Transforming
Medicine
THROUGH
Collaboration

UCSF Department
of Medicine

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2018-2019

BIENNIAL REPORT

UCSF Department of Medicine

Collaboration

Advances in our understanding of the biological and social determinants of health and illness – along with the resources and technological maturity to apply that understanding – make this a watershed moment for health care.

By virtue of its remarkable history, mission, people, and geography, UC San Francisco and its Department of Medicine are in a unique position to contribute to discoveries and practice changes that transform health and health care in venues ranging from the intensive care unit to the home. But doing so requires thoughtful, intentionally designed collaborations – across disciplines and sites, and between scientists, clinicians, educators, trainees, companies, and communities. Recognizing the need for such collaborations naturally led to the title and theme of this 2018-2019 biennial report for the UCSF Department of Medicine: *Transforming Medicine Through Collaboration.*

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Front row from left: Lisa Deng, MD; Veronica Manzo, MD, MS; Nancy Choi, MD; and Smitha Ganeshan, MD, MBA. Back row: Paul Marano, MD; and Katie Raffel, MD

Cover photographic illustration: Destruction of leukemia blood cell

Message
FROM
THE Chair

Robert M. Wachter, MD
Hospital Medicine

To stay ahead, organizations need to create the conditions in which people with various perspectives and backgrounds can come together to look at problems through new lenses, applying insights from one field to another.

ROBERT WACHTER, MD

Creative Collaborations and Transformation

UCSF and our Department of Medicine are storied organizations. Whether it's our role in the founding of the biotech industry, in addressing the HIV/AIDS epidemic, or in areas ranging from medical education to patient safety to health disparities, we have much to be proud of as unquestioned world leaders in academic medicine.

But truth be told, there are countless stories of leading organizations that declined precipitously because competitors entered the market, introducing new and more effective ways of doing business. From Blockbuster to BlackBerry, and from Sears to Kodak, it is not hard to find these cases in the business world; and it is easy to see how scientific discoveries, technological advances, economic pressures, and new understanding of the various factors that impact human health demand that we at UCSF effectively adapt or risk losing our position of leadership.

One of the most important insights about transformation of any kind is that no one individual, division, or department has all the skills, resources, and vision needed to transform an organization to meet the needs of changing times. To stay ahead, organizations need to create the

conditions in which people with various perspectives and backgrounds can come together to look at problems through new lenses, applying insights from one field to another.

This report, which covers 2018-2019, will focus on teamwork in the UCSF Department of Medicine – with an eye on how we are taking advantage of new collaborations to transform our work and grow our impact in a rapidly changing world of health and health care.

Clinical Care   At each of our clinical sites, the need for new partnerships and ways of doing work is evident. At UCSF Health, we have doubled our size and revenues over the past seven years, partly through new affiliations with community-based delivery systems, including John Muir Health in the East Bay, MarinHealth to the north, Washington Hospital Healthcare System in the South Bay, and the Dignity Health/ CommonSpirit Health and One Medical systems in several locations. These partnerships enable more patients to receive UCSF-level care closer to where they live and work, and free up limited space in our academic medical centers in San Francisco for patients who require the tertiary and quaternary care facilities and specialists whose practices are based there.

At Priscilla Chan and Mark Zuckerberg San Francisco General Hospital and Trauma Center (ZSFG), the installation of the Epic electronic health record system in 2019 has woven together the hospital and the many clinics in the San Francisco Department of Public Health, providing more opportunities for collaboration. At the San Francisco Veterans Affairs Medical Center, new federal policies that allow patients to seek care closer to home have driven the migration of our clinics and physicians to new locations, particularly to the north, allowing veterans to see UCSF faculty closer to where they live.

At all of our sites, we have embraced new technological approaches to care, including patient-centered portals, apps, and telemedicine, to create more convenient ways for our patients to receive care. Finally, building on our pioneering work in electronic consultation (e-consults) a decade ago, we developed an inpatient model known as targeted automatic electronic consultation (TACo), which is rapidly becoming a national model. All of these innovations share the goal of using new approaches and technologies to bring clinical teams closer together, or to provide our patients new ways to access UCSF care.

Research   Our Department of Medicine faculty, staff, and trainees remain uniquely successful in research. In 2018, our people authored more than 3,100 publications and secured 373 National Institutes of Health (NIH) grants totaling $209 million, again placing the department as the number one department of medicine in the United States in NIH funding. We have launched a number of programs to support our research faculty, including one we call NIH-Plus that provides flexible dollars to our faculty to accompany each federal grant.

Even with all our successes, we recognize that building new collaborations is essential. We've established programs in the past year that include PREPARE (PRE-Proposal Application Review), which offers our junior investigators feedback from seasoned investigators on upcoming grant submissions, a new mentorship program for physician-scientists, and a team science grant that offers pilot funds to bring new teams together to tackle complex research problems.

Well-designed space can also facilitate teamwork. Major new research buildings are under construction on our Parnassus campus (along with the many new buildings at Mission Bay) and at ZSFG, buildings that will provide faculty, staff, and trainees modern space that promotes collaborations designed to attack important questions. For example, the new Parnassus space will house several large multidisciplinary research groups, including ImmunoX (which includes investigators, many from the Department of Medicine, addressing

challenges of fundamental and translational immunology), the Digital Collaborative (which brings together a variety of investigators taking advantage of digital tools and technologies), and the Benioff Center for Microbiome Medicine. Our department has also played a leadership role in the campus initiative to build CoLabs, a cutting-edge research incubator at Parnassus. Similar efforts to bring diverse investigators together will accompany the opening of the new research building at ZSFG in 2022.

Education We have also had an outsized role in the creation and implementation of our new medical school curriculum, named Bridges, which gives students early clinical exposure and an opportunity to work in a clinical microsystem to learn improvement techniques – which virtually always involve teamwork and collaboration. The core of Bridges is a robust student coaching system, and more than half of the Bridges coaches are Department of Medicine educators.

Our residency curriculum is evolving to ensure that our trainees have strong exposure to all of the medical specialties, in both the inpatient and outpatient settings. We are also particularly proud of a new program to connect junior faculty who aspire to careers in medical education with more senior faculty mentors – another example of

working systematically to create and nurture strong teams, including mentor-mentee relationships.

Diversity and Leadership We continue to work on diversifying our department and creating an environment in which everyone can perform to their full potential. After all, how can teams be effective if they are not diverse, across a whole range of attributes, and if some individuals face structural or cultural barriers to full participation? Added to that, we need to be sure our people have the skills they need to be strong leaders, including promoting inclusiveness and bringing out the best in all of our faculty, staff, and trainees.

To that end, we have developed many programs to improve diversity and leadership, including, in 2019, a leadership and coaching program that brought together about 20 of our new division chiefs and other

departmental leaders. Virtually all of our departmental leaders have completed training in diversity, equity, and inclusion, and many of the School of Medicine's diversity champions hail from our department. Our residency program has gone from 15 percent under-represented in medicine five years ago to nearly 30 percent today, and there are new programs (including the School of Medicine's John A. Watson Faculty Scholars and our department's Diversity in Basic Science program) that are providing crucial support for promising young faculty and trainees from under-represented groups. At this writing, of 14 new division chiefs recruited over the past three years, five were women and three were from groups traditionally under-represented in medicine. In 2019, two more Department of Medicine faculty members were elected to the prestigious National Academy of Medicine, both women.

Conclusion   One of my favorite quotes comes from the late Israeli prime minister Golda Meir: "Don't be so humble – you're not that great." It's a perfect reminder that arrogance is both unattractive and often a preamble to decay.

Our department is pretty wonderful, but the rules of the game are changing, and we have to change with them if we want to continue to lead. Among the most important changes are the creation of new partnerships, collaborations, and teams – and the determination to work even harder to value everyone's unique contributions and build an environment in which all our faculty, staff, and trainees can do their very best work. While remaining humble, we can all feel good about the progress we've made toward these crucial goals.

Bob Wachter

Robert M. Wachter, MD

PROFESSOR AND CHAIR, DEPARTMENT OF MEDICINE

HOLLY SMITH DISTINGUISHED PROFESSOR
IN SCIENCE AND MEDICINE

LYNNE AND MARC BENIOFF ENDOWED CHAIR
IN HOSPITAL MEDICINE

Driving Action ᴛᴏ Address ᴛʜᴇ Social Determinants ᴏꜰ Health

Founded in 2006, the UCSF Center for Vulnerable Populations (CVP) is renowned for its expertise in understanding how factors that include literacy, food policy, poverty, and minority status affect people's health. In 2018-2019, the CVP's numerous achievements exemplify the value of its wide-ranging research and community-based interventions.

Generous Grant Establishes UCSF Benioff Homelessness and Housing Initiative

For more than 20 years, Margot Kushel, MD, who became director of the CVP in 2018, has dedicated much of her research and clinical practice to uncovering and addressing the links between homelessness and health. "We now know that many medical conditions lead to homelessness, that homelessness has devastating consequences for health – and that there is no medicine as powerful as housing," she says.

In 2019, Marc and Lynne Benioff donated $30 million to UCSF to conduct research that further illuminates the root causes of homelessness and identifies evidence-based solutions to prevent and end it. The project, the UCSF Benioff Homelessness and Housing Initiative, is based within the CVP and will leverage the expertise of researchers and experts across UCSF, while working closely with other stakeholders, including elected officials, agency leadership, nonprofit directors, and impacted populations.

The initiative, which Kushel will lead, has three primary aims:

1 Close existing evidence gaps. "While we know that the primary strategy to end homelessness is to address the underlying causes – including lack of affordable housing, income inequality, and structural racism – there are many strategies for which we do not yet know the best practice. For example, we don't do a good job at predicting who is likely to become homeless soon, which is essential for targeting homelessness prevention resources effectively. [Nor do we] know how best to help older, formerly homeless adults age in place in permanent supportive housing," says Kushel, whose work has contributed to the recognition that about half of today's single adult homeless population is now 50 and older; many have never been homeless before.

2 Close the evidence-to-policy-and-practice gap. The initiative aims to translate what is already known and what its investigators learn to key decision makers, so they can make more informed practice

and policy changes. "Many decision makers don't recognize the connection between deeply affordable housing [housing that is accessible to people earning less than 30 percent of an area's median income] and health," says Kushel. "It's incredibly powerful for our colleagues working on deeply affordable housing to have medical colleagues who can speak to the data and motivate change." Along the same lines, Kushel and colleagues from five University of California campuses recently secured a UC Office of the President grant to enhance collaboration among economists, lawyers, and social policy experts, so they can more effectively use data to present high-quality evidence to policymakers.

3 Train a new and diverse generation of individuals to advance this work. The third goal of the Benioff-funded initiative overlaps with the CVP's core educational efforts, as well as with a 2018-2019 effort – led by Kushel – to have the UCSF School of Medicine and UCSF School of Nursing join the National Clinician Scholars Program (the successor program to the well-known Robert Wood Johnson Foundation Clinical Scholars Program). This interdisciplinary research program offers two-year fellowships to supply future health care leaders with the skills to reduce and eliminate health disparities in their communities, invent new models of clinical care delivery, and inform policy.
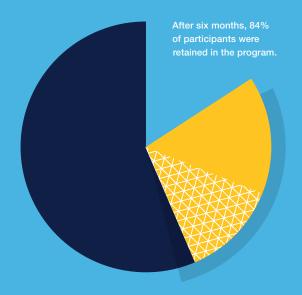
> We now know that many medical conditions lead to homelessness, that homelessness has devastating consequences for health – and that there is no medicine as powerful as housing.

MARGOT KUSHEL, MD

Reducing Smoking Among People Who Have Been Homeless

The work of CVP faculty member Maya Vijayaraghavan, MD, MAS – including an influential 2018 study in the *Journal of Community Health* – counters long-held assumptions that addressing smoking in homeless, housing insecure, or recently housed populations should be a low priority.

