INSIDE STANFORD MEDICINE

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First-year doctoral students marked the beginning of their studies by donning lab coats and taking an oath of integrity.

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Treatment helps teens sleep more each night

By Erin Digitale

Teenagers got 43 more minutes of sleep a night after a four-week intervention that reset their body clocks and helped them go to bed earlier, a study from the Stanford University School of Medicine has shown.

The treatment had two components: brief, early morning flashes of bright, broad-spectrum white light to reset the teens' circadian clocks, and cognitive behavioral therapy that motivated them to try earlier bedtimes. The findings were published online Sept. 25 in *JAMA Network Open*.

"Using a passive light therapy during sleep, we can help teens get an extra 43 minutes of sleep every single night," said senior author Jamie Zeitzer, PhD, associate professor of psychiatry and behavioral sciences.

The light was delivered by a device in the teens' bedrooms that was programmed to deliver 3-millisecond flashes of light every 20 seconds during the last few hours of sleep. The brief flashes of light did not wake the teens. Zeitzer's previous research on jet lag had shown that exposure to short flashes of light can trick the brain into adjusting to a new time zone, even during sleep.

NORBERT VON DER GROEBEN

Jamie Zeitzer co-authored a paper that describes how brief flashes of light and cognitive therapy can be used to increase the amount of sleep teenagers get.

Chronic sleep deprivation is common in teenagers, Zeitzer said. The body's circadian clock, which controls daily rhythms of when we sleep and when we're awake, is naturally set later in teens than in children or in adults, meaning that teens often don't feel sleepy until late at night. Teens might also stay up late because of such social influences as homework and electronic device use. Early school start times often require them to wake up before they're fully rested, further contributing to sleep deprivation.

Prior studies tested whether cognitive behavioral therapy alone could help teens go to sleep earlier. Successes were modest: After the treatments, teens went to sleep 10 to 15 minutes sooner, on average. But these interventions might have put participants at odds with their own body clocks, asking them to try to fall asleep before they were tired, a behavior that is difficult to sustain, Zeitzer said.

"We have a biological drive to stay awake in the hours before we normally go to sleep," he said. "So our team wondered if we could adjust the circadian timing, having the teens essentially move their brains to Denver while they're living in California."

In the first four-week portion of the new study, researchers tested light therapy alone in a group of 72 teenagers. For four weeks, half the participants were exposed to the frequent brief light flashes during the final

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Tanning salons cluster in gay neighborhoods of large American cities

By Krista Conger

Neighborhoods with high proportions of gay and bisexual men are twice as likely to have an indoor tanning salon than neighborhoods with fewer sexual minority men, according to a study by researchers at the School of Medicine.

The finding suggests the possibility that the tanning industry may be targeting gay and bisexual men, who are six times more likely than heterosexual men to tan indoors during their lifetimes and

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LIGHTPOET/SHUTTERSTOCK.COM

Scientists uncover genetic similarities among species that use sound to navigate, hunt

By Krista Conger

Insect-eating bats navigate effortlessly in the dark and dolphins and killer whales gobble up prey in murky waters thanks in part to specific changes in a set of 18 genes involved in the development of the cochlear ganglion — a group of nerves that transmit sound from the ear to the brain, according to a study by researchers at Stanford University.

Surprisingly, these very different species evolved their unique ability to use sound waves to navigate and identify obstacles and tasty morsels, be they mosquito or minnow, in part by acquiring identical mutations in their genomes — mutations not shared by other, more closely related species like humpback whales, which patiently sieve the ocean for krill, or fruit bats, which seek stationary, yummy-smelling snacks.

The discovery solves a long-standing biological debate as to whether echolocating bats and whales have independently undergone many similar genomic changes "under the hood" to accomplish the same goal. It also opens the door to understanding more about the molecular basis for human disorders as varied as deafness, skin lesions caused by high cholesterol and altitude sickness, the researchers said.

"Not only is it breathtaking to see how these very

RUDMER ZWERVER/SHUTTERSTOCK.COM

Many bats use echolocation, but so do dolphins. Evolutionary adaptations that are shared by unrelated species arose in part due to identical, independently acquired genetic changes, a study found.

different species carved their own evolutionary niches for themselves through independently acquiring similar genetic changes, it's beneficial to our understanding of our own physiology and development," said Gill Bejerano, PhD, professor of developmental biology, of computer science, of pediatrics and of biomedical data science at Stanford. "Developmental biologists have long wondered

See ECHOLOCATION, page 6

Study identifies cause of rare but deadly neurological disease

By Krista Conger

A deadly neurological disease that primarily affects infant boys is caused by increased sensitivity to iron in the brain, according to a new study by researchers at the Stanford School of Medicine, the University of California-San Francisco and the University of Cambridge.

The researchers also found that a drug that binds to and removes iron enhances the survival of cells involved in the disorder.

The researchers are planning to conduct a clinical trial in Europe in children with the condition, called Pelizaeus-Merzbacher disease, to determine whether the drug can halt or slow its progression.

"The rescue of diseased cells grown in the laboratory was dramatic," said Marius Wernig, MD, professor of pathology at Stanford. "It's unbelievably satisfying to identify a potential treatment for such a devastating disorder."

The study was published online Oct. 3 in *Cell Stem Cell.*

Wernig shares senior authorship of the study with David Rowitch, MD, PhD, an adjunct professor of pediatrics and of neurological surgery at the UCSF and a Wellcome Trust senior investigator at the University of Cambridge. Hiroko Nobuta, PhD, a postdoctoral scholar at Stanford and at UCSF, is the lead author.

> "The rescue of diseased cells grown in the laboratory was dramatic."

Often fatal by adolescence

Pelizaeus-Merzbacher disease affects about 1 in every 200,000 to 500,000 people. People with the disease are usually diagnosed in infancy after displaying abnormal head and eye movements, poor muscle tone and developmental delays. The disease is progressive and is often fatal by the early teenage years. Pelizaeus-Merzbacher is caused by mutations in a gene called PLP1 that is involved in the formation of the insulating sheath called myelin that coats the outside of neurons and helps them transmit nerve signals throughout the brain. But until now, it was unclear how mutations in PLP1 caused the disease.

Nobuta used skin cells from a patient with a specific mutation in PLP1 to create what are called induced pluripotent stem cells, which can become nearly any cell in the body when exposed to the proper conditions. She then grew the stem cells under conditions that would stimulate their development into myelin-producing cells called oligodendrocytes.

Marius Wernig

Nobuta found that stem cells with the disease-associated mutation died before becoming functional oligodendrocytes. In contrast, cells in which the mutation had been corrected developed normally in a laboratory dish and on human brain slices. When transplanted into the brains of mice with a myelination disorder, the corrected cells not only developed normally but also contributed to the myelination of neurons in the animals. In contrast, most of the cells with the uncorrected mutation died after transplant.

"When Hiroko studied the cells more closely, she found that they exhibited many hallmarks of iron toxicity," Rowitch said. "Adding a molecule that can chelate, or bind, iron outside the cell restored the cells' ability to become mature, functional oligodendrocytes."

Reducing levels of cell death

The researchers also injected the drug into week-old mice with a mutation in PLP1 that causes a very severe form of the disease. These mice usually die about 35 days after birth. They found that the drug reduced the levels of cell death and stimulated the formation of new myelin in the brain. They also saw a slight increase in how long the animals survived.

