republic of Italy.

James Byron Snow, Jr., MD, first chair of the Department of Otorhinolaryngology-Head and Neck Surgery at the University of Pennsylvania; May 28.

Snow graduated from Harvard Medical School in 1956 and completed his internship at Johns Hopkins Hospital and his residency in Otolaryngology at Massachusetts Eye and Ear Infirmary. He served in the military as a Captain in the Army Medical Corp, stationed in Korea.

At the University of Oklahoma, he achieved the rank of full Professor before being appointed the chair of Otorhinolaryngology-Head and Neck Surgery at Penn, from 1972 to 1990. He held many leadership positions, including regent of the American College of Surgeons, director of the American Board of Otolaryngology, and president of the American Broncho-Esophagological Association and the American Laryngological Association. Snow became the first director of the National Institute on Deafness and other Communication Disorders (NIDCD), where he served from 1990 until retiring in 1997.

He was honored with the Senior Executive Service Presidential Meritorious Executive Rank Award for his service in the government.

A Life long Friendship Will Be Remembered Through Generations of Impact



M. Jane Williams



Valerie Vargo

Relationships leave an impact that often endures long after we are gone. In the case of the late University of Pennsylvania alumni M. Jane Williams, CW'65 and Valerie Vargo, MT'65, their deep and abiding friendship sparked an impact that, through their philanthropic legacy at Penn, continues to grow.

After graduation, Williams' nearly 50-year fundraising career culminated in becoming Assistant Vice President of Alumni Relations, Individual Gifts at Penn and playing a leadership role in planning the nation's first billion-dollar capital campaign. She facilitated numerous major gifts for scores of nonprofit organizations through her consulting work, including Penn Medicine. She was even honored as the first female Fundraiser of the Year by the Philadelphia chapter of the Association of Fundraising Professionals.

Williams also became a generous donor herself, establishing a Charitable Remainder Trust, among other planned gifts. She wanted her legacy to benefit an array of causes at Penn that were meaningful and honored her time here, including life-saving epilepsy and breast cancer research at Penn Medicine and supporting the faculty whose expertise made her time at the School of Arts and Sciences so special.

After Williams' passing in 2017, Vargo decided to bolster Williams' legacy through a thoughtful combination of planned gifts that include beneficiary designations of retirement and financial accounts, life insurance policies, and even real estate. Today, the Funds that bear both their names are advancing groundbreaking research at Penn Medicine's Abramson Cancer Center and the Department of Neurology, as well as laying the foundation for an endowed professorship at the School of Arts and Sciences.

Ultimately, these friends amplified the power of their combined creative planned gift assets and tailored a legacy that reflected the priorities of the University while meeting their individual goals. Generations of students and faculty at Penn, and countless patients around the world, will experience the impact of their vision, their devotion to serving others, and their friendship.

► For more information, please visit our website at: www.pennmedicine.org/plannedgiving.

Planned giving is often described as the final piece of a philanthropic puzzle. Figuring out how this important puzzle piece can work best for you, your family, and your philanthropic goals is what we do best. Speak with us to learn more about giving options. Contact Kim F. V. Grube, Deputy Chief Advancement Officer & Chief Administrative Officer, at 215-746-3007 or kimgrube@upenn.edu.



DOCTORING IN THE DIGITAL SPACE

Photos by Kyle Cassidy

Like playing a video game for extra practice of clinical skills, a new suite of virtual-case technology is changing how medical students at PSOM learn and gain experience.

Practice makes perfect. With just two and a half years to gain clinical experience before they graduate, medical students need all the opportunities they can get to know what it's like to work with real-life patients.

At the Perelman School of Medicine (PSOM), their options have recently expanded into a virtual world to practice their skills before and in between real-world clinical encounters.

Through the Measey Learning in a Virtual Environment program (Measey LiVE), students take part in interactive simulated cases they experience through a 3D virtual reality headset or in a two-dimensional video simulation on a

screen. Whether on their own or working with an instructor, “the students can make decisions and then, based on those decisions, they are forwarded to the scene corresponding to their answer, like in a choose-your-own-adventure format,” explains Suzana Tsao, DO, an associate professor and vice chair of Education in Emergency Medicine.

Practicing clinical scenarios in this way offers students the benefit of a standardized experience not subject to chance variations in what cases they will see, as in a real-world clinic. And it allows students to practice over and over, depending on their knowledge or comfort levels. Like working with

standardized patients and simulation with medical manikins, the virtual scenarios can cover the types of cases that clerkship directors deem important for students to practice.

In fact, Measey LiVE originated as a “virtual clerkship” experience in the early weeks of the COVID-19 pandemic, when students needed the clinical exposure that would help them learn, without being directly in contact with patients or actors, says Stacey Kassutto, MD, an assistant professor of Clinical Medicine and director of Simulation for the Internal Medicine Residency program. She and Tsao serve as the co-directors of Measey LiVE, while Caitlin Clancy, MD, is the lead assessment director. Initially, the team piloted some virtual reality software platforms and received positive feedback from their students. “This helped with school leadership, who had also been thinking about novel uses for technology for virtual reality,” Kassutto says.