The assumption comes, in part, from supportive housing's (i.e., subsidized housing with closely linked supportive services for formerly homeless individuals) "Housing First" approach, which prioritizes housing without any preconditions of abstinence or a requirement to engage in services prior to entry into or while staying in supportive housing. Yet about 50 percent of people entering supportive housing smoke, and smoking is one of the leading causes of death in these populations. In addition, some homeless individuals spend as much as a third of their income on cigarettes, which compromises resources available for food and housing.

After six months, 84% of participants were retained in the program.

33% of those reported having a smoke-free home, and 17% reported not smoking at all.

Vijayaraghavan's work has helped to demonstrate that many people who have experienced homelessness fully understand the dangers of tobacco and are interested in quitting. Her recent study tested giving supportive housing residents who smoked access to one-on-one counseling about how to adopt a smoke-free home, as well as training for supportive housing staff on how to deliver brief cessation counseling. The researchers followed 100 currently smoking resident participants for six months, with a retention rate of 84 percent. At six months, 33 percent reported having a smoke-free home, compared with 12 percent at baseline; 17 percent of the participants reported not smoking at all.

"There's no quick fix, but we are trying to shape discussions about tobacco cessation so that every person entering supportive housing has access to cessation resources," says Vijayaraghavan. "Our pilot convinced us our approach could be sustainable and that smoke-free homes could make tobacco less normative."

There's no quick fix, but we are trying to shape discussions about tobacco cessation so that every person entering supportive housing has access to cessation resources.

MAYA VIJAYARAGHAVAN, MD, MAS

My goal is to integrate "Bring It Down San Francisco" into routine care and practice throughout the city.

VALY FONTIL, MD, MAS, MPH

Controlling Blood Pressure Among the Underserved

Over the past few years, CVP faculty member Valy Fontil, MD, MAS, MPH, has developed and expanded a practice-based hypertension intervention – "Bring It Down San Francisco" – he'd successfully piloted at ZSFG's Richard H. Fine People's Clinic. The expansion to 11 additional community clinics occurred in collaboration with Ellen Chen, MD, primary care director of population health and quality in the San Francisco Department of Public Health's San Francisco Health Network.

"My goal is to integrate this work into routine care and practice throughout the city," Fontil says.

The intervention has multiple components:

- A registry enables clinical sites to quickly recognize who has their blood pressure controlled and who does not.

- An innovative treatment algorithm helps physicians decide what medications are right for their patients by incorporating nontraditional factors, including the drug's local availability and the ability of the patient to travel to a pharmacy.

- Nurses and medical assistants receive training to ensure the readings they perform are accurate. Without such training, notes Fontil, "Some physicians assume blood pressure checks are not done correctly, and so often disregard high readings."

- With physician oversight, nurses perform rechecks and recommend treatment adjustments based on the algorithm, enabling all providers to perform more effectively.

To ensure a successful rollout, Fontil worked with the San Francisco Health Network's cardiovascular and hypertension equity workgroups, led by Chen. Representatives from each clinic tailored elements of the intervention to their individual clinic practices.

Now Fontil is working on a digital health platform that helps providers synthesize relevant information from the medical record and from patients to make faster and more accurate treatment decisions. This computerized clinical decision support system, embedded in the electronic health record (EHR), will display essential information – such as medication history, blood pressure trends, and home blood pressure measurements – to the provider in an accessible and user-friendly format that promotes fully informed and collaborative decision support.

"It's not rocket science, but it does involve thoughtful application of implementation science," says Fontil.

Diet is just as powerful as medication for reducing the risk of disease, but today, while I can prescribe a statin that insurance or Medicare covers, I can't realistically prescribe an apple a day.

Our long-term vision is to create structures that make access to healthy food part of medical care.

HILARY SELIGMAN, MD, MAS

Successful Nutrition Program Spreads South and East

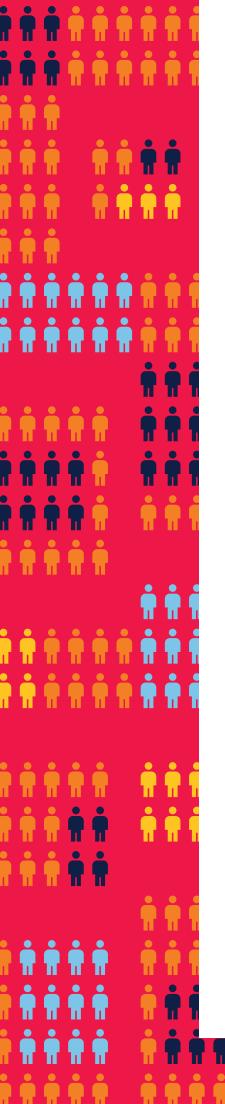Hilary Seligman, MD, MAS, faculty member of the Center for Vulnerable Populations and director of the Centers for Disease Control and Prevention's Nutrition and Obesity Policy Research and Evaluation Network, founded EatSF in 2015. Her motivation for this work is easy to understand. An influential May 11, 2019, article in *The Lancet* estimated that in 2017, poor diets were responsible for the deaths of 11 million people around the world.

Since its inception, EatSF – which gives low-income residents six months' worth of food vouchers that are redeemable at grocery stores, corner stores, and farmers markets in their neighborhoods – has become a national model for programs trying to address the devastating health impact of poor nutrition and food insecurity.

Hilary Seligman, MD, MAS, at the Heart of the City Farmers' Market, where EatSF vouchers are regularly used

"Diet is just as powerful as medication for reducing the risk of disease, but today, while I can prescribe a statin that insurance or Medicare covers, I can't realistically prescribe an apple a day," says Seligman. In 2018-2019, EatSF not only continued to expand its footprint in San Francisco – to date, approximately 11,000 city residents have participated in the program, in nearly every low-income neighborhood in the city – but also helped launch sister programs in Los Angeles and Boulder, Colorado.

EatSF is ideal for scaling, says Seligman, because, "Vouchers allow people to retain their dignity and buy food in the context of their normal shopping behaviors." The six-month duration lowers financial barriers long enough to help families develop sustainable new habits. Moreover, by using the vouchers in their own neighborhoods, residents increase local demand for healthy food, thereby helping to eliminate so-called food deserts.

Research by Seligman and her team confirms that those who use the vouchers are more food secure and see their dietary intake of fruits and vegetables rise by about a serving a day. "Our long-term vision is to create structures that make access to healthy food part of medical care," she says.

Establishing a Latinx Center of Excellence

Achieving health equity depends, in part, on a clinical and research workforce that reflects the population being served. Yet in California, with its rapidly growing Latinx population, a 2015 study indicated a shortfall of almost 55,000 Latinx physicians. To help address this gap, in 2018 UCSF received a Health Resources and Services Administration grant to become one of 12 Latinx Centers of Excellence nationwide.

The center will work with undergraduates in Fresno and San Francisco, as well as with UCSF medical students, residents, and faculty, to create and grow outreach and support programs aimed at expanding the number of Latinx clinicians and researchers. It unites programs that already existed at UCSF and creates new ones to address the various issues that have made it difficult to attract and retain talented Latinx individuals to medicine.

Alicia Fernandez, MD (center), advises medical students (from left) Francesco Sergi, Elodia Caballero, Lauro "Nate" Avalos, Rob Osario, Ruth Laverde, and Ivan Iñiguez.

"UCSF is a great place for this because we already have a strong commitment to diversity," says Alicia Fernandez, MD, who directs the center. "We chose to house this in the Center for Vulnerable Populations because it allows us to take advantage of a committed community of researchers interested in improving the health of underserved patients, and creates a synergy with the CVP's other educational programs."

Fernandez adds that the new center goes beyond recruiting Latinx individuals. "We are trying to create programs that work for a broad group of people," she says.

One of her biggest hopes is that the center will help address the fact that too many high-achieving minority students at the UCSF School of Medicine choose to do their residency elsewhere, which shrinks the pipeline that can ultimately lead to a more diverse faculty. As of the fall of 2018, students from groups traditionally under-represented in medicine comprise 33 percent of UCSF's School of Medicine, making it one of the most diverse in the nation.

Says Fernandez, "It's only our first year, and we are already seeing movement, including an increase in diversity at the residency level."

> We are trying to create programs that work for a broad group of people…. It's only our first year, and we are already seeing movement, including an increase in diversity at the residency level.

ALICIA FERNANDEZ, MD

SOLVE Seeks to Bring Technology Innovation to the Underserved

The UCSF SOLVE Health Tech Accelerator was created in response to concerns that technological advances often fail to reach the most vulnerable populations. Led by Urmimala Sarkar, MD, MPH – who spearheads the CVP's Health Information Technology and the Safety Net Program – and Courtney Lyles, PhD, SOLVE creates public-private partnerships that combine UCSF's expertise in working with underserved patient groups with companies developing health technology. The goal is to facilitate and accelerate these companies' ability to create and adapt products that reach diverse populations.

In May 2019, SOLVE partnered with the UCSF Health Hub to hold the first SOLVE Health Tech Summit, which convened digital health companies, funders, and innovators interested in using health IT (information technology) to transform health for vulnerable populations. Nearly 200 individuals attended, including representatives of 30 digital health companies, 25 venture capital firms, 10 foundations, eight health systems, and five design agencies. The conference featured presentations by six finalist companies that were selected from 33 applicants to pitch to a panel of experts. SOLVE eventually chose three winners and is now working with each partner company on a specific acceleration project.

> The goal is to facilitate and accelerate these companies' ability to create and adapt products that reach diverse populations.

"We plan to combine our health communication, implementation, and evaluation expertise among diverse patient populations with the companies' abilities to iteratively tailor and market products and bring them to more customers at scale," says Sarkar, who also sees primary care patients at ZSFG's Richard H. Fine People's Clinic. Her clinical care provides a perspective that she believes is invaluable for the work of SOLVE.

Prior to SOLVE, Sarkar and Lyles had been working with digital health companies on an ad hoc basis, but, says Sarkar, "We wanted to systematize this work, so we could choose the companies and timing, realize some synergies between them, and share with the larger community."

Urmimala Sarkar, MD, MPH (left), and Courtney Lyles, PhD

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UCSF-Led Discoveries Revolutionize Understanding of Human Biology

CRISPR Advances Deliver Hope for Immune Diseases and Beyond

"In medicine we have moved from the use of pills to the use of hormones and antibodies as drugs to, today, genetically modifying a patient's own immune cells to treat their disease," says immunology researcher and infectious disease specialist Alexander Marson, MD, PhD.

In the first generation of genetically modified cells, scientists used viral vectors, but Marson says the advent of the CRISPR (clustered regularly interspaced short palindromic repeats) gene-editing tool enables such therapies to be more precise and less expensive – and to have far broader applications. His work, in collaboration with a number of partners, has brought this effort to the brink of extensive clinical use and has received international attention.

Using a methodology described in the July 2018 issue of *Nature*, Marson's team inserted DNA to genetically reprogram T cells using electroporation, a process in which an electrical field is applied to cells to make their membranes temporarily more permeable. The research team found that when certain quantities of T cells, DNA, and the CRISPR "scissors" are mixed together and then exposed to an appropriate electrical field, the T cells take in these other elements and integrate specified genetic sequences precisely at the site of a CRISPR-programmed cut in the genome. Marson believes the technique could accelerate the arrival of new and safer treatments for cancer, autoimmunity, and other diseases, including rare inherited disorders.

In cases where physicians don't know the mutation, Marson and his team have also developed a new method for quickly finding the relevant mutation and creating smart T cells to respond. In a December 13, 2018, publication in the journal *Cell*, he and his team describe a single guide RNA (sgRNA) lentiviral infection with Cas9 protein electroporation (SLICE) methodology that identifies and characterizes functional gene targets in primary cells. This discovery holds the promise of accelerating researchers' ability to prioritize novel targets for drug development and improve the design of genetically reprogrammed cell-based therapies. Marson also hopes to eventually be able to put smart code and safety switches into these cells, so they can not only find the mutation and respond, but allow clinicians to monitor and regulate the activity to ensure safety.

The combination of science and computing power necessary to realize these types of advances demands extensive collaboration.