The study and its findings are an extension of earlier work by Wernig. In 2007, he was the first to show that it's possible to directly reprogram mouse skin cells into pluripotent stem cells — the first step toward creating functional neurons in quantities sufficient to study neurological disorders such as schizophrenia and autism.

"As a researcher you hope that something you discover will eventually contribute in some way — perhaps decades later — to patient care, but this happened so much sooner than we anticipated," Wernig said. "It's exciting to think that we could soon be testing this approach in patients."

Other Stanford authors of the study include former postdoctoral scholar Nan Yang, PhD; postdoctoral scholars Yi-Han Ng, PhD, and Samuele Marro, PhD; and senior electron microscopist Philip Huie Jr.

Researchers from the Children's Hospital Oakland Research Institute, the University of Victoria in British Columbia and the University of Rochester Medical Center also contributed to the study.

The study was funded by the National Multiple Sclerosis Foundation, the European Leukodystrophy Association, the New York Stem Cell Foundation, Action Medical Research, the Adelson Medical Research Foundation, the National Institute for Health Research Cambridge Biomedical Research Centre and the European Research Council.

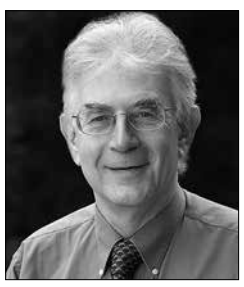
Stanford's Department of Pathology also supported the work. **ISM**

Drug combination lengthens life of women with common breast cancer

By Krista Conger

Women with a common type of advanced metastatic breast cancer live about nine months longer when hormone therapy is paired with a second drug than do those who receive hormone therapy alone, according to an international, multicenter phase-3 clinical trial led by a researcher at the School of Medicine.

The second drug belongs to a class of molecules known as CDK4/6 inhibitors that work to block the division of cancer cells.



George Sledge

Breast cancers are classified according to the presence of specific proteins within or on the surface of tumor cells, and these categories are used to guide treatment decisions. Cancers that express high levels of the estrogen receptor often rely on estrogen to grow and are known as hormone-receptor-positive cancers. The protein HER2, which stands for human epidermal growth factor receptor 2, also is often expressed on cancer cells. When it's not, the cancer is known as HER2-negative.

The randomized, double-blind trial enrolled nearly 700 women with hormone-receptor-positive, HER2-negative breast cancers at 142 centers in 19 countries. Prior to enrollment, the women had seen their cancers progress while on endocrine therapy, which is the standard first-line treatment for this type of breast cancer.

About 40,000 women in the United States die of metastatic breast cancer each year, most of them from hormone-receptor-positive, HER2-negative breast cancer, said George Sledge, MD, professor of medicine and the chief of the division of oncology at Stanford.

"Data from this trial pretty clearly shows that if you take this drug combination, you live longer," said Sledge, who is the principal investigator of the trial, called MONARCH 2. "It also delays the point at which we need to start these women on chemotherapy. So not only do you live longer; you have a better quality of life."

Sledge is a medical oncologist specializing in breast cancer treatment who sees patients at the Stanford Women's Cancer Center.

In 2017, a preliminary analysis of data from the trial indicated that the drug combination significantly increased the progression-free survival — or the length of time from enrollment in a clinical trial until the disease worsens or the participant dies — compared with hormone therapy alone.

Today, the trial is about 77% complete, and the new data definitively indicate that the drug combination also extends the overall survival rate of the women. The study was funded by Eli Lilly and Co., which developed and markets abemaciclib, the drug tested in the trial.

Sledge is the lead author of the study, which was published online Sept. 29 in *JAMA Oncology* to coincide with a presentation of the findings at the 2019 meeting of the European Society of Medical Oncology in Barcelona, Spain. Antonio Llombart-Cussac, MD, PhD, chairman of the medical oncology service at the University Hospital Arnau de Vilanova in Valencia, Spain, is the senior author.

> "Not only do you live longer; you have a better quality of life."

Hormone therapy

Endocrine therapy, or hormone therapy, is a common first-line treatment for hormone-receptor-positive, HER2-negative breast cancer because it is relatively effective and nontoxic. This approach either blocks the ability of the body to make estrogen or treats the cancer with drugs that block the binding of estrogen to the cancer cells.

However, these cancers can become resistant to endocrine therapy over time. Recently, physicians have started combining endocrine therapy with a new class of drugs known as CDK4/6 inhibitors in an effort to improve treatment outcomes. These drugs target proteins in cancer cells that are necessary to drive the division of the cells and the growth of the tumors. But until now, the combination had not been proven to enhance the survival of women with advanced metastatic cancers.

The MONARCH 2 trial was launched in 2014 to test the efficacy of a CDK4/6 inhibitor called abemaciclib in combination with an endocrine therapy called fulvestrant for hormone-receptor-positive, HER2-negative advanced breast cancer. The women enrolled in the trial had experienced disease progression while being treated with an endocrine therapy other than fulvestrant.

Women were randomly assigned in a 2 to 1 ratio to receive either abemaciclib and fulvestrant (446 women), or fulvestrant plus a placebo (223 women). Neither the women nor their physicians knew to which group they had been assigned. They were monitored until their disease progressed or the women died or withdrew from the trial.

After three years, the study investigators saw that treatment with abemaciclib plus fulvestrant extended the length of time between study enrollment and disease progression by about seven months as compared with women who received fulvestrant plus the placebo.

After five years, 338 of the 669 women had died. Of those who died, 211 had received the drug combination, and 127 of those **See CANCER, page 3**

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STANFORD MEDICINE

$4.75 million awarded to scientists for high-risk, high-reward research

By Tracie White and Bruce Goldman

Two School of Medicine scientists have been awarded grants from the National Institutes of Health for high-risk research efforts that could make a big impact in biomedicine.

The two researchers — Jin Hyung Lee, PhD, associate professor of neurology and neurological sciences, of bioengineering and of neurosurgery, and Corey Keller, MD, PhD, an instructor of psychiatry and behavioral sciences — will receive a total of $4.75 million over five years from the National Institutes of Health to fund their work.

The grants come from the NIH's High-Risk, High-Reward Research Program, which is designed to fund scientists conducting innovative work. The goal is to encourage investigators to pursue research that may otherwise face difficulties getting funded in more traditional ways. This year, the NIH program has awarded 93 grants totaling about $267 million.

"We are honored that these gifted researchers have been recognized by the NIH for their groundbreaking work," said Lloyd Minor, MD, dean of the School of Medicine. "Ambitious research, like that of Drs. Lee and Keller, is essential to Stanford Medicine as we endeavor to advance care and realize our precision health vision."

Pioneer Award

Lee received the NIH Director's Pioneer Award, which was established to provide funding for investigators at all career levels with bold and innovative research projects.

Jin Hyung Lee

Lee plans to use her $3.5 million award to develop mechanogenetics, a novel method that enables noninvasive, precisely targeted spatial and mechanical perturbation of living cells within the mammalian brain, and a functional ultrasound imaging technology that can monitor whole-brain function in animals that are awake and active.

"Our goal is to develop powerful new technologies that allow us to decode the brain's complicated circuitry and discover therapies for neurological diseases like epilepsy, Parkinson's disease and Alzheimer's disease," she said. Her laboratory seeks to understand the intricate patterns of communication between nerves in the brain and how these large-scale networks control behavior and how, when problems in the network arise, disease results.