That experience led them to apply for a grant through the Benjamin and Mary Siddons Measey Foundation in the spring of 2020 to develop the Measey LiVE program. The \$1 million funding allowed investment in hiring software engineers, videographers, and editors to create video scenes and purchase 55 virtual reality headsets. It also funded faculty time for creating clinical case content and working with software developers.

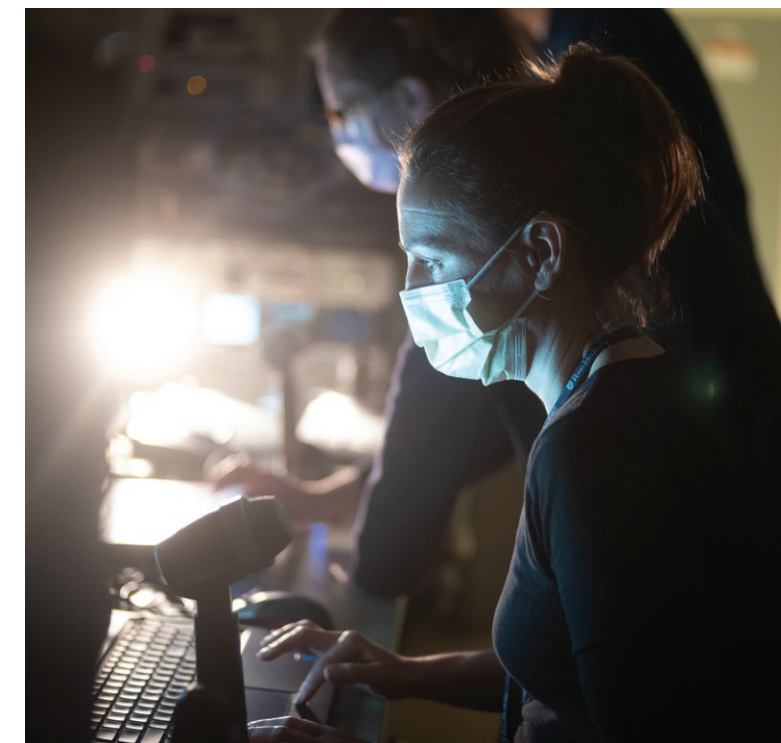
To get up and running quickly without the deep investment needed for coding and creating virtual humans and avatars, they built their virtual scenes by working with Penn’s Annenberg School for Communication and the medical school’s standardized patient program, filming the program’s actors performing the video cases. They worked with course directors to pick clinical scenarios suitable to the program.

The designers developed an interface that allows a facilitator to play the interactive videos of a clinical encounter like a piano, says Kyle Cassidy, a technologist in the Annenberg School who was a core member of the project team. For example, after watching a video of a patient describing difficulty breathing, a student could suggest a certain intervention — and the facilitator could jump ahead instantly to play the results of that intervention.

Based on the successful implementation of 11 simulated cases in the first year, the team has now more than doubled its library to 23 cases. As the variety of cases grows, the program’s leaders hope to provide students a space for extra practice and autonomy. They also envision adding gamification to assessments. Medical students might earn virtual badges as they master new skills, allowing supervisors to trace their progress in independent virtual learning.

But the future vision for this virtual practice is even bigger still: Working together with the medical school’s leaders, they want to create a virtual hospital setting where students, beginning in their first year, can oversee the care of a virtual cohort of patients. They are working closely with Nadia Bennett, MD, MSED’18, and Dennis Dlugos, MD, MSCE’02, the associate deans for curriculum in clinical and basic science areas, respectively.

It’s an initiative that Suzanne Rose, MD, MSED, senior vice dean for medical education, describes as “groundbreaking,



Suzana Tsao, DO, supervises filming of virtual clinical cases for medical students to practice in virtual reality.

using educational technology the team has created a platform for virtual patients and a virtual hospital.”

As students progress further into post-clerkship, such as in a sub-internship to get ready for residency, they will “unlock” more complex cases in the Measey LiVE system, manage critical patients, and work in a team environment, which will help them throughout their career, Tsao says.

“Currently, when students are on rotations in their clinical experience, they don’t have a lot of opportunities for autonomous practice where they are the ones at the head of the bed making those clinical decisions,” Tsao explains. “This allows them to have that opportunity in a safe environment before they start their internship year and, all of a sudden, they’re the person who is responsible.”

Rose points out the virtual hospital platform puts patient safety at the forefront at multiple stages of learning. It ensures students get practice in simulated environments before going out to an authentic bedside, and even during clerkship and post-clerkship phases of the curriculum it helps students put their learning in context.

The approach is novel and might set a new standard. “I don’t think [the virtual hospital] is being done anywhere else, or at least not in the breadth and scope that we’re envisioning for it,” Tsao says. “I really do believe this is going to be an integral part of the medical school’s curriculum in future years. We’re excited to be at the forefront of it.” ◻

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A HOSPITAL FOR BODY, MIND, AND SPIRIT

Look up. A soaring sculpture by renowned artist Maya Lin reaches from the ground floor to the connector-level lobby ceiling at the Pavilion, where it evokes the concepts of science, growth, and healing. A year after the opening of Penn Medicine's newest inpatient building at the Hospital of the University of Pennsylvania, get a glimpse of a typical day in the life in this remarkable space.

▶ **Read more on page 28.**