"It's one of the strengths of UCSF," says Marson. His UCSF collaborators include Bluestone, colleagues at ImmunoX (see page 20), and Jimmie Ye, PhD, whose lab develops novel experimental approaches that enable the large-scale collection of functional genomic data, as well as computational approaches that translate the data into novel biological insights. Marson hopes that the advent of CoLabs (see page 21) will further grow the power of these collaborations. Outside of UCSF, Marson works with colleagues at the Innovative Genomics Institute (IGI), which is led by CRISPR pioneer Jennifer Doudna, PhD, of UC Berkeley; the Parker Institute for Cancer Immunotherapy; and the Chan Zuckerberg Biohub.

Even as the work advances, Marson remains acutely aware of some of the ethical questions that can surround this work – and consults periodically with bioethicists. In fact, partly due to ethical concerns, his own research focuses entirely on curing diseases in individual patients, not on germ-line mutations, which can be passed down from generation to generation. The November 2018 report of a scientist in China using CRISPR to create such germ-line mutations led to widespread ethical concerns.

"Germ-line editing is a ripe area for ethics scholarship, and Jennifer Doudna [the execu-
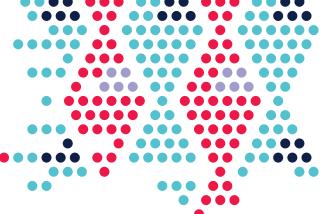
tive director of IGI] and Alex are in a clear position to work with us as major voices on these topics," says bioethicist Christine Cassel, MD, who serves as senior advisor for policy and strategy in the Department of Medicine.

All of these collaborations and UCSF's location in the Bay Area, says Marson, "have us poised to be on the front lines of this new class of medicines. There is a synergy here, making things go faster than we imagined and expanding our sense of what's possible."

Clockwise from top left:
Jimmie Ye, PhD,
Jennifer Doudna, PhD,
Alexander Marson,
MD, PhD, and
Jeffrey Bluestone, PhD

ONE STEP CLOSER TO CLINICAL USE

Recently, a family with three children who inherited rare mutations causing type 1 diabetes and other autoimmune complications were considering a bone marrow transplant (BMT) for the sickest of the three. Their physicians contacted Marson's team and sent blood samples. Using electroporation and CRISPR technology, the research team successfully produced gene-corrected regulatory T cells in the lab that, in theory, could help the family avoid the BMT for their child. As of this writing, the team was testing the safety of this approach and seeking approval for a clinical trial. The work builds on long-standing efforts by UCSF's Jeffrey Bluestone, PhD, who has developed a pipeline for generating clinical-grade immune cells to treat autoimmune diseases. UCSF is now in a position to lead the way toward new CRISPR-modified cell therapies for autoimmunity.

Christine Cassel, MD

In 2018, Christine Cassel, MD, returned to UCSF, where she had completed her residency in internal medicine and a fellowship in bioethics. In the decades since, she's had one of the most distinguished careers in all of medicine, including serving as president of the American College of Physicians, president of Physicians for Social Responsibility, and a member of the President's Council of Advisors on Science and Technology under President Barack Obama. She has also served as dean at Oregon Health & Science University, CEO of the American Board of Internal Medicine, and CEO of the National Quality Forum. In 2018-2019, she was the UCSF Presidential Chair, before formally joining the UCSF faculty.

"I'm delighted to be back to a place that helped create the academic discipline of biomedical ethics," she says, noting how, since her training, the focus of her field has expanded from reproductive rights and end-of-life decisions to determining ethical ways to navigate advances like gene editing, big data, and artificial intelligence (AI).

Since her return, her primary concern has been bringing a team together to develop an ethical framework for working with big data and AI in health care. "Because that framework doesn't yet exist, it's an opportunity for groundbreaking scholarship," she says. She and her colleagues are exploring issues ranging from how patients who share their data can also share in the benefits, including financial benefits, through ethical considerations around using AI to predict mortality in end-of-life care and other treatment recommendations.

"Tackling these essential questions demonstrates why bioethics needs to be viewed as a tool, not static subject matter," she says. "We need to give our students this tool, so they can encounter issues we can't yet predict are out there; we have to be imaginative about what lies ahead."

Enter the UCSF Benioff Center for Microbiome Medicine

Another scientific advance that could dramatically change how we approach human health and disease involves the human microbiome. Visionary donors Marc and Lynne Benioff recognize the potential in this area and, in 2019, generously donated $25 million to create the UCSF Benioff Center for Microbiome Medicine. By characterizing small molecules in the microbiome from a genomic and functional standpoint, the center expects to help both researchers and clinicians understand how these molecules influence the physiology of the host – and to develop new therapies rooted in this understanding.

"We are at a watershed moment in human biology," says Susan Lynch, PhD, who directs the center. She notes that the millions of microbial genes in the human microbiome form remarkably flexible communities that respond to environmental exposures and are a factor in the body's variable responses to treatment and outcomes. Increasing evidence, much of it emerging from UCSF, also indicates that these communities play an important role in the early-life origins of chronic inflammatory disease.

"In a sense, we have a second, much larger microbial pangenome that co-evolves as we age," says Lynch. "We hope that by fostering collaborative studies of the human microbiome, we can shape the body's response to therapies, promote health, and prevent diseases that cause enormous physical and economic burden."

Specifically, the center aims to accelerate innovation by:

- Attracting new faculty to complement UCSF's world-class cohort, which includes Lynch; Tiffany Scharschmidt, MD; Katie Pollard, PhD; Peter Turnbaugh, PhD; and many others. Research by these faculty members has shown that:

  - In the first weeks of life, the gut microbiome predicts whether children will develop allergies and asthma.

  - Microbes in neonatal hair follicles dictate immune responses that cause inflammatory disorders of the skin.

Clockwise from left: Susan Lynch, PhD (third from left), in her lab with (from left to right) Clark Santee, Ariane Panzer, and Ivan Vujkovic-Cvijin, PhD; Peter Turnbaugh, PhD; Tiffany Scharschmidt, MD; and Katie Pollard, PhD.

- The gut microbiome is linked to obesity and affects the viability of ingested drugs.

- Expanding access to research resources for clinical investigators

- Offering educational and training opportunities, including an annual symposium and summer internships for underprivileged youth

"Initially, the center's primary focus will be on how very early life microbial development and metabolic dysfunction drive a range of childhood diseases, including dermal, respiratory, and neurological disease, as well as obesity," says Lynch. "This understanding could create an opportunity to prevent disease development by reengineering the microbiome during the early months of life."

A second important focus will be to develop novel therapeutics for many of these diseases, as well as therapeutics that promote the viability of existing drugs.

All of this work, says Lynch, demands access to next-generation technologies, unprecedented computing power, expansion and
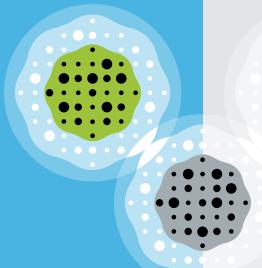
development of preclinical testing platforms, and, most important, collaboration with faculty from other fields. "UCSF is an amazing place to nucleate our vision for integrative human-centric research, and we are already working closely with David Erle [associate

chair for Biomedical Research and leader of the CoLabs project] and Max Krummel [who chairs the ImmunoX program] to accelerate and translate our discoveries in the field."

Those two campus-wide initiatives – ImmunoX and CoLabs – seek to systematically foster highly ambitious, perhaps even audacious research collaborations across multiple disciplines. The leaders of these initiatives, many of them from the Department of Medicine, expect that by optimizing resources and ensuring that all of the latest supportive technology is widely available, UCSF can further its leadership in the development of new diagnostics and therapies.

Mark Anderson,
MD, PhD

> Our technology and growing pipeline of human samples are enabling us to make connections between patients with a broad range of diseases.

MARK ANDERSON, MD, PHD

The Bakar ImmunoX Initiative

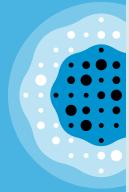The Bakar ImmunoX Initiative is a broad effort to build on UCSF's world-class immunology program and lay the groundwork for the next generation of research. Dramatic recent successes in immunotherapy for cancer illustrate the potential benefits of understanding relationships between the immune system and many human diseases.

A project called Immunoprofiler – Krummel's brainchild – gave ImmunoX its start and was a major inspiration for CoLabs. Initially working with biological samples from cancer patients, Immunoprofiler conducts standardized assays on a central platform, thereby creating a collaborative sandbox for researchers working on a broad range of projects to draw on the resulting data for their own particular studies.

In 2018-2019, with the help of a generous gift from the Gerson Bakar Foundation, ImmunoX expanded its work dramatically to include other diseases and new investigators. It now issues RFPs (requests for proposals) that encourage innovative and collaborative projects, called CoProjects, in human immunology. The expanded effort also includes the mentoring of students and postdoctoral fellows to create a generation of researchers who can grow and refine the model.

The work is essential, says immunologist Mark Anderson, MD, PhD, who co-founded ImmunoX and is on its steering committee, because "our technology and growing pipeline of human samples are enabling us to make connections between patients with a broad range of diseases, such as Alzheimer's, diabetes, cancer, rare genetic conditions, and more general inflammatory conditions – in all of which the immune system plays a key role."

CoLabs

With financial and logistic support from ImmunoX and the Office of the Executive Vice Chancellor and Provost, UCSF is now building a broader initiative that aims to integrate the entire UCSF biomedical research community through common pipelines, co-location of key experts and technology, and data curation. The creation of coherent, thematic spaces for all campus research coincides with the planned revitalization of the Parnassus Heights campus.
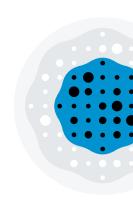
In 2019, phase one of CoLabs began the effort to create additional space on the eighth floor of the UCSF Medical Sciences Building, where core facilities and experts will be located. The leadership team anticipates that the next phase will involve construction of a dedicated research building on the Parnassus campus that will house most of the core technologies and research staff, along with many other innovative programs in clinical and biomedical research. The Department of Medicine will be a major presence in this new building.

"Consistent with the collaborative spirit of ImmunoX, we have been working closely with university leadership and dozens of UCSF faculty and staff since January 2018 to develop CoLabs as a resource for the entire UCSF research community," says David Erle, MD, the department's associate chair for biomedical research, who leads CoLabs with Lindsey Criswell, MD, MPH, DSc, vice chancellor for research.

CoLabs should provide the campus with the most efficient use of its sophisticated technologies – everything from mass spectrometry and flow cytometry through advanced bioinformatics – by maintaining a staff of expert technologists, pooling resources to keep technologies up-to-date, and creating a central data library of what's emerged from assays of human samples. The novel CoProject model will enable research projects, under the supervision of UCSF principal investigators, to take place largely or completely within CoLabs, with research fellows embedded in CoLabs for the duration of their projects.

Several ImmunoX-funded studies already use the CoProject model. These include exciting investigations into cancer immunotherapy, chronic viral infections, neurodegeneration, and the development of organoids – miniature organs that are powerful research tools. UCSF investigators hope to use the CoProject model to attract support from other funders – including the National Institutes of Health (NIH), industry, and philanthropists – for a broad range of studies focused on understanding the fundamental biology of human health and disease.

"Those who prefer will still be able to use the available technologies on a recharge basis, but we believe CoLabs is a significant improvement on traditional core models, both for the campus and for individual researchers," says Criswell.

Lindsey Criswell, MD, MPH, DSc; and David Erle, MD

> Consistent with the collaborative spirit of ImmunoX, we have been working closely with university leadership and dozens of UCSF faculty and staff since January 2018 to develop CoLabs as a resource for the entire UCSF research community.

DAVID ERLE, MD

UCSF
Department of
Medicine

**Transforming
Medicine
Through
Collaboration**

2018-2019
Biennial Report

New Center Leverages UCSF Expertise to Confront a Persistent Killer

Despite widespread belief that tuberculosis (TB) is under control or restricted to the developing world, it is still the leading cause of death worldwide from a single infectious agent. It remains a perplexing clinical and population health problem.