"We use interdisciplinary approaches from biology and engineering to develop technology that empowers us to not just analyze but to also manipulate brain circuitry with precision," she said. "We also use advanced computational approaches to build models of the brain. We pull our basic building blocks from a spectrum of fields ranging from medical imaging, signal processing, machine learning and computer science to genetics and cellular molecular biology."

Lee is a member of Stanford Bio-X and of Wu Tsai Neurosciences Institute and a faculty fellow of Stanford ChEM-H and at Stanford.

Early Independence Award

Keller, an instructor in psychiatry and behavioral sciences, received the Early Independence Award, which promotes independent research by junior investigators by allowing them to forgo the traditional postdoctoral training period. Keller plans to use his $1.25 million award to uncover new methods of improving brain stimulation treatments for neurological and psychiatric disorders.

"The overall goal is to develop a personalized approach for the treatment of mental illness, specifically using brain stimulation, an emerging field in psychiatry that utilizes magnetic pulses to alter brain circuits," he said. "I hope to use the money to start up my lab to further these investigations."

Keller has found that brain-based biomarkers might be used to predict who will respond to transcranial magnetic stimulation and to help monitor brain networks during interventions to determine the best targets or methods for treating each specific patient. His current research is focused on treatments for depression but could work for a variety of mental illnesses, such as post-traumatic stress disorder or bipolar disorder.

Corey Keller

"Unfortunately, many of these methods of using brain stimulation are one size fits all," Corey said. "The idea is to evaluate the patient in front of us and probe their brain circuitry using TMS and electroencephalograph recordings to determine ways we can modulate the circuit of interest, and then find the specific intensity that will enhance the effectiveness of the treatment." ISM

Medical device safety in the real world: Tapping EHR data

By Hanae Armitage

Before any medical device, such as a pacemaker or artificial hip implant, reaches the market, it has to meet certain safety standards set by the Food and Drug Administration. But these standards are just a first step; any number of things can happen when the devices hit the clinic.

"The safety standards required by the FDA are for initial approval of the device's use," said Nigam Shah, PhD, associate professor of medicine and biomedical data science at Stanford. "What we need is a scalable way — beyond self-reporting — to see how safe and effective these devices are in a population after years of use."

Large numbers of health records detailing the experiences of real-world patients hold the answer, Shah said. And he and his team are using artificial intelligence to mine them.

A paper detailing the findings of the study was published online Sept. 25 in *npj Digital Medicine*. Shah is the senior author. Stanford research scientists Alison Callahan, PhD, and Jason Fries, PhD, share lead authorship.

There are existing methods to report medical device safety issues to the FDA after approval. "But it requires health providers to be really motivated to do so, and sometimes these things end up getting postponed or drawn out," Callahan said. "We also know that self-reported data introduces bias into any data analysis. So it's challenging to get a clear picture of the safety profile of medical devices."

There are other obstacles. Patient information is often spread across multiple databases, making it difficult to detect any signal of a given device's safety profile or success rates. Shah and his team's AI-based monitoring method gets around that by accessing patient data stripped of personal identifying information.

'Wealth of information'

"There's a wealth of information hidden in these records, and collected by the millions, they provide a valuable resource to show which devices are the most dependable," Fries said.

The idea behind the algorithm is to find a way to link up certain medical characteristics — things like infection rates, how long an implant lasts before it needs to be replaced, and levels of patient pain — with specific implantable devices. Shah and his team chose to follow hip implants as a proof of principle, since they're one of the most common medical devices.

The team showed that the algorithm accurately and efficiently identified complication events with each patient's implant. Callahan explained that the algorithm also pointed to a powerful predictor of complication: pain.

"Previous studies have likewise shown that pain is a useful predictor for more serious complications later on," she said. By tracking patient pain levels over time, the model helped reveal a patient's quality of life with that specific implant. By compiling data from many patients, the algorithm also provided a broader picture of complications and pain levels associated with each device.

The researchers know the algorithm can flag the safest devices. But Fries and Callahan hope it could provide even more nuanced information. For instance, people are getting hip implants at younger ages, Callahan said, and will have them for longer periods of time. Ideally, the algorithm could help show which implant models are best for specific populations — say, for someone in their 40s versus someone in their 70s.

"The vision is to use this technology to provide tailored, patient-level recommendations based on a person's medical history," Fries said. But for that, the researchers need more data, so they're beginning to deploy the model at other sites, such as in the Veterans Affairs Health Administration, to see how it fairs.

"Our hope is that as we incorporate new data, we will continue to improve our model's accuracy and efficiency while increasing the utility among a broad population of patients," Callahan said.

The research was supported by the National Institutes of Health. ISM

Cancer

continued from page 2

in the control arm. Women receiving both fulvestrant and abemaciclib had a median survival time of 46.7 months, compared with 37.3 months for those who had received fulvestrant plus placebo — an increase of 9.4 months. Furthermore, women who received both drugs were able to delay starting chemotherapy for about 28 months longer on average than those in the control group.

"Doctors don't render their patients immortal," Sledge said. "We still haven't cured metastatic breast cancer. But this is a drug that increases survival and reduces the need for chemotherapy. Women can live longer and have a relatively good quality of life and more time with their families, their children and their loved ones."

Researchers from Kyoto University in Japan, the Universitaire Ziekenhuizen Leuven in Belgium, the Yonsei Cancer Center in South Korea, the Saitama Cancer Center in Japan, the Centre Paul Strauss in France, the Arkhangelsk Regional Clinical Oncology Dispensary in Russia, the Adelaide Cancer Centre in Australia, the Osaka National Hospital in Japan, the University of Vermont Cancer Center, Kaiser Permanente, the Eberhard Karls University in Germany, the Instituto Oncologico Veneto in Italy, the Royal Marsden NSH Foundation Trust in the UK, the Hospital Arnau Vilanova in Spain and Eli Lilly and Co. also contributed to the study.

The study was funded by Eli Lilly and Co.

Stanford's Department of Medicine also supported the work. ISM

CRISPR pioneer to speak on ethics, future of the gene-editing technology

Jennifer Doudna, PhD, a pioneer of the powerful gene-editing tool CRISPR-Cas9, will speak at 1 p.m. Oct. 9 in Berg Hall at the Li Ka Shing Center for Learning and Knowledge.

Jennifer Doudna

In her talk, "World of CRISPR: Editing Genomes and Altering our Future," Doudna, a professor of chemistry and of biochemistry and molecular biology at the University of California-Berkeley, will cover the basic biology that inspired CRISPR-Cas9 and discuss how the gene-editing tool is being used in labs around the world, and how it may come to bear on the future of medicine. She will also speak to the ethical challenges surrounding CRISPR, focusing on how scientific and medical decisions today could affect generations in the future.

The event, which is free and open to the public, is part of the Molecular Imaging Program at Stanford's IMAGinING THE FUTURE seminar series. ISM

Donning lab coats, new grad students embark on bioscience studies

By Mandy Erickson

Nora Enright understands the value of medical research.

"I'm a Type 1 diabetic," Enright said. "From an early age, I've known that discoveries can really change people's lives." A first-year PhD student in bioengineering, Enright was nibbling on appetizers Sept. 23 at an evening reception outside the Li Ka Shing Center for Learning and Knowledge. She and other new graduate students at the School of Medicine had just received crisp, white lab coats, with their names embroidered on them, during a welcoming ceremony inside the center. Classes began that day.

"This is an exciting time for you and the Stanford community," said Lloyd Minor, MD, who addressed the students in a recorded video because he was traveling. "There is no better time to take the journey on which you're embarking. It's a time when you can open up whole new fields of research."

The lab coat ceremony marked the beginning of the students' graduate careers in the biosciences, including biophysics, cancer biology, immunology, stem cell biology and neuroscience.

Arturo Molina, MD, president of the Stanford Medicine Alumni Association, told the students that the lab coat is a symbol of "respect for science."

"It symbolizes curiosity and pursuit of truth," he said.

'Wear closed-toe shoes'

Guest speaker Ryan Watts, who earned a PhD in biology from Stanford in 2004 and is now the chief executive officer of Denali Therapeutics, in South San Francisco, offered some practical advice: Confessing that he always wore flip-flops, he encouraged the students to "wear closed-toe shoes" as a safety precaution in the lab.

He also encouraged them to build strong ties with their classmates and advisers. "Anytime I had a career decision to make, I'd meet with people and discuss it with them," he said.

After the students donned their coats, they read the Stanford biosciences affirmation, declaring an "uncompromising respect for truth" and promising to "never let the potential for personal recognition, profit or advancement cause me to act in a way that violates the public trust in science."

Meeting peers

"It's great to have a big welcoming cohort," said Eerik Kasenlit, a first-year bioengineering student from Estonia, after the ceremony. "It's been wonderful to see everyone and learn which departments they're in."

Kasenlit, who worked in the biosciences industry for several years, said he's looking forward to being back in school. "I want to study how cells make decisions," he said.

Angel Madero Rincon, a first-year student in biology, hopes to study protein homeostasis and neurodegenerative diseases. A native of Colombia, he said he chose Stanford because the school allows students to work in labs outside their departments.

"That was very attractive to me because I intend to take a multidisciplinary approach to my research," he said.

Enright, who grew up in Vermont, hopes that she can contribute to a medical breakthrough during her time at Stanford.

"I'm excited to make connections with people and collaborate with them, in addition to making a discovery," she said. "Fingers crossed." **ISM**

JIM GENSHEIMER

(Clockwise from top right) At the Sept. 23 lab coat ceremony, new graduate students in the biosciences recite an affirmation, declaring an "uncompromising respect for truth." Mallory Laboulaye, a new PhD student, talks with pathology professor Marius Wernig at a reception following the ceremony. Arturo Molina, president of the Stanford Medicine Alumni Association, helps Isabel Delwel, a new graduate student in microbiology and immunology, into her lab coat.

Stanford Medicine recognized for physician-wellness work

By Julie Greicius

Changing the culture that has led to a national epidemic of physician burnout doesn't happen overnight. But efforts at Stanford Medicine — which have grown to include departmental and organizational initiatives, ongoing assessment tools, and engagement and accountability at the highest levels of leadership — are gradually beginning to take hold and helping to advance the cause.

Now those efforts have been acknowledged by the American Medical Association's new Joy in Medicine Recognition Program. Stanford Medicine, which comprises Stanford Health Care, Stanford Children's Health and the School of Medicine, received the program's highest recognition: gold.

"Stanford Medicine has long been a leader in taking on some of the world's most challenging medical problems," said Lloyd Minor, MD, dean of the School of Medicine. "In facing the systemic issue of physician burnout, we've turned our lens of inquiry inward. We're proud to receive this recognition from the AMA that marks our progress and encourages us to stay the course."

The AMA may recognize health care organizations with a bronze, silver or gold based on their performance in six competency areas: commitment, assessment, leadership, efficiency of practice environment, teamwork and support.

Several of Stanford's initiatives seek to improve the experience of frontline physicians. A dedicated well-being director in almost all of Stanford's 18 clinical departments focuses on addressing the challenges and frustrations unique to each department, such as rearranging schedules within the department to minimize disruptions in workflows.

At both Stanford Health Care and Stanford Children's Health, improving the efficiency of the practice environment is a top priority. At Stanford Health Care, the operational plan calls for enhancing the procedural and ambulatory work environments. The chief medical information officers at both hospitals, in collaboration with the WellMD team, have begun to address this with their own tool to measure "work after work," the record-keeping most physicians must complete afterhours and usually at home.

The data from this tool, other key metrics and physician wellness surveys are regularly reported to both hospitals' boards, which can base decisions on these metrics with the goal of maintaining a cycle of continuous improvement. This information is also provided to all department chairs and is being used in several departments as an outcome metric for improvement teams studying workflow redesign, changes in team-based care and integration of documentation assistance, such as scribes. These are just some of the wellness efforts in development across the organization. They also include leadership development programs, peer support resources and commensality groups to build meaningful connection and support for doctors.

"We have a long way to go in our work to improve physician wellness, but this recognition indicates that Stanford Medicine not only acknowledges this challenge but also has the highest level of commitment to change things for the better," said Tait Shanafelt, MD, professor of medicine and chief wellness officer at Stanford Medicine. "The AMA designation recognizes that Stanford Medicine has established the appropriate systems and processes to begin to make meaningful progress at the organizational level — work that the school and hospital leadership are dedicated to continuing."

For Stanford Medicine, this gold designation of excellence is a welcome affirmation following a series of efforts to redefine health care working environments to improve physician satisfaction and reduce burnout. The Stanford Medicine WellMD Center was created in late 2015. Two years later, Stanford Medicine was the first academic medical center in the United States to establish the role of chief wellness officer.

"As an academic medical center, we recognize that the healthiest environment for patients must also be a healthy one for their physicians," said David Entwistle, president and CEO of Stanford Health Care. "We're working to build the systems that will ensure the best practice environment for physicians, with the goal of increasing their well-being and ultimately ensuring the highest quality care for our patients."

Paul King, president and CEO of Lucile Packard Children's Hospital Stanford and Stanford Children's Health, agreed. "We're at a turning point where health care organizations have the opportunity to reshape the field of medical practice. We're listening, we're learning and we're taking meaningful steps to create a more livable, nourishing and sustainable environment for our workforce."

Read more about Stanford Medicine's physician wellness efforts in the latest *Stanford Medicine* magazine.

For resources on physician wellness at Stanford, visit https://wellmd.stanford.edu. **ISM**

Rehearsals ready care teams for opening day at new hospital

By Grace Hammerstrom

THRU LUKE'S LENS

An interventional radiology team gathers before their first scenario during a "dress rehearsal" on Aug. 29 at the new Stanford Hospital.

When the doors of the new Stanford Hospital opened early on the morning of Aug. 29, the only patients inside were volunteers playing the role of patients in an all-day dress rehearsal. Caring for them were 860 Stanford Health Care staff and School of Medicine faculty. They spent the day practicing common patient care scenarios, all part of learning how to work together, across departments, in their future workspace.

Just as actors rehearse for opening night, Stanford Hospital sent its leads through two dress rehearsals — one in July and the second in August. In all, 1,575 staff took part in a total of 164 scenarios. For each of these scripted training events, patient care and support teams walked through paths of travel, practiced new workflows, became familiar with their new environment and the location of supplies and equipment, learned how to work together and documented problems as they arose. The goal was to resolve outstanding issues before opening day so that safe processes would be maintained for every real patient care scenario.