That's why, in 2019, expert TB researchers across the campus formalized their collaborations to form the UCSF Center for Tuberculosis. The work enables development of numerous cross-cutting units, such as one with the world-renowned UCSF-Gladstone Center for AIDS Research, now led by the department's Monica Gandhi, MD, MPH.

"The breadth of what we do at UCSF includes everything from uncovering the molecular structure of TB through public policy, implementation science, and the training of people to become leaders in TB prevention and treatment in their own countries and locally," says Payam Nahid, MD, MPH, who leads the TB center.

The center intends to use this breadth to leverage collaborations ranging from ImmunoX and CoLabs for basic research through clinical and policy partnerships with the San Francisco Department of Public Health and public health ministries around the world.

"TB is one of the biggest, longest-lasting problems in human history, because it is a chronic disease that is hard to diagnose and easy to spread," says Joel Ernst, MD, a leading TB researcher who recently returned to UCSF as chief of the Division of Experimental Medicine. He notes that treatment remains challenging, since it usually involves taking medications for a minimum of six months, many of which can be toxic. Worse, drug-resistant strains have emerged, and creating a sufficiently effective vaccine has proved difficult. Even if an effective vaccine is developed, public health officials will have to find ways to administer it to the 2 billion people at highest risk.

"It is a unique global problem, but today an informed clinician can effectively evaluate patients, stratify the rate of progression and the type of bacteria for treatment – and we can use the bacteria and immune samples to discover what contributes to slowing the disease," says Nahid. "We seem to be at a tipping point, and I am optimistic about future funding and attention."

"There is a powerful history at UCSF, which began years ago with [professor emeritus] Phil Hopewell, who trained, mentored, and launched all of us, either directly or indirectly," says Ernst. "We formed the center because we are steeped in a tradition of sharing ideas, knowledge, data, and samples. Doing so is a matter of public good, because we're not going to be able to tackle this pathogen with business-as-usual approaches."

TB, STIGMA, and the DEVELOPED WORLD

In the fall of 2016, after returning from a trip to Indonesia, Charet Wynn developed a heavy, persistent cough, followed eventually by night sweats, fatigue, and weight loss. Her primary care physician never considered TB and prescribed antibiotics for a presumed bronchial infection. But in December, after waking up with "crazy chest pains," Wynn eventually received a chest X-ray, which revealed active pulmonary TB.

"At first, I was shocked," she says. "TB sounded so antiquated, and I thought I'd been vaccinated when I was young." She was 38 at the time, working in finance at UC Berkeley, and already under stress as the single mother of a teenage daughter; the diagnosis ramped up her stress considerably.

Charet Wynn

Wynn was immediately quarantined and referred to UCSF for treatment. She then underwent the arduous task of contacting everyone she might have come into contact with over the prior months. As her friends, family, and colleagues were screened, Wynn was disturbed to hear that a number were already infected.

> At first, I was shocked. TB sounded so antiquated, and I thought I'd been vaccinated when I was young.
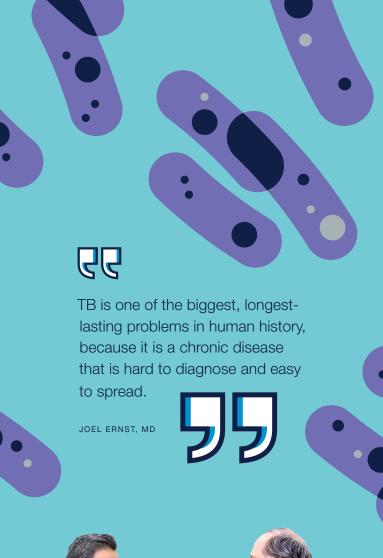
CHARET WYNN

"It was uncomfortable," she says. "Some were supportive, but some were scared, and a friend who was pregnant didn't know how to react." When she returned to work, some people kept their distance and, says Wynn, "There was some whispering."

She also continued struggling with her health. "I'm naturally slim and had lost 20 pounds. I was fatigued, moving around slowly, and you could tell I'd been sick," she says. The medications caused dizziness, joint pain, and stiffness; they disrupted her sleep with odd dreams. Yet she had to stay on the medications for nearly a year until regular sputum tests came back fully negative.

Through it all, she says, "I felt great about the care I received. [The UCSF team, the San Francisco Department of Public Health TB Clinic staff, and nurses at ZSFG] were positive and upbeat and great about informing me about where to get support, which is important because the disease is very isolating. People who survive can move on and have a happy life, but you have to keep fighting, because it puts a strain on relationships with friends, family, and significant others." Wynn has since become a strong advocate, having spoken at national conferences to spread awareness of the disease.

> TB is one of the biggest, longest-lasting problems in human history, because it is a chronic disease that is hard to diagnose and easy to spread.

JOEL ERNST, MD

Payam Nahid, MD, MPH (left), and Joel Ernst, MD

Highlights FROM THE Divisions, 2019

Cardiology

Ted Abraham, MD, received the Richard Popp Excellence in Teaching Award from the American Society of Echocardiography.

Michelle Albert, MD, MPH, received the Dr. Daniel D. Savage Memorial Science Award from the Association of Black Cardiologists. She was elected to the American Society for Clinical Investigation, named president of the Association of Black Cardiologists, and selected as the new associate dean of admissions for the UCSF School of Medicine.

Neal Benowitz, MD, ranked in the top 0.01 percent for research impact among 7 million scientists across 22 major fields, according to a detailed citation analysis published in *PLoS Biology*.

Michael Crawford, MD, was named a Master of the American College of Cardiology.

Teresa De Marco, MD, was elected to the Board of Directors of the International Society for Heart and Lung Transplantation and to the Scientific Leadership Council of the Pulmonary Hypertension Association.

Saptarsi Haldar, MD, was elected to the American Society for Clinical Investigation.

Priscilla Hsue, MD, is chair of the Clinical and Integrative Cardiovascular Sciences study section at the National Heart, Lung, and Blood Institute.

Jorge Kizer, MD, was named chief of the Division of Cardiology at the San Francisco VA Health Care System (SFVAHCS).

Binh An Phan, MD, received the UCSF School of Medicine Bridges Curriculum Commitment to Teaching Award, the UCSF Academic Senate Distinction in Teaching Award, and the ZSFG Medicine Service Distinction in Medical Education Award.

Paul Simpson, MD, was profiled in a "Leaders in Cardiovascular Science" piece in *Circulation Research*.

Lucas Zier, MD, received the ZSFG Henry F. (Chip) Chambers, MD Medicine Subspecialty Consultant Award.

The UCSF Health Heart Transplant Program received the Press Ganey Patient Pinnacle Award for achieving the highest satisfaction ratings over a three-year period.

Endocrinology/Metabolism

Mark Anderson, MD, PhD, received the Distinguished Service Award from the University of Chicago Pritzker School of Medicine Alumni Association.

Carl Grunfeld, MD, PhD, received the Haverford College Distinguished Achievement Award.

Anne Schafer, MD, was named chief of the Division of Endocrinology at the SFVAHCS.

Experimental Medicine

Joel Ernst, MD, was named chief of the Division of Experimental Medicine at ZSFG and served as a member of the Board of Scientific Counselors for the National Institute of Allergy and Infectious Diseases Division of Intramural Research.

Gastroenterology

Lukejohn Day, MD, was appointed chief medical officer at ZSFG.

Jennifer Lai, MD, MBA, was appointed to the U.S. Food and Drug Administration's Gastrointestinal Drugs Advisory Committee.

Susan Lynch, PhD, received a $25 million gift from Marc and Lynne Benioff to launch the Benioff Center for Microbiome Medicine at UCSF.

Uma Mahadevan, MD, was named chair of the American Gastroenterological Association's IBD Parenthood Project and IBD in Pregnancy Clinical Care Pathway.

Jonathan Terdiman, MD, was named chief of the Division of Gastroenterology at UCSF Health.

General Internal Medicine

Joan Addington-White, MD, was appointed director of the ZSFG Primary Care Residency Program.

Kirsten Bibbins-Domingo, PhD, MD, MAS, received the Harold S. Luft Award for Mentoring in Health Services and Health Policy Research from the Philip R. Lee Institute for Health Policy Studies at UCSF, and also became the chair of UCSF's Department of Epidemiology and Biostatistics.

Alice Chen, MD, MPH, was appointed deputy secretary for policy and planning for the California Health and Human Services Agency.

Calvin Chou, MD, received the Lynn Payer Award from the Academy of Communication in Healthcare (ACH) and the ACH Healthcare Communication Teaching Excellence Award.

Denise Davis, MD, received the UCSF Chancellor Award for Dr. Martin Luther King, Jr. Leadership.

Gurpreet Dhaliwal, MD, received the Osler Distinguished Teacher Award from the UCSF School of Medicine.

Mitch Feldman, MD, MPhil, was elected secretary of the Society of General Internal Medicine.

Alicia Fernandez, MD, received the 2019 Herbert W. Nickens Award from the Society of General Internal Medicine.

Ralph Gonzales, MD, MSPH, received the Distinguished Alumni Award from the Washington University College of Arts & Sciences.

Claire Horton, MD, was appointed chief of the medical staff at ZSFG.

Katherine Julian, MD, received the UCSF Excellence and Innovation Award in Graduate Medical Education.

Alka Kanaya, MD, was named director of Clinical and Translational Science Training at UCSF.

Jeffrey Kohlwes, MD, MPH, received the UCSF Academic Senate Distinction in Teaching Award and the School of Medicine Excellence in Teaching for Clinical Faculty Award.

Era Kryzhanovskaya, MD, received the Maxine Papadakis Award for Faculty Professionalism and Respect from the UCSF School of Medicine.

Margot Kushel, MD, received $30 million to launch the UCSF Benioff Homelessness and Housing Initiative at the UCSF Center for Vulnerable Populations and was named director of the center. Kushel also received the Harold S. Luft Award for Mentoring in Health Servies and Health Policy Research from the Philip R. Lee Institute for Health Policy Studies at UCSF and the Innovative Researcher Award from the American Public Health Association's Caucus on Homelessness, and was elected to the American Society for Clinical Investigation.

Sara-Megumi Rumrill, MD, has been appointed as the new quality, safety, value (QSV) officer for Primary Care Services at the SFVAHCS.

Tung Nguyen, MD, received the UCSF Chancellor Award for Dr. Martin Luther King, Jr. Leadership.

Dan Null, MD, received the UCSF Health Exceptional Physician Award.

Patricia O'Sullivan, EdD, received the Career Achievements in Medical Education Award from the Society of General Internal Medicine and the Lifetime Achievement in Mentoring Award from the UCSF Office of Academic Affairs and Faculty Development and Advancement.

Neda Ratanawongsa, MD, MPH, was appointed chief medical informatics officer for the San Francisco Health Network.

Anne Rosenthal, MD, was appointed medical director of the Richard H. Fine People's Clinic at ZSFG.

Steve Schroeder, MD, received the Ken Shine Prize in Health Leadership from the Dell Medical School at the University of Texas at Austin.

Hilary Seligman, MD, MAS, was named director of the UCSF National Clinician Scholars Program.

Leslie Sheu, MD, received the Henry J. Kaiser Award for Excellence in Teaching in Ambulatory Care Setting from the UCSF School of Medicine.

Michael Shlipak, MD, MPH, received the Department of Veterans Affairs John Blair Barnwell Award, the VA's highest award for clinical research.

Rebecca Shunk, MD, was named chair of the UCSF School of Medicine Committee on Curriculum and Educational Policy.

Rachel Stern, MD, was named medical director for the PRIME (Public Hospital Redesign and Incentives in Medi-Cal) program and QIP (Medi-Cal's Quality Incentive Program) for the San Francisco Health Network.

Margaret Wheeler, MD, was inducted into the UCSF Gold-Headed Cane Society.