"The first dress rehearsal in July was transformative," said Helen Wilmot, vice president of facilities, services and planning, whose strategy team was responsible for planning and executing the complex dress rehearsal events. "It was the first time we came together as a large group in the new hospital, and the energy was so positive."

Dress rehearsals are just one element of a series of synchronized activities that must occur to open a new hospital. Planning and design actually began more than five years ago with teams from every department tasked with creating new workflows for the then-unbuilt space. This planning/design phase required working with tabletop displays and cardboard sets to develop operational, staffing and training plans and to determine technology needs.

As the hospital gets within six to 12 months of opening, the activation phase kicks in. "The work becomes more tactical as departments begin to execute their plans," Wilmot said. Dress rehearsals are part of this activation phase.

Planning to move patients is the third step necessary to open the new hospital. Move planning takes four to five months, but moving patients will take just four to six hours, with one patient being moved to the new hospital every three to six minutes, on average.

Stabilization, a three-month period of intense scrutiny and issue identification, is the final phase required to activate the new hospital. This phase begins on patient day one, as providers and staff begin to care for real patients in the new space, with new workflows, new equipment and new technology.

Real-life scenarios

During the eight-hour dress rehearsal in July, 700 employees and faculty ran through 80 scenarios. At any given moment, 28 different scripted events were being played out in every patient care area of the hospital, from the interventional operating suites on floor 2 to the emergency department on the first floor and patient rooms on floors 4-7. In August, 875 employees ran through 84 scenarios, with 29 scenarios running simultaneously.

"The first dress rehearsal in July was transformative."

These scripted, simulation-based trainings tested staff confidence in the new space. The scenarios covered common patient-care situations, but with added complexities to allow staff to troubleshoot complications. For each scenario, a host coordinator directed the team through each step, and a recorder documented issues identified by team members as they performed their typical job functions.

In the post-anesthesia care unit on the second floor, for example, a team of nurses, physicians, laboratory personnel, imaging staff, patient experience representatives, lift specialists, respiratory therapists and patient access staff cared for an unstable patient. When the nurse called for a lift team, the **See REHEARSAL, page 7**

Stanford Health Care – ValleyCare certified as primary stroke center

By Bruce Goldman

Stanford Health Care – ValleyCare's hospital in Pleasanton, California, earned Joint Commission certification as a primary stroke center on Sept. 25, marking the inauguration of a new primary stroke center in the Tri-Valley area.

The Joint Commission, an independent private organization, surveys health care organizations throughout the United States, inspecting applicant institutions and programs from a number of different perspectives and employing numerous criteria to assess applicants' total performance from the minute patients show up to the point of their discharge.

"Stanford Health Care – ValleyCare is proud to receive this certification from The Joint Commission. This designation allows us to provide a high level of neurovascular care to the many stroke patients in the region who need it most," said Rick Shumway, president and CEO of Stanford Health Care – ValleyCare. "As a primary stroke center, we are already seeing the positive impact this is having on the community. Patients are receiving care closer to home, allowing them faster treatment and better outcomes."

STANFORD HEALTH CARE – VALLEYCARE

Stanford Health Care – ValleyCare's hospital in Pleasanton, California, underwent a rigorous on-site review by The Joint Commission as part of the primary stroke center certification process.

Stanford Health Care – ValleyCare's hospital underwent a rigorous on-site review in August. During the certification visit, The Joint Commission measured the hospital against more than 100 standards for the care of stroke patients, including door-to-CT scan times, how quickly patients received tissue plasminogen activator, or tPA — the clot-busting medication — and the quality of care administered within those time frames.

"The stroke care team at Stanford Health Care – ValleyCare has done exceptional work over the past few years to achieve this certification," said David Entwistle, president and CEO of Stanford Health Care. "For patients suffering a stroke, having an option for the highest quality care close to home can make a life-changing difference. The team at Stanford Health Care – ValleyCare has made that option a reality."

Residents of the Tri-Valley area will reap substantial, immediate health benefits, said Prashanth Krishnamohan, MD, medical director of Stanford Health Care – ValleyCare's neurology and stroke program.

"This allows us to provide prompt treatment to local stroke patients," he said. "Previously, even someone whose stroke happened right outside our door would have been taken to another primary stroke center in the Bay Area for evaluation and treatment. That could mean a 15-minute to one-hour drive in an ambulance."

Around-the-clock care

Patients will have around-the-clock neurology care in person or through telemedicine technology in collaboration with Stanford Health Care in Palo Alto.

"Patients have 24/7 access to stroke-trained neurologists any time of the day or night — even at 2 o'clock in the morning or on weekends," Krishnamohan said. "Our remote-connection technology enables those doctors to perform the same kind of detailed evaluation from a distance that would be provided at the patient's bedside."

Stanford Health Care – ValleyCare's dedicated 24/7 stroke response team is ready to administer clot-busting medicine quickly to all patients who are eligible; to deploy advanced imaging software that helps identify patients who might benefit from more advanced modes of treatment; and when necessary, to swiftly transfer patients to Stanford Health Care, which offers a full spectrum of such advanced treatment modes. **ISM**

To fight effects of sleep deprivation, reach for healthy snacks

By Tracie White

Nutrition scientist Maryam Hamidi, PhD, conducted research recently which required her to repeatedly stay awake from 8 a.m. until 5 a.m. the next day. As part of the study, she also needed to keep supplies of both healthy and unhealthy snacks stacked in her office.

Then, somewhere along the line, Hamidi, who has a doctorate in nutritional epidemiology and is a trained nutritionist, began to notice something strange about her own food cravings:

"Around 6 or 7 p.m., I would start craving chips," she said. "I started noticing these bags of potato chips in my office. I had not craved chips since my undergraduate college years. One day I had one bag. Then a Diet Coke. And then I went for a second bag, and then a third. I was having fun. I remember thinking, 'This is great. I should do this more often.'"

As a nutrition expert, she realized she was providing an excellent example of just how hard it can be to eat healthy when you're exhausted, no matter how well you understand the importance of a good diet.

"I'd never eaten three bags of chips at once," she said, laughing. "But I'd also never been that sleep-deprived."

As a researcher at the WellMD Center, which promotes physician wellness at Stanford Medicine, Hamidi is interested in this complicated relationship between sleep and dietary behaviors. Sleep deprivation comes with the territory for physicians, who often work long hours and face interrupted shift cycles. Many researchers have looked into the various ways of improving sleep by reducing work hours or rearranging work schedules, but few have examined how improving a physician's diet might help.

In a study published online Sept. 10 in the *American Journal of Lifestyle Medicine*, Hamidi, along with other Stanford researchers, examined survey results on sleep and nutrition from 245 Stanford physicians and found that a better diet is associated with reduced side effects of sleep deprivation. Mickey Trockel, MD, PhD, clinical associate professor of psychiatry and behavioral sciences, is the senior author of the study.

Barriers to eating well

Physicians face significant barriers to eating well at work due to long hours, a heavy workload and limited access to healthy meals, snacks and drinks. The findings of this study suggest that by providing healthy options at work, employers could help reduce the brain fogginess, difficulty concentrating and irritability caused by poor sleep among health care providers. And, as a result, help improve patient care.

"No one really thinks about how a physician's diet affects patient care," Hamidi said.

During her 21 years of experience working side by side with physicians, Hamidi has often observed something similar to her own snack attack with the chips. It's understandable, especially when your options are limited.

MIROSLAVIK/PIXABAY

Of course, doctors, and the occasional wayward nutritionist, are far from alone in reaching for junk food when they're tired. Ask any college student who has reached for a candy bar while cramming for exams late at night.

> "One day I had one bag. Then a Diet Coke. And then I went for a second bag, and then a third."

Interestingly, the Stanford study provides an overview of previous scientific literature that has explored the multiple possible causes of why we crave junk food when we're tired, and a lot of it has to do with physiology. In other words, it's not all our fault.

First off, sugar provides a quick fix by temporarily boosting blood sugar levels. In addition, inadequate sleep tends to lower executive brain function — impairing decision-making skills — and willpower. Research also shows that changes caused by lack of sleep in appetite-regulating hormones and brain functioning can further lead to the desire to boost energy-levels with food and snacks high in added sugars, sodium, fat and saturated fat.

"Given all of these things, physiology pushes physicians to go for unhealthy foods," Hamidi said. "The nature of the profession makes it more difficult to eat well."

At the same time, past research has also shown that improved nutrition can help mitigate fatigue by improving both cognitive function and sleep quality. As the study says:

"Potential mechanisms for the effect of diet on cognitive performance include regulation of hormones, neurotransmitters, and blood flow as well as reduction of oxidative stress and inflammation. The effects of diet on sleep quality have been attributed to the role of dietary factors in regulation of peripheral circadian clocks and to the synthesis of hormones and neurotransmitters that are involved in sleep regulation."

Facing similar challenges: Pilots

Hamidi once worked as a nutritional consultant for Air Canada Rouge to improve the diets of their pilots to help combat fatigue. Much like physicians, pilots face similar challenges to getting a good night's sleep, she said. They work in a confined space, with little or no time to go in search of healthy foods during layovers. She's seen firsthand how increasing intake of vegetables, and cutting down on added sugars and saturated fat, helps reduce the effects of sleep deprivation.

"Increasing physicians' access to healthy snack options close to their work areas and creating a work environment with many healthy options can help reduce their daytime fatigue," she said.

Her suggestion to employers: Cut back on the ready supply of sodas and snacks high in sugar, sodium and saturated fat and instead offer fruits, vegetables, unsalted raw or dry roasted nuts, salads, smoothies and even healthy protein bars within arm's reach.

"It becomes an organization's responsibility to provide healthy food options for their busy health care providers and to improve the quality of patient care," she said. **ISM**

Echolocation

continued from page 1

whether, at the most basic level, something that's the same on the outside — like species that use echolocation — are the same on the inside. That is, do they acquire these traits through similar molecular changes? Now we know that not only is this true as least some of the times, but also that many of these changes occur in the coding region of the genome. It's fascinating."

Bejerano is the senior author of the study, which was published Sept. 30 online in the *Proceedings of the National Academy of Sciences*. Postdoctoral scholar Amir Marcovitz, PhD, and graduate students Yatish Turakhia and Heidi Chen share lead authorship.

Although the cochlear ganglion has been previously implicated in the sound-as-GPS technique known as echolocation, past studies have relied primarily on researchers' intuition to identify possible genetic players based on prior knowledge of their function — a kind of looking-for-your-lost-keys-under-a-lamppost approach. These studies suggested only a few responsible mutations in just four genes involved in hearing.

Sifting through whole genomes

In contrast, the Stanford researchers developed an unbiased way to sift through whole genome sequences and spotlight concerted genetic changes shared by animals with unusual abilities or traits.

They used the technique to identify genes involved not only in echolocation, but also others critical to the development of the specialized skin of aquatic mammals such as manatees and killer whales, or to the increased lung capacity and function enjoyed by jaunty high-altitude animals like pikas and alpacas.

The technique developed by the researchers is likely to open countless doors for biologists seeking to identify the genetic underpinnings of other adaptive traits. The findings also answer yet another hotly debated question in developmental biology.

"For a long time, biologists have wondered whether important evolutionary changes could occur through changes in the sequences of genes that are very similar across related species," Bejerano said. "These genes often control multiple functions in different tissues throughout the body, so it seems it would be very difficult to introduce even minor changes. But here we've found that not only do these very different species share specific genetic changes, but also that these changes occur in coding sequences."

Bejerano and his colleagues developed the technique by searching for instances in which animals sharing unique traits also shared changes in their DNA that are not found in their more closely related peers. To analyze the evolution of echolocation, for example, they compared the genetic sequences of echolocating bats with those of megabats that don't echolocate, and toothed cetaceans such as dolphins and killer whales with cloven-hooved land mammals. (At the time of the study, whole genome sequences for nonecholocating whales were not available.)

Gill Bejerano

The researchers looked for instances in which the DNA sequences of genes independently changed to encode amino acids that, although identical among echolocating species, differed from the amino acid found at that position in most other mammals. They then devised a way to determine whether these changes occurred more often than would be expected by chance in particular groups of genes that are predicted to have similar functions. There are about 4,000 groups of genes known to affect the development and function of a large variety of tissues in mammals.

Remarkably, the researchers found that their unbiased analysis homed in on the cochlear ganglion as the single most affected tissue among echolocating mammals. In particular, 25 "convergent" amino acid changes occurred in 18 genes known to be involved in the development of the cochlear ganglion. Only 2 of the 25 changes had been previously identified in past echolocation studies.

"Pulling the cochlear ganglion — a real poster child for the development of echolocation — out of a hat containing more than 4,000 possible gene sets, based on genomic sequence alone, was pretty spectacular," Bejerano said. "You go from agnostically checking all these different groups to boom, you have a prime suspect jump immediately to the top."

Diving into the data

Finally, the scientists burrowed more deeply into the data to ensure that their tool wouldn't mistakenly identify instances in which different animals had devolved, or abandoned certain traits when they were no longer required by their environment. To do so they examined the whole genome sequences of different subterranean moles that have lost their vision after millennia in the dark underground.

"This study is a great example of what we can accomplish when we combine the data in whole genome sequences from multiple species with functional information about specific genes," Bejerano said. "The biomedical community has been gathering both of these datasets for many years, and it's wonderful to now be at the confluence of these two fields — identifying the relationships between gene conservation and function and between phenotype and gene sequences. Now we've developed a tool that can screen millions of potential matches, and we are seeing the emergence of some beautiful patterns. Doing this in other animals and for other traits is going to be so much fun."

Other Stanford co-authors of the research are graduate students Michael Gloudemans and Benjamin Braun and postdoctoral scholar Haoqing Wang, PhD.

The research was supported by the National Institutes of Health, the National Science Foundation, a Packard Foundation Fellowship and a Microsoft Faculty Fellowship.

Stanford's Department of Developmental Biology also supported the work. **ISM**

Tanning

continued from page 1

about twice as likely to suffer from skin cancer.

"If tanning facilities are available right next to your home, you're probably more likely to use them," said Eleni Linos, MD, MPH, professor of dermatology, who sees patients at Stanford Health Care's dermatology clinic at Hoover Pavilion. "Our concern is whether the tanning industry is targeting high-risk communities, similar to how the tobacco industry has done in the past, marketing to vulnerable groups."

Eleni Linos

Linos is the senior author of the study, which was published online Oct. 4 in *JAMA Open Network*. The lead author is graduate student Rebecca Chen.