Mary Whooley, MD, received the Michael L. Pollock Established Investigator Award from the American Association of Cardiovascular and Pulmonary Rehabilitation and the Foundation Research Professor Award from the Academy of Consultation-Liaison Psychiatry.

Geriatrics

Louise Aronson, MD, MFA, published the *New York Times* best-seller *Elderhood*.

Sei Lee, MD, MAS, received the Mid-Career Research Mentorship Award from the Society of General Internal Medicine.

John Newman, MD, PhD, was chosen as the Outstanding Junior Investigator of the Year by the American Geriatrics Society.

Christine Ritchie, MD, MSPH, won the UCSF Academic Senate Distinction in Mentoring Award and received the Compassionate Care Innovator Award from the Coalition for Compassionate Care of California.

Alex Smith, MD, MPH, MS, won the UCSF Academic Senate Distinction in Mentoring Award.

Rebecca Sudore, MD, received the Award for Excellence in Scientific Research in Palliative Care from the American Academy of Hospice and Palliative Medicine.

Hematology and Oncology

Alan Ashworth, PhD, received the Pioneer Award at the Precision Medicine World Conference and was elected Fellow of the American Association for Cancer Research Academy.

Anand Dhruva, MD, was named the UCSF Osher Foundation Endowed Chair in Education in Integrative Medicine.

Terence Friedlander, MD, was named chief of the Division of Hematology and Oncology at ZSFG.

Katie Kelley, MD, was selected as the chair of the Cholangiocarcinoma Foundation Scientific and Medical Advisory Board and as a member of the International Liver Cancer Association Governing Board.

Andrew Leavitt, MD, received the Maxine Papadakis Award for Faculty Professionalism and Respect from the UCSF School of Medicine.

Ross Okimoto, MD, received the Young Physician-Scientist Award from the American Society for Clinical Investigation.

Margaret Tempero, MD, served as president of the American Pancreatic Association and was appointed co-director of the UC Wide Pancreas Cancer Consortium.

Sunny Wang, MD, was named chief of the Division of Hematology and Oncology at the SFVAHCS.

UCSF received a $35 million gift from Marc and Lynne Benioff to establish the UCSF Benioff Initiative for Prostate Cancer Research.

HIV, Infectious Diseases and Global Medicine

Lillian Brown, MD, PhD, and **Melissa Conrad, PhD,** received the Teri Liegler Young Scientist Career Awards.

Monica Gandhi, MD, MPH, will co-chair the 23rd International AIDS Conference. She was named director of the UCSF-Gladstone Center for AIDS Research (CFAR) and launched the POP-UP (Positive-health Onsite Program for Unstably-housed Populations) clinic at Ward 86 at ZSFG.

Bryan Greenhouse, MD, and **Isabel Rodriguez-Barraquer, MD, PhD,** co-launched the Experimental & Population-based Pathogen Investigation Center (EPPIcenter).

Diane Havlir, MD, was elected to the National Academy of Medicine.

Hospital Medicine

Julia Adler-Milstein, PhD, received the AMIA Signature Award for Health Policy Contribution in Informatics and was elected to the National Academy of Medicine.

Andy Auerbach, MD, was named Master in Hospital Medicine by the Society of Hospital Medicine.

Denise Connor, MD, was named the Gold-Headed Cane Endowed Education Chair in Internal Medicine.

Larry Haber, MD, received the Excellence in Teaching Award from the Academy of Medical Educators.

Kelly Han, MD, received the ZSFG Department of Medicine Care Experience Award.

Beth Harleman, MD, received the Lloyd Holly Smith Award for Exceptional Service to the UCSF School of Medicine and the ZSFG Department of Medicine Professional Altruism Award.

Andy Lai, MD, MPH, earned the UCSF Health Exceptional Physician Award.

Cindy Lai, MD, was named the Gold-Headed Cane Endowed Teaching Chair in Internal Medicine.

Farhan Lalani, MD; Gabe Ortiz, MD, PhD; and **Josue Zapata, MD, MBA,** received the School of Medicine Excellence in Teaching for Clinical Faculty Award.

Catherine Lucey, MD, was elected to the National Academy of Medicine.

Oanh Nguyen, MD, MAS, received the Junior Investigator Award from the Society of Hospital Medicine and the ZSFG Department of Medicine Outstanding Junior Investigator Award.

Heather Nye, MD, PhD, will be the course director for the Society of Hospital Medicine 2020 Annual Conference.

Pallabi Sanyal-Dey, MD, received the Excellence in Teaching Award from the Academy of Medical Educators.

Sachin Shah, MD, MPH, published a paper in the *Annals of Internal Medicine* that was selected "most outstanding article by a junior investigator."

Larissa Thomas, MD, was named the inaugural director of well-being for UCSF Graduate Medical Education.

Robert Wachter, MD, was named chair of the Scientific Advisory Board for The Healthcare Improvement Studies (THIS) Institute at the University of Cambridge, in England.

The Division of Hospital Medicine at UCSF Health launched the UCSF-St. Mary's Hospital Medicine Program at St. Mary's Medical Center.

Infectious Diseases

Joanne Engel, MD, PhD, was elected president of the Chlamydia Basic Research Society.

Richard Locksley, MD, was named a Distinguished Fellow of the American Association of Immunologists.

Joel Palefsky, MD, was awarded the McGill University Medicine Alumni Global Lifetime Achievement Award and the Global Initiative Against HPV and Cervical Cancer Lady Ganga Trailblazer Award.

Brian Schwartz, MD, received the Henry J. Kaiser Award for Excellence in Teaching in a Classroom Setting from the UCSF School of Medicine and the Society Citation Award from the Infectious Diseases Society of America.

David Sears, MD, received the Excellence in Teaching Award from the Academy of Medical Educators.

Nephrology

Chi-yuan Hsu, MD, MS, was selected for membership in the Association of American Physicians.

Michael Humphreys, MD, received the Leonard Share Award from the Water and Electrolyte Homeostasis Section of the American Physiology Society.

Lowell Lo, MD, received the Henry J. Kaiser Award for Excellence in Teaching in Inpatient Care Setting from the UCSF School of Medicine.

Neil Powe, MD, MPH, MBA, received the David M. Hume Award from the National Kidney Foundation.

Leticia Rolon, MD, gave the keynote address at the UCSF School of Medicine White Coat Ceremony.

Ramin Sam, MD, became Nephrology Inpatient Services director for ZSFG.

Anitha Toke, MD, was named Nephrology Outpatient Services director and medical director for the ZSFG Renal Center.

Occupational and Environmental Medicine

Paul Blanc, MD, MSPH, received the Excellence in Education or Research Award from the American College of Occupational and Environmental Medicine.

Jessica Chuang, MD, MPH, was appointed chief of Employee Health at ZSFG.

Carisa Harris-Adamson, PhD, received the Virginia Long Sail Training Service & Support Award for community service from US Sailing (the national governing body for the sport).

Palliative Medicine

Giovanni Elia, MD, led the inpatient Palliative Care Services at Parnassus and Mission Bay, which achieved Advanced Certification for Palliative Care through the Joint Commission.

Steven Pantilat, MD, was named chief of the newly launched Division of Palliative Medicine at UCSF Health.

Bridget Sumser, MSW, received a Cambia Sojourns Scholar Leadership Award in palliative care.

End Game, a Netflix original documentary featuring the UCSF Health Palliative Care Program and Symptom Management Service, was nominated for an Academy Award.

Prevention Science

Edwin Charlebois, PhD, MPH, received the UCSF AIDS Research Institute Award for Outstanding Teaching and Mentorship.

Mallory Johnson, PhD, was named co-director of the UCSF-Gladstone Center for AIDS Research (CFAR).

Susan Kegeles, PhD, received the UCSF Chancellor Award for Lesbian, Gay, Bisexual, Transgender, Queer and Intersex Leadership.

Marguerita Lightfoot, PhD, received the UCSF Chancellor Award for Lesbian, Gay, Bisexual, Transgender, Queer and Intersex Leadership. She is the director and principal investigator for the UCSF Prevention Research Center, which was refunded by the Centers for Disease Control and Prevention (CDC).

Tor Neilands, PhD, received the UCSF AIDS Research Institute Teri Liegler Award for Outstanding Teaching and Mentorship.

Jae Sevelius, PhD, received the Outstanding Achievement Award from the American Psychological Association's Committee on Sexual Orientation and Gender Diversity.

Pulmonary, Critical Care, Allergy and Sleep Medicine

Brian Block, MD, received the UCSF Excellence and Innovation Award in Graduate Medical Education.

Carolyn Calfee, MD, MAS, was elected to the American Society for Clinical Investigation.

Harold Collard, MD, was awarded the European Respiratory Society Gold Medal in Interstitial Lung Disease. He was also named associate vice chancellor of Clinical Research at UCSF.

David Erle, MD, and **Mark Looney, MD,** were elected to the Association of American Physicians.

John Fahy, MD, was awarded the European Respiratory Society Gold Medal in Asthma and selected as the Faculty Research Lecturer in Translational Science.

Brian Graham, MD, was named chief of the Division of Pulmonary and Critical Care at ZSFG.

Katherine Gundling, MD, received the UCSF Sustainability Award.

Steve Hays, MD, received the Outstanding Clinician Award from the California Thoracic Society.

Payam Nahid, MD, MPH, was named the director of the newly launched UCSF Center for Tuberculosis and associate director of Clinical Trials Operations (CTO) for the UCSF Office of Research.

Michelle Yu, MD, PhD, received the UCSF Physician-Scientist Scholars Program Award.

The pre-lung transplant outpatient practice was awarded the UCSF Voice of the Patient Pinnacle Award by achieving the highest patient satisfaction ratings over a three-year period.

Rheumatology

Lianne Gensler, MD, received the SPARTAN (Spondyloarthritis Research and Treatment Network) Service Award.

Sarah Goglin, MD, received the Henry J. Kaiser Award for Excellence in Teaching in a Classroom Setting from the UCSF School of Medicine.

John Imboden, Jr., MD, received the Arthritis Foundation's Medical Award of Excellence.

Renuka Nayak, MD, PhD, received the Irene Perstein Award from the UCSF School of Medicine.

Gabriela Schmajuk, MD was named chief of the Division of Rheumatology at SFVAHCS.

Arthur Weiss, MD, PhD, received the William B. Coley Award for Distinguished Research in Basic and Tumor Immunology from the Cancer Research Institute and was named a Distinguished Fellow of the American Association of Immunologists.

David Wofsy, MD, received the Lloyd Holly Smith Award for Exceptional Service to the UCSF School of Medicine.

Jinoos Yazdany, MD, MPH, was named chief of the Division of Rheumatology at ZSFG.

UCSF
Department of
Medicine

**Transforming
Medicine
Through
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2018-2019
Biennial Report

Collaborations Expand Access ᴛᴏ Cutting-Edge Care

Part of the spirit of collaboration that characterizes UCSF and its Department of Medicine involves learning from community partners while extending cutting-edge clinical expertise to a much larger patient population. Below are just a few examples.

A Medicine Service at SMMC

In February 2018, the UCSF Division of Hospital Medicine launched a medicine service at Dignity Health St. Mary's Medical Center (SMMC) in San Francisco, a facility where other UCSF specialty groups had already established strong working relationships.

The partnership began with UCSF hospitalists admitting patients from the emergency department at Parnassus to SMMC using agreed-upon criteria. The service grew from there, with both organizations learning important lessons, says UCSF faculty member Ari Hoffman, MD, who serves as medical director for the hospitalist service at SMMC.

"Merging cultures, systems, and technology has its challenges, so humility is crucial," he says. "For our part, we initially suggested changes that our partners at St. Mary's value, such as ways to streamline their first-call system." The effort built trust for a number

of quality improvement initiatives, such as incorporating unit-based leadership teams.

"Having UCSF hospitalists actively engaged in improving clinical services has been very

meaningful," says Terrie Mendelson, MD, director of Graduate Medical Education at SMMC. "The shared vision and energy have made it possible to achieve a lot more than we would have otherwise – and it is a lot of fun to work with like-minded people."