The study used census data paired with business locations in neighborhoods in the 10 U.S. cities with the largest numbers of gay, lesbian, bisexual and transgender residents, including San Francisco and Los Angeles. The researchers used self-reported male-male households as a proxy for the prevalence of sexual minority men in each neighborhood.

They found that neighborhoods in which male-male households accounted for at least 10% of the total unmarried households were twice as likely to include an indoor tanning salon than those in which fewer than 10% of the households were male-male, even after correcting for socioeconomic differences, including income and race.

'No benefit to indoor tanning'

The findings surprised and concerned the researchers.

"Indoor tanning is a class 1 carcinogen," Linos said. "I don't think we can be naïve and think of this as just another business. There's no benefit to indoor tanning. Because we are already seeing very high rates of skin cancer in this community, we need to be particularly vigilant about industry influence."

The researchers intend to launch a new effort in conjunction with Stanford's PRIDE Study — a long-term study of sexual and gender minority health — to investigate the marketing and advertising efforts of the tanning industry. But regardless of the outcome, they warn that indoor tanning is not safe and note that one way to curtail its use is to reduce its availability.

"Your built environment has a tremendous influence on your health in both positive and negative ways," Linos said. "As public health researchers and advocates, we are committed to improving people's health. By supporting healthier neighborhoods, we have the potential to benefit the health of an entire community."

Other Stanford authors of the research are researcher Lily Morrison, MPH; senior research scientist Lisa Henriksen, PhD; and professor of dermatology Susan Swetter, MD.

A researcher from the Center for Geospatial Analytics at North Carolina State University also contributed to the study.

The study was funded by the National Institutes of Health and the Melanoma Research Foundation.

Stanford's Department of Dermatology also supported the work. ISM

Sleep

continued from page 1

three hours of their normal sleep period. The remaining participants received a sham light therapy treatment, consisting of three bright flashes of light per hour — too little to reset their body clocks.

Although the light therapy caused the teens who were exposed to it to feel more tired earlier at night, they still stayed up late. Using the light alone was not enough to increase the amount of time they slept.

"We had to convince teens to try to go to sleep earlier," Zeitzer said.

So, in the second four-week phase of the study, researchers recruited 30 teens; half of them received light therapy during their final two hours of sleep, and half had sham light therapy.

> Using light therapy alone was not enough to increase the amount of time teens slept.

But in this phase of the study, all of the teens also participated in four one-hour sessions of cognitive behavioral therapy to encourage them to go to sleep earlier. Therapists worked with each teen to identify areas of their lives they cared about that would be better if they had more sleep — such as academics, physical appearance or athletic performance — and used these to help motivate the teens. The cognitive behavioral therapy also included giving them information about the body clock, sleep hygiene and strategies for waking up earlier on weekends.

In addition to the extra sleep, participants who received both light therapy and cognitive behavioral therapy went to bed an average of 50 minutes earlier than participants who had only cognitive behavioral therapy. In addition, the participants receiving both therapies were six times more successful than those receiving only cognitive behavioral therapy at maintaining consistent bedtimes.

Prior studies of light therapy for resetting the circadian clock have shown that the early morning flashes of light must continue daily to be effective, Zeitzer said. "The cool part, for an intervention teens would potentially have to live with for years, is that it is completely passive. We set up the flashing light in the person's bedroom and put it on a timer; they don't have to wear a device, remember to turn it on or do anything else."

The flashing light used in the study was a programmable bridge beacon; it is not marketed as a sleep aid, Zeitzer said.

The next step, he said, is to figure out the best way to deliver brief cognitive behavioral therapy for improving sleep duration to large numbers of people.

The study's other Stanford co-authors are Katherine Kaplan, PhD, clinical instructor in psychiatry and behavioral sciences, and research assistants Meital Mashash and Rayma Williams.

Scientists from Palo Alto University also contributed to the study. Stanford University holds a patent on the light therapy technique for resetting the body clock.

The study was funded by the National Institute of Child Health and Human Development, the Lucile Packard Foundation for Children's Health and the Stanford Maternal & Child Health Research Institute.

Stanford's Department of Psychiatry and Behavioral Sciences also supported the work. ISM

Rehearsal

continued from page 5

first issue of the morning was identified. The wheels of the lift device were too wide to get through the patient room door.

The "patient," an elderly woman well prepared for her acting debut, began shivering. Together, the care team followed the detailed steps of the scenario, traveling en masse to a nearby warming drawer for a blanket and to the Omni cell, an automated medication dispensing cabinet, to retrieve a needed medication. When the nurse identified that the patient was bleeding, an order was placed for blood. Unable to control the bleed, the nurse paged the attending physician. As the patient's condition worsened, she called a code. Throughout the scenario, the staff paused to review each step and make small adjustments to their workflows.

"We test every step," said Ann Cullen, MS, RN, clinical transition director for critical ambulatory care. "Anytime you move staff into a new space, they have to get familiar with the new footprint."

Downstairs, a team in the emergency department readied themselves for an incoming trauma victim. A 60-year-old woman with a blunt force injury from a high-speed collision was arriving by ambulance in five minutes. Treatment Bay Three was packed with trauma attending physicians, residents, nurses and observers. The team ran through their roles, identified the locations of the nearest supply cabinets, crash carts, medication Omni cells and defibrillators, and practiced operating the new overhead boom light.

As the patient moaned in pain, the team called for a portable X-ray. When the patient was transported to the CT room, the entire entourage followed the gurney, cramming themselves into the imaging area, and then over to the elevator bays as the patient was sent to surgery. The location of supplies, crash carts and defibrillators was heavily discussed, and finding the fastest path of travel from the emergency department and CT rooms to the operating rooms above was identified as an outstanding issue.

THRU LUKE'S LENS

Members of the cardiodiagnostics team go through the steps of preparing a "patient" — a volunteer from a Stanford Medicine patient and family advisory council — for a procedure.

Fictitious patients lend a real-life quality to the role-playing, Wilmot said. "When you have a patient you're caring for, people are used to moving a certain way to get what they need. They have muscle memory," she said. "Dress rehearsals let teams adjust their muscle memory from the existing hospital to the new hospital and adapt to their new environment."

Future training milestones

With just two full days of cross-functional team dress rehearsals, every patient care team and department has been in the new hospital multiple times, conducting department-specific training in their new space.

Further fine-tuning will take place this month when the Office of Emergency Management will hold a three-hour, hospital-wide mass casualty exercise. Later that same day, a infacilities team will be on-site, testing all of the building's systems — badge readers, nurse call buttons, elevator entrapments, overhead paging, pneumatic tubes. Further resolution of issues identified during dress rehearsals will be ongoing, with some teams running mini-simulations to work out final changes. An operations command center will be set up in the new hospital and will run through a final mock drill to prepare for final occupancy approval.

"We know how to do the clinical work," said Alison Kerr, chief administrative officer of clinical operations at Stanford Health Care. "But in the new space, with new equipment, new technology, new workflows and different disciplines working together, we have to practice so we get that operational discipline down with a high degree of reliability. We don't ever want to get anything wrong." ISM

THRU LUKE'S LENS

Playing the part of a patient during a scenario at the dress rehearsal in August. The goals of the rehearsals were to resolve outstanding issues at the new Stanford Hospital before opening day so that safe processes would be maintained for every real patient care scenario.

From Eritrea to Stanford, PA student sees 'the positive in every negative'

By Daphne Sashin

In an instant, Rahwa Sebhatu went from a privileged child of a business owner to a stranger who didn't belong in her own country, Ethiopia.