She adds that UCSF's teaching expertise brings a more consistent academic rigor to SMMC's internal medicine residency program in hospitalist service. "UCSF hospitalists are wonderful role models, who epitomize what we want from our residents, and I expect their presence will drive improvements in our resident recruitment," she says.

> Merging cultures, systems, and technology has its challenges, so humility is crucial. For our part, we initially suggested changes that our partners at St. Mary's value, such as ways to streamline their first-call system.

ARI HOFFMAN, MD

In a recent survey in which SMMC internal medicine residents rated their hospitalist teaching faculty, the composite scores were considerably higher than in the prior two surveys at SMMC, which took place before the arrival of UCSF hospitalists.

That thrills Hoffman, who believes, "With our St. Mary's colleagues, we are equipping these residents with the skills to practice 21st-century medicine."

From left: Jonathan Duong, MD, Ari Hoffman, MD, Terrie Mendelson, MD, and Shubhra Gupta, MD, at a collaborative faculty meeting

Oncology Service Expands in South Bay

UCSF and Washington Hospital Healthcare System in Fremont, California, already had a well-established partnership for various specialties when they created a joint medical oncology service in 2017. The service offers patients comprehensive oncology services close to home and eases referrals and transfers to UCSF when needed. In 2018-2019, the service expanded to include radiation oncology and on-site clinical trial participation.

"We have facilitated smoother and quicker access for our patients to state-of-the-art procedures and surgeries, collaborate with our expert colleagues on disease-specific tumor boards, and can rapidly evaluate the need of any clinical trials offered at UCSF or locally through the UCSF-Washington Cancer Center," says Bogdan Eftimie, MD, who co-leads the service with David JaeYoon Lee, MD. Jeffrey Wolf, MD, who leads UCSF's oncology affiliate network development, has been a key partner.

A recent case demonstrates the value of the collaboration. When a patient's abnormal liver tests and subsequent workup at Washington revealed a large mass with a difficult-to-characterize pathology, rapid review by UCSF pathologists confirmed a rare biliary duct tumor. Lee met with his UCSF oncological and surgical colleagues, and together, they decided to begin chemotherapy to shrink the tumor before proceeding with a highly complex surgical resection.

"We did the chemo locally, and then the patient went up to UCSF for his surgery," says Lee. With the tumor removed, the patient then completed his follow-up chemotherapy and surveillance in Fremont. "He looks fantastic," says Lee.

"It's a great example of doing whatever can be done locally, but also having ready access to a world-class institution, with world-class expertise."

"Frankly, every time I go up to UCSF, I'm humbled by what it has to offer," says Eftimie. "This has been a wonderful experience for us and for our patients."

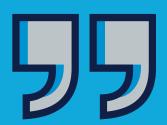David JaeYoon Lee, MD (above left), Bogdan Eftimie, MD (above right), and Jeffrey Wolf, MD (far right with patients)

Rebecca Berman, MD

"

We are taking a rigorous look at what a 21st-century learner needs to know: what we need to teach and what we need to stop teaching.

REBECCA BERMAN, MD

Shortly after completing her residency at Brigham and Women's Hospital (BWH), Rebecca Berman, MD, built a network of student-faculty primary care practices for Massachusetts General Hospital, which has given more than 1,000 Harvard medical students early exposure to primary care for the underserved. Berman then returned to BWH to direct its primary care residency program, while teaching nationally on negotiation skills for physicians, as part of her commitment to help reduce pay disparities and improve diversity in medical leadership positions. In 2019, she was recruited to UCSF to lead the department's Internal Medicine Residency program.

When she arrived, the department was in the midst of a periodic accreditation process by the ACGME (Accreditation Council for Graduate Medical Education), the organization that accredits U.S. training programs. One key element of the process is a self-assessment, which Berman took over at the time of her arrival. Five priorities emerged:

1

More inclusive environments are essential. Berman notes the residency has already done an amazing job recruiting a diverse workforce by implementing holistic recruitment practices. Now, to make UCSF the best place for physicians of all backgrounds to train, the department is implementing a microaggression tool kit and training all of its educational leaders on diversity and inclusion best practices.

2

Mentorship and career development involve a comprehensive program. Residents are matched with a residency leadership team member who focuses on residents' career paths, can engage

with a alumni network of 300+ mentors from around the country, and will soon have access to a database that will help them connect with research mentors.

3

A resident well-being effort is a high priority for Berman. It involves, she says, addressing systems issues that challenge residents in the hospital and clinics, a major cause of physician burnout nationwide.

4

Service-learning optimization focuses on decreasing the service-related work per patient, opening up the time for better education. "How can we improve the workload, so residents are not doing too many repetitive, onerous tasks?" Berman asks. "We are partnering with our hospitals to look for areas where we can work together on systems improvement to help patients and residents alike."

5

Curriculum change is critical because of constant change in medical practice and, says Berman, "We are taking a rigorous look at what a 21st-century learner needs to know: what we need to teach and what we need to stop teaching."

We are a community of passionate individuals whose aim is to engage patients, reduce stigma, and safely start medications like buprenorphine. The literature is unequivocal that there is a decrease in all-cause mortality when we start patients on these medications. They don't overdose and die – and many regain control of their lives.

HANNAH SNYDER, MD

From left:
Paula Lum, MD, MPH,
Soraya Azari, MD,
and Marlene Martin, MD

Addiction Medicine Fellowship Creates Cohort of Experts

The staggering national toll of the opioid epidemic, combined with new knowledge about the nature of addiction, has increased demand for cutting-edge addiction treatment. To meet the need, UCSF's addiction medicine-trained faculty and Primary Care Addiction Medicine Fellowship within the Department of Medicine are creating a cohort of experts in the field, with a special focus on unhealthy substance use among the safety net population in San Francisco.

UCSF faculty and fellows play an essential role in disseminating current thinking on addiction treatment, according to Paula Lum, MD, MPH, program director and founder of the fellowship. "This includes harm reduction, the need to overcome the stigma of drug use, evidence-based medications for the treatment of substance use disorders, safer opioid prescribing for chronic pain management, and effective behavioral therapies like motivational interviewing, cognitive behavioral therapy, and contingency management," she says.

In the fellowship, physicians drawn from diverse specialties rotate through San Francisco's unique array of addiction services, including:

- Three months as a Street Medicine physician, a program of the San Francisco Department of Public Health

- Two months at the city's Office-Based Buprenorphine Induction Clinic

- Three months with the Opiate Treatment Outpatient Program clinic at ZSFG

- Three months in a newly created inpatient consultation service at ZSFG called the Addiction Care Team (ACT)

The Addiction Care Team

Hospitalist Marlene Martin, MD, who is board-certified in addiction medicine and physician lead for equitable care at ZSFG, directs the ACT, which she founded in early 2019.

"We operate like any consult service," says Martin. "We offer compassionate, patient-centered, evidence-based care and provide medication treatment, motivational interviewing, harm reduction, and linkage to care for people with substance use disorders."

In its first three months, despite being available for only three hospital services, ACT saw 60 highly complex patients: Half have more than one addiction, many are experiencing homelessness, and about a third have concurrent mental illness. ACT was originally funded by a three-year grant from the San Francisco Health Plan, and Martin is working with San Francisco Health Network leadership to evaluate and expand the service.

"We need to ensure our priorities are aligned with the health network and hospital to secure long-term funding. ACT has quickly become a pivotal service," says Martin.

The California Bridge Program

Former UCSF primary care addiction fellow Hannah Snyder, MD, is associate director of ACT and co-principal investigator of the California Bridge Program. Supported by a $12 million grant from the California Department of Health Care Services, Bridge trains staff from 52 California hospitals on how to treat opioid use disorder in the inpatient setting.

"We are a community of passionate individuals whose aim is to engage patients, reduce stigma, and safely start medications like buprenorphine," says Snyder. "The literature is unequivocal that there is a decrease in all-cause mortality when we start patients on these medications. They don't overdose and die – and many regain control of their lives."

HOPE Clinic Supports Primary Care Providers

Because she was especially concerned about improving the capacity and knowledge of primary care providers for their patients with addiction concerns, Soraya Azari, MD, established the HOPE (Helping Opioid and Pain Experiences) clinic at ZSFG in 2019.

"Evolving practice patterns for treating pain with opioids are often a source of frustration for people in primary care," says Azari. To ease that burden, the HOPE clinic makes addiction experts available for consultations with primary care providers. A primary care addiction medicine fellow at HOPE sees the patients and creates a plan for everything from poorly controlled pain through pain plus an opioid use disorder. The HOPE provider follows the patients until they are stable enough to return to their primary care provider. In addition, UCSF primary care residents rotate through the HOPE clinic to gain experience in complex pain and addiction treatment.

"The idea is to bring an objective set of eyes with addiction medicine expertise to each patient's care, while allowing patients to maintain their relationship with their primary care provider," says Azari.

Telehealth and Beyond

Physician shortages or geographic disparities – and an increasingly digitized world – have led to patient and provider demands for telehealth: the use of digital information and communication technologies to provide remote health care services. In many settings, however, telehealth implementations have struggled due to the challenges of choosing the right technology and managing the necessary process and system changes. And the stakes are high, since glitches and failures compromise adoption among both patients and providers.

In 2018-2019, both the San Francisco VA Health Care System (SFVAHCS) – which UCSF faculty staffs – and UCSF Health embarked on or extended successful telehealth efforts.

"REVAMPing" Sleep Medicine

VA leadership was among the first to recognize that sleep medicine is critical to wellness, disease prevention, and the treatment of disorders ranging from pulmonary and cardiovascular conditions through depression, to say nothing of its impact on quality of life. Yet like many health systems, the VA and most rural clinics have a shortage of sleep medicine providers.
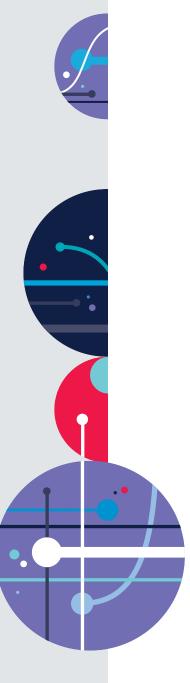
That's why, in 2018, the Veterans Health Administration (VHA) Office of Rural Health funded a three-year TeleSleep Enterprise-Wide Initiative. "We needed to find a way to collaborate efficiently across sites, so we could see more patients," says the UCSF Department of Medicine's Kathleen Sarmiento, MD, MPH, who leads the program.

She and her team crafted a hub-and-spoke model with seven VA Medical Center hubs and 35 VA Medical Center and Community-Based Outpatient Clinic spokes. Clinicians diagnose obstructive sleep apnea by supplying patients with home testing devices (rather than requiring a night in a health system-based sleep lab) and then work with rural providers and patients via videoconferencing, telephone visits, and remote monitoring of CPAP (continuous positive airway pressure) devices to facilitate chronic disease engagement. Sarmiento's SFVAHCS team also conducts in-person monthly visits to the rural clinics.

In addition, as a co-inventor of REVAMP (Remote Veterans Apnea Management Platform), Sarmiento promotes the use of this web application for virtual care, which enables veterans and their providers to log in and monitor symptoms, sleep quality, and the functioning of CPAP machines, while also accessing instructions for making adjustments and reordering supplies. Veterans can also use the application to email their provider.

In the course of their work, Sarmiento and her team have pioneered telehealth protocols that can be used by other specialty areas, including ways to create efficient teams using advanced practice providers, respiratory therapists, sleep technologists, and virtual providers. To promote adoption of this work, they have created tool kits and other resources on the internal VA intranet aimed at supporting a national community of telesleep providers. They are also gathering what they expect will become the largest database of patient-generated data for sleep and sleep apnea, as part of an effort to shape changes in practice guidelines and inform future changes to sleep care delivery.