Everything changed in 1998, when she was in fourth grade. At the beginning of the school year, Sebhatu and her three brothers enjoyed a middle-class lifestyle in the capital city of Addis Ababa, where their parents owned an automotive repair business and instilled in them the importance of education. The children attended a private, culturally diverse American school, and Sebhatu spoke three languages.

But that May, war broke out between Ethiopia and neighboring Eritrea. During the two-year conflict that ensued, thousands of people of Eritrean origin, like Sebhatu's parents, were deported from Ethiopia.

The soldiers came for her father first. He only had time to grab a few clothes. Too young to understand, Sebhatu said she mainly remembers her mother crying — continuously. She can picture her mother packing up wedding gifts that would eventually get lost, struggling to sell her husband's business assets and getting jailed twice.

Children who used to be friends looked at Sebhatu and her siblings with hostility.

"People started to find out that we were Eritrean, and word got out that we were the enemy," Sebhatu said. "We couldn't believe how they would say that. We shared so many memories and here we are, starting to become strangers."

That July, Sebhatu, her mother and her siblings were deported too.

Living under dictatorship

They were reunited with Sebhatu's father and lived in an apartment under a dictatorship in Eritrea. Sebhatu said her family's evangelical church was forcibly closed by the government in 2004, and the pastors were put in prison.

Despite the conditions, she worked hard and excelled in school. She graduated from high school at age 16 following a grueling year at the Sawa military camp, where Eritreans spend their final year of secondary education, and some are conscripted indefinitely.

STEVE FISCH

Rahwa Sebhatu, a student in the physician assistant program, with her husband, Alexander Araya, and their two children.

She said she went through months of combat training and manual labor in extreme weather with very little food and frequent punishment.

"I learned so much from the people around me," she said. "I try to look at the positive in every negative. That gives me peace and hope. Whenever I dwell on the negative things, I tend to become bitter, and that hasn't helped me."

Sebhatu's life changed dramatically when she won an American green card and was fortunate enough to receive an exit visa to leave Eritrea legally.

With $300, Sebhatu moved to Oakland, where her grandmother had a cousin willing to take her in. Sebhatu first enrolled in community college and then transferred to the University of California-Davis, where she said she graduated with a 3.9 GPA and a bachelor's degree in biological sciences.

Dreaming of curing diseases

Science and medicine had beckoned Sebhatu since she was a little girl in Ethiopia. Back then, she dreamed of curing diseases like HIV and malaria. An early medical experience cemented her interest in health care: When a procedure she underwent as an infant left her with frequent pain and infection, a volunteer doctor from Germany ended her discomfort with a minor surgery.

"From then on, it was like I had never been sick," she said. "From that day forward, I wanted to become a provider myself."

She was the first in her family to graduate from college. By that time, her mom and brothers were able to join her in Oakland. Sebhatu married her best friend in the United States — a hardware engineer whose family went to the same church in Eritrea. She recently became a U.S. citizen.

While working as a patient care coordinator for a University of California-San Francisco geriatric primary care clinic, Sebhatu decided to apply to physician assistant programs. Pregnant with her first child at the time, she saw the PA track as an opportunity to provide patient care while affording her the work-life balance she sought.

Sebhatu is in her second year in Stanford's physician assistant master's program. She was one of three PA students to receive a one-time scholarship created by Simon Stertzer, MD, professor emeritus in cardiovascular medicine.

After graduation, Sebhatu plans to work for three years in an underserved health care community as a requirement of her National Health Service Corps Scholarship. After that, she sees herself continuing to provide primary care in a low-income community where she can develop relationships with patients.

"Being able to learn from world-class experts ... that is a blessing," she said. "Honestly, this is a dream come true." **ISM**

Stanford Children's Health earns Magnet status

Stanford Children's Health has achieved Magnet recognition as a reflection of its exemplary professional nursing practice, interprofessional teamwork and preeminent patient care. The American Nurses Credentialing Center's Magnet Recognition Program distinguishes organizations that meet rigorous standards for nursing excellence.

With this credential, Stanford Children's Health joins the global community of Magnet-recognized organizations. Just 8% of more than 6,300 U.S. health care organizations have achieved Magnet recognition.

"Magnet recognition is a tremendous honor and reflects our commitment to delivering the highest quality of care to our patients and their families," said Kelly Johnson, PhD, RN, vice president of patient care services and chief nursing officer at Stanford Children's Health. "This achievement underscores the foundation of excellence and values that drives our entire staff."

To achieve initial Magnet recognition, organizations must pass a rigorous and lengthy process that demands widespread participation from leadership, staff and providers. This process includes an electronic application, written patient care documentation, an on-site visit and a review by the Commission on Magnet Recognition.

Magnet-recognized health care organizations have proven to provide specific benefits to the communities they serve and the people who work there, including the following:

- Higher patient satisfaction with nurse communication, availability of help and receipt of discharge information
- Lower risk of 30-day mortality and lower failure-to-rescue rates
- Higher job satisfaction among nurses
- Lower nurse reports of intentions to leave their positions

"We are exceptionally proud of reaching this milestone — a result of tireless dedication from our nursing and patient care leadership and everyone who delivers care at Stanford Children's Health," said Paul King, president and CEO of Stanford Children's Health. "To have opened our new hospital in 2017 and now, less than two years later, meeting this extraordinary benchmark is a testament to the unparalleled quality and potential of our organization." **ISM**

Memorial event for Roy Maffly, former associate dean, will be held Oct. 11

A celebration of the life of Roy Maffly, MD, a former associate dean for student affairs at the School of Medicine and a champion for recruiting underrepresented minorities to the school, will be held from 5-7 p.m. Oct. 11 at the Stanford Faculty Club. No RSVP is necessary.

Roy Maffly

Maffly died April 15. He was 91. **ISM**

OF NOTE

reports on significant honors and awards for faculty, staff and students

SERENA HU, MD, professor of orthopaedic surgery, was named a president-elect of the American Orthopaedic Association. Her term as the first woman to serve as president will run from 2021 to 2022.

MICHELLE MONJE, MD, PhD, associate professor of neurology and neurological sciences, is a co-principal investigator of a project that received $7.4 million from Cancer Research UK to study signals that prompt pediatric brain tumors. These tumors tend to appear at specific times and places in the growing brain. Monje's team will use 3-D intact-tissue RNA sequencing to study when and where genes switch on in normal brain development and during the development of pediatric brain tumors. They aim to identify new drug targets.

MATTHEW PORTEUS, MD, PhD, professor of pediatrics, received a three-year, $878,000 grant from the Doris Duke Charitable Foundation supporting his work to improve CRISPR-based gene correction in hematopoietic stem cells to cure sickle cell disease.

DANIEL RUBIN, MD, professor of biomedical data science and of radiology, was awarded a $50,000 grant from the faculty and research engagement program of Yahoo Research to support his use of ultrasound movie images to detect breast cancer.

EDITH SULLIVAN, PhD, professor of psychiatry and behavioral sciences, received the Research Society on Alcoholism's Henri Begleiter Excellence in Research Award. The award recognizes a career in alcoholism research, specifically her study of brain-behavior relations, her collaboration with international scholars and her mentoring of developing scientists. **ISM**

Serena Hu

Michelle Monje

Matthew Porteus

Daniel Rubin

Edith Sullivan