Left to right: Kathleen Sarmiento, MD, MPH; Jeff Kohlwes, MD, MPH; and William Smith, MD, MPH

V-IMPACT: Expanding Access to Primary Care in Rural Regions

The TelePrimary Care Hub at SFVAHCS, dubbed V-IMPACT (Virtual Integrated Multisite Patient Aligned Care Team), is one of 12 in the VHA nationwide aimed at responding to primary care vacancies at rural health clinics. In the program, providers use videoconferencing as well as electronic stethoscopes and specialized cameras to practice longitudinal primary care across rural Northern California and western Nevada.

"The goal is to match resources and high-quality providers to clinics in the region that need them most," says the Department of Medicine's William Smith, MD, MPH, who co-leads the program with the department's Jeff Kohlwes, MD, MPH.

At the rural clinics, everything functions like a traditional clinic until the patient enters the exam room. There, a nurse uses peripherals linked to a telehealth device to present

The program's success is reflected in its growth to 25 full-time staff over two years and its footprint of 9,500 patient visits at seven rural clinics across Northern California and western Nevada.

> The goal is to match resources and high-quality providers to clinics in the region that need them most.
>
> WILLIAM SMITH, MD, MPH

physical information to the remote physician, who also speaks directly with the patient to collect the necessary clinical history.

"We do extensive training with [nonphysician providers] at each clinic, so they know how to use the equipment and facilitate the exam," says Smith. Physicians are available for follow-up discussions with patients via phone or laptop, using a secure VA protocol, and the physicians make periodic visits to the rural clinics to do procedures, see people in person, and bolster their collaboration with the telehealth teams. Those teams reflect the VA's innovative primary care medical home model and often include a primary care provider, a registered nurse, a licensed vocational nurse, and a clerk all dedicated to one patient panel.

The program's success is reflected in its growth to 25 full-time staff over two years and its footprint of 9,500 patient visits at seven rural clinics across Northern California and western Nevada. In 2019, V-IMPACT received VHA Office of Rural Health funding to significantly expand its scope. It also launched two electives for UCSF internal medicine residents, in telehealth and rural health medicine, beginning to pave the way for training a future generation of physicians who will provide a significant proportion of their care remotely.

"It's important that we better understand how we can use telemedicine to reach people who don't otherwise have access," says Smith.

The visits remove barriers to care for people who can't easily take off work or afford transportation for multiple visits. By lowering the barrier to access, we improve chronic disease management for all of our patients.

NATHANIEL GLEASON, MD

Clockwise from top left: Ralph Gonzales, MD, MSPH; Benjamin Rosner, MD, PhD; Michelle Mourad, MD; Robert Rushakoff, MD, MS; Aaron Neinstein, MD; and Timothy Judson, MD, MPH. Center: Nathaniel Gleason, MD

Video Visits, E-Consults, and Virtual Care at UCSF Health

At UCSF Health, two aspects of telehealth – video visits and e-consults – grew significantly in 2018-2019, with a new element, called virtual care, in robust development.

Often used for follow-up appointments when an in-person meeting is unnecessary, video visits are driven by patient demand, and in 2018, the number doubled to nearly 2,000 per month, according to Nathaniel Gleason, MD, medical director for Practice Innovation at UCSF Health.

"The visits remove barriers to care for people who can't easily take off work or afford transportation for multiple visits," he says. "By lowering the barrier to access, we improve chronic disease management for all of our patients."

As for e-consults, department Chair Robert Wachter, MD, believes they are among the most promising health care innovations of the digital age. By having specialists respond to less complex cases electronically, e-consults speed and expand access to care, enable specialists and subspecialists to spend more time on truly complex cases, and keep primary care physicians at the center of the patient's care.

UCSF pioneered e-consults in the outpatient setting, first at ZSFG and then at UCSF Health in 2012. Early published literature, including articles by Gleason and Associate Dean for Clinical Innovation and Chief Innovation Officer for UCSF Health Ralph Gonzales, MD, MSPH, found high levels of satisfaction among all three parties: patients, primary care physicians, and consulting specialists. Over the past decade, outpatient e-consults have become a standard feature of ambulatory practice at UCSF Health. In 2019, the volume of requests grew by another 20 percent, and the team is planning to add cancer genetics and gastrointestinal oncology to the numerous other specialties offering such consults.

UCSF then took the pioneering idea of e-consults to the inpatient setting with a program in which endocrinologist Robert Rushakoff, MD, MS, monitors all diabetic or hyperglycemic adult patients across two UCSF Health hospitals. Through an electronic dashboard built into his EHR screen, Rushakoff can see blood sugar and other relevant laboratory studies, nutritional and fluid status, and current therapies. If needed, Rushakoff places a note in the patient's chart with recommendations for insulin adjustments.

Whereas a single formal endocrine consultation in the hospital might take an hour, this remote e-consult system allows Rushakoff to review 15-20 patients remotely in about the same amount of time. For about half the cases he reviews, he sees opportunities for improved management and makes a note in the patient's chart. In results published in the *Annals of Internal Medicine* in 2017, Rushakoff and colleagues showed that, since the virtual system was implemented, the number of hospitalized patients with high or low glucose levels has dropped by nearly 40 percent.

In the August 6, 2019, issue of *JAMA*, Wachter and faculty members Timothy Judson, MD, MPH, and Michelle Mourad, MD, argued that these targeted automatic e-consultations (TACos) have the potential to transform inpatient care. They are currently working with Rushakoff and other specialty faculty to scale the model from diabetes to other use cases, such as electrolyte disorders, hematologic abnormalities, and some common scenarios in infectious diseases.

Finally and, perhaps, most ambitiously, in the outpatient setting, UCSF's Digital Patient Experience program plans to implement a tool that would enable clinical experts for nearly any known medical condition to author rules for algorithms that would automate and expand access to care for (1) chronic illnesses, (2) acute symptoms, and (3) periprocedural coordination. The interdisciplinary team includes Gleason; Gonzales; Aaron Neinstein, MD, director of Clinical Informatics at the Center for Digital Health Innovation; Judson, associate director of Clinical Innovations for the UCSF Department of Medicine; and Benjamin Rosner, MD, PhD, of the UCSF Center for Clinical Informatics and Improvement Research.

This group expects to have a prototype for hypertension ready for rigorous validation by early 2020. Patients will be able to use the tool to check in electronically about symptoms, send device data to the EHR, and answer questions generated by either their physician or the algorithm. The data will become part of the EHR, and should a symptom or response need further attention based on the clinical algorithm, the system will alert clinical staff or the physician as indicated.

"This is about considering how people, processes, and technology come together to extend clinical interaction beyond the office to touch patients more frequently and better manage their care," says Gleason.

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>
> NATHANIEL GLEASON, MD

UCSF
Department of
Medicine

**Transforming
Medicine
Through
Collaboration**

2018-2019
Biennial Report

UCSF Digital Collaborative ᴛᴏ Coordinate IT Innovation

As much of the rest of this report makes clear, IT is central to achieving the promise of everything from personalized medicine through tightly coordinated care and effective patient engagement. But digital health's transition from theory to the patient's bedside – the so-called last mile – has been burdened by hype and challenges that frustrate patients and practitioners alike.

"The misperception has been that technology alone can achieve the outcomes we want," says Robert Wachter, MD, whose 2015 book on the subject, *The Digital Doctor*, was a *New York Times* science best-seller. "But we now know that the technology must be accompanied by profound adaptive change, which in turn requires a deep understanding of change management, culture, policy, politics, economics, ethics, and many other disciplines."

With that in mind, over the past decade numerous innovative and complementary initiatives have emerged at UCSF, often in collaboration with the Bay Area's world-leading technologists. Together, these efforts address the diverse areas of expertise needed for successful development and implementation of a digital health strategy.

> But we now know that the technology must be accompanied by profound adaptive change, which in turn requires a deep understanding of change management, culture, policy, politics, economics, ethics, and many other disciplines.

ROBERT WACHTER, MD

Yet by 2018, says Wachter, "We realized the need for a central nervous system that is aware of everything digital going on at UCSF and better connects us to the outside world without compromising the great work already in progress. That's how we make the outcomes of our UCSF digital enterprise far greater than the sum of its parts."

From left: Aaron Neinstein, MD, Julia Adler-Milstein, PhD, and Robert Wachter, MD

Rich Insights from Multiple Sources

Wachter, Aaron Neinstein, MD, and Julia Adler-Milstein, PhD, have taken the lead on planning a new entity, currently called the UCSF Digital Collaborative, to help coordinate and scale UCSF's clinical digital activities.

The partners in this effort include:

- The Bakar Computational Health Sciences Institute, led by Atul Butte, MD, PhD, which advances health care's computing and data science capabilities

- The Center for Digital Health Innovation (CDHI), led by Michael Blum, MD, which collaborates with UCSF innovators and commercial partners to design, develop, and implement digital solutions that transform care delivery at UCSF Health and beyond

- UCSF Health Informatics, led by UCSF Chief Health Information Officer Russ Cucina, MD, MS, which designs, develops, adopts, and applies information services in health care delivery, including optimizing UCSF's EHR and its data and analytic capabilities

- The UCSF Clinical Innovation Center, led by Ralph Gonzales, MD, MSPH, which uses implementation science to accelerate innovations that solve critical delivery system challenges at UCSF Health

- The UCSF Center for Clinical Informatics and Improvement Research (CLIIR), led by Adler-Milstein, which analyzes the ways in which clinicians use digital tools and how those processes affect patient health, with the aim of improving quality and value

- The Clinical & Translational Science Institute (CTSI), led by Harold Collard, MD, which facilitates clinical and translational research to improve patient and community health by providing infrastructure, services, and training to enable research to be conducted more efficiently, more effectively, and in new ways

These entities have already been instrumental in a number of advanced digital health projects that have significantly improved frontline care and the patient experience at UCSF and beyond, including creation of a now commercialized clinical communications platform, software that automates the digitization of faxes from referring physicians into the EHR, and a digital patient engagement platform to bring patients a better experience in accessing care at UCSF. In addition, in an effort to inform future advances, the CLIIR and the CDHI have recently completed a national assessment to determine how health systems use patient-facing technology.

"The depth, breadth, and maturity of UCSF initiatives have given us some unique advantages as we implement the collaborative," says Adler-Milstein. She believes that now is the time to tackle the common administrative challenges the various groups face to accelerate implementation of the most promising initiatives, attract new contributors, and help facilitate new internal and external partnerships.

Michael D. Lesh, MD

In 2017, physician-entrepreneur Michael D. Lesh, MD, returned to UCSF as executive director of Health Technology Innovation in the Office of the Vice Chancellor for Business Development, Innovation and Partnership – Innovation Ventures. Lesh trained at UCSF and was on the faculty in the 1980s, rising to lead the cardiac electrophysiology section in the Division of Cardiology. Over the years he pioneered numerous cardiac procedures, authored over 200 papers, secured more than 150 patents, and founded several companies. In 2018, after a conversation with Wachter regarding Lesh's desire to "give back" to his alma mater, he began his current role with Innovation Ventures.

At UCSF, he has campus-wide responsibility for digital health and medical device opportunities, mentors faculty entrepreneurs, and assists them in starting companies. One project Lesh is shepherding involves creation of a "synthetic electronic medical record." The goal is to allow health systems — including UCSF — to share their health data with third parties without any risk of compromising patient privacy or data security.

"A million records contain a lot of wisdom," says Lesh. With that in mind, an Innovation Ventures team is using cutting-edge machine learning to re-create the entire UCSF Health database, with the same statistical properties but none of the original data. "This will allow us to collaborate with industry to advance the cause of personalized medicine," he notes. "UCSF patient data never leaves the building." The third parties can add data from other institutions with no risk of a data leak. Innovation Ventures hopes to license synthetic EHRs to commercial parties for modeling health outcomes, as controls in clinical trials, and more.

"Part of the University's mission is to be fairly compensated when its technology is licensed," says Lesh. "UCSF is blessed with brilliant faculty whose mission is to help the public, but if their work stays siloed within the University, it will not provide the broad patient benefit they have made possible."

> This will allow us to collaborate with industry to advance the cause of personalized medicine. UCSF patient data never leaves the building.

MICHAEL D. LESH, MD

Filling the Gaps

Adler-Milstein, Neinstein, and Wachter all emphasize that the goal is to champion and support work already in progress and attract new faculty and partners by making UCSF – which is located at the epicenter of technology innovation – the easiest and most robust setting to do this digital work. "We're trying to develop common infrastructure in the blank spaces in between current groups," says Neinstein. "We want people to feel they can continue to do their best work and use the collaborative where it allows them to go beyond what they are doing today."

"The digital world is evolving really quickly, and UCSF has responded with a variety of new centers and new hires, working in different areas," says Wachter. "It's all very exciting, very cutting-edge. But like many aspects of digital technology, we realize the greatest benefits when we weave things together effectively – that's when we start seeing synergies and interconnections. That's the path to digital transformation."

> We're trying to develop common infrastructure in the blank spaces in between current groups.
>
> AARON NEINSTEIN, MD

Focused on the Front Lines of Care

Neinstein says the [UCSF Digital Collaborative] is particularly interested in advancing projects that present opportunities to improve the front lines of care for patients and care teams. In the outpatient setting, he offers the example of the opportunity for earlier diagnosis and treatment of primary hyperaldosteronism – a condition characterized by hypertension and low potassium levels. It's curable, in many cases, by removal of the hyperactive adrenal gland(s), which can get people off medications that have significant side effects. But because of a lack of awareness among primary care providers, it often goes undiagnosed.

Neinstein says, "While it may be possible to create an algorithm to detect potential cases, the hard part is the effector arm – how to create an efficient workflow to influence care delivery to get the right patients screened." The hope is that the collaborative can facilitate the kinds of relationships and underlying infrastructure that ensure these innovations reach patients and providers in meaningful ways.

In the inpatient setting, Wachter uses the example of building on TACos (see page 37) for daily diabetes consults. "With the Rushakoff program, we have demonstrated that it is feasible to digitally triage an entire at-risk inpatient population," he says. "We hope that the UCSF Digital Collaborative can facilitate expansion of this concept by connecting with other specialties, technologists, and, perhaps, our network partners. Maybe we can even create an artificial intelligence application to do the first pass."

Equally important is ensuring that new technologies help address, rather than exacerbate, health inequities, which is why the UCSF Digital Collaborative is working closely with the SOLVE initiative, based at ZSFG and profiled earlier in this report (see page 15).

Identifying Short- and Long-Term Goals

The UCSF Digital Collaborative seeks to work in the spaces *between* the current efforts and pursue projects that help everyone do digital better. Its initial focus has been (1) establishing a "311 service" to help digital project leaders better navigate the complexities of UCSF and access expertise and resources to accelerate projects, and (2) conducting a digital census of all ongoing UCSF projects to improve awareness, identify synergies, and increase internal and industry collaboration and investment opportunities. Both projects should be in place by summer 2020.

"We want to connect faculty, fellows, and residents with promising collaborators and broaden understanding across UCSF of exciting projects already in process," says Neinstein, director of Clinical Informatics at the CDHI. "We expect this will enhance the opportunities for collaboration."

"Making the underlying processes clearer and smoother – like where to go to get approval or the processes for building new digital solutions – is critical," says Adler-Milstein. "And we can be better partners with industry if we have a single front door that brings together all expertise at UCSF that might be applicable on a particular project."

> With the Rushakoff program, we have demonstrated that it is feasible to digitally triage an entire at-risk inpatient population.
>
> ROBERT WACHTER, MD

Research, Leadership, Awards, AND Accomplishments

Research Leadership AND Impact

Department of Medicine faculty members now lead 14 research centers across UCSF.

In 2018:

Department faculty members published more than 3,100 peer-reviewed articles.

277 faculty members spent more than half their time on sponsored research projects, working in collaboration with 219 post-doctoral researchers and 117 non-faculty academic researchers and specialists.

Approximately 500 staff members worked either directly on research projects or on the department's research administration.

Awards

654 new or competitive-renewal grant proposals

336 new or renewed grants

$294 million in grant funding

$118.9 million in sponsored contracts

14 department-led institutional National Research Service Awards (T32 awards)

48 National Institutes of Health (NIH) early-career development awards

23 mid-career awards

6 first-time R01 recipients in 2018-2019:

- Chloe Atreya, MD, PhD
- Sulggi Lee, MD, PhD
- Annie Luetkemeyer, MD
- Tien Peng, MD
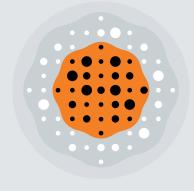- Judy Tan, PhD
- Veronica Yank, MD

Grants

In 2018, Department of Medicine investigators received 231 new peer-reviewed grants and fellowships, as well as a combined total of 279 new sub-awards, joint personnel agreements, and contracts, for a combined dollar amount of $412.9 million. Of that total, more than $200 million came from the National Institutes of Health (NIH), making the department first in the nation for the 7th consecutive year. These 15 grants were the largest.

1 **Alan Ashworth, PhD; Eric Small, MD; Emily Bergsland, MD; Robert Hiatt, MD, PhD; Ben Braun, MD, PhD;** and **Kate Shumate, MPA, CCRP,** received a five-year, $41.2 million grant from the National Cancer Institute for the Helen Diller Family Comprehensive Cancer Center.
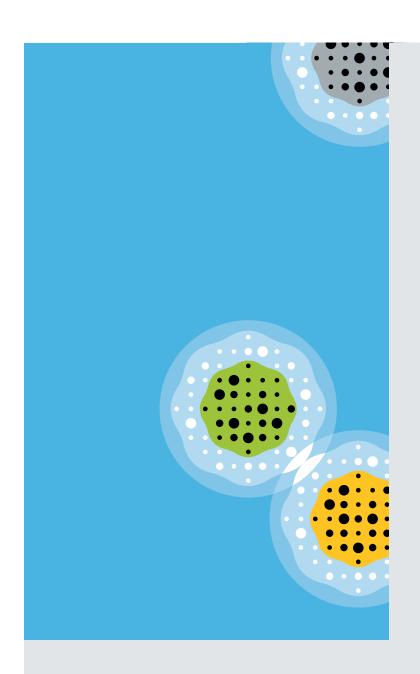
2 **Stanton Glantz, PhD; Pamela Ling, MD, MPH; Carolyn Calfee, MD, MAS; Jeffrey Gotts, MD, PhD; Michael Matthay, MD; Matthew Springer, PhD; Gideon St. Helen, PhD;** and **Neal Benowitz, MD,** received a five-year, $20 million grant from the National Heart, Lung, and Blood Institute for a project titled "Integrated Health, Behavioral and Economic Research on Current and Emerging Tobacco Products."

3 David Erle, MD; Prescott Woodruff, MD, MPH; Nirav Bhakta, MD; Walter Eckalbar, PhD; John Fahy, MD; and **Feroz Papa, MD, PhD,** received a five-year, $7 million grant from the National Institute of Allergy and Infectious Diseases for a project titled "Understanding Asthma Endotypes."

4 Carolyn Calfee, MD, MAS; Michael Matthay, MD; Kevin Delucchi, PhD; Lorraine Ware, MD; and B. Taylor Thompson, MD, received a six-year, $6.8 million grant from the National Heart, Lung, and Blood Institute for a project titled "Precision Medicine in the Acute Respiratory Distress Syndrome."

5 Kenneth Covinsky, MD, MPH; Mike Steinman, MD; John Boscardin, PhD; Rebecca Sudore, MD; Brie Williams, MD, MS; Alex Smith, MD, MPH, MS; Sei Lee, MD, MAS; Louise Walter, MD; and **Kristine Yaffe, MD,** received a five-year, $6.2 million grant from the National Institute on Aging for the UCSF Older Americans Independence Center (Pepper Center).

6 Jacquelyn Maher, MD; Holger Willenbring, MD, PhD; Sandy Feng, MD, PhD; Jody Baron, MD, PhD; and **James Grenert, MD, PhD,** received a five-year, $6 million grant from the National Institute of Diabetes and Digestive and Kidney Diseases for the UCSF Liver Center.

7 Steve Schroeder, MD; Jason Satterfield, PhD; Catherine Saucedo; Christine Cheng; Jennifer Matekuare; Brian Clark; Jennifer Lucero, MA, MS; Maria Pamatmat, MPH; and **Tony Wu** received a five-year, $5 million grant from the Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Mental Health Services for the National Center of Excellence for Tobacco-Free Recovery.

8 John Metcalfe, MD, PhD, MPH; and David Engelthaler, PhD, a key collaborator from the Translational Genomics Research Institute, received a five-year, $3.8 million grant from the National Institute of Allergy and Infectious Diseases for a project titled "Novel Next-Generation Sequencing Assay for Monitoring Multidrug-Resistant Tuberculosis Treatment in the Setting of HIV Infection."

9 Veronica Ann Yank, MD; Leah Karliner, MD, MCR; Kenneth Covinsky, MD, MPH; Catherine "Kit" Chesla, RN, PhD, FAAN; Jing Cheng, MD, MS, PhD; and key collaborators from Stanford University and Texas A&M University received a five-year, $3.8 million grant from the National Institute on Aging for a project titled "Evaluating the Effectiveness of an Online Small-Group Self-Management Workshop for Rural Caregivers of Individuals with Alzheimer's Disease and Related Dementias."

10 Ralph Gonzales, MD, MSPH; Urmimala Sarkar, MD, MPH; Madeline Mann; James Harrison, PhD; Tasce Bongiovanni, MD, MPP, MHS; William Brown, PhD, DrPH, MA; and **Matthew Pantell, MD, MS,** received a five-year, $3.6 million grant from the Agency for Healthcare Research and Quality and the Patient-Centered Outcomes Research Institute for the UCSF Learning Health System K12 Career Development Program.

11 Philip Rosenthal, MD; Sam Nsobya, BBLT, MSC, PhD; Jean Bosco Ouedraogo, MD, PhD; Roland Cooper, PhD; and Jeffrey Bailey, MD, PhD, received a five-year, $3.5 million grant from the National Institute of Allergy and Infectious Diseases for a project titled "Mechanisms of Varied Sensitivity of *P. falciparum* Field Isolates to the Antimalarial Drug Pipeline."

12 Monica Gandhi, MD, MPH; David Glidden, PhD; Hideaki Okochi, PhD; Leslie Benet, PhD; K. Rivet Amico, PhD; Jared Baeten, MD, PhD; Kenneth Ngure, MPH, MSc, PhD; and Nelly Mugo, MBChB, MMed, MPH, received a five-year, $3.5 million grant from the National Institute of Allergy and Infectious Diseases for a project titled "Point-of-Care Urine Monitoring of Adherence (PUMA): Testing a Real-Time Urine Assay of Tenofovir in PrEP."

13 Alison Huang, MD, MAS; Margaret Chesney, PhD; Eric Vittinghoff, PhD; Wendy Mendes, PhD; Sarah Pawlowsky, PT, DPT, OCS; and Leslee Subak, MD, received a five-year, $3.4 million grant from the National Institute of Diabetes and Digestive and Kidney Diseases for a project titled "A Randomized Controlled Trial of a Group-Based Therapeutic Yoga Intervention for Urinary Incontinence in Ambulatory Older Women."

14 Diane Havlir, MD; Edwin Charlebois, PhD, MPH; Ted Ruel, MD; and key collaborators from Makerere University, Uganda, and the Kenya Medical Research Institute received a two-year, $3.4 million grant from the Eunice Kennedy Shriver National Institute of Child Health and Human Development for a project titled "Strategic Antiretroviral Therapy and HIV Testing for Youth in Rural Africa (SATURN)."

15 Adithya Cattamanchi, MD; Payam Nahid, MD, MPH; Patrick Phillips, PhD, MS, MA; Amanda Sammann, MD, MPH; and key collaborators at the Infectious Diseases Research Collaboration, the Uganda Tuberculosis Implementation Research Consortium, and the Johns Hopkins Bloomberg School of Public Health received a $3.3 million grant from the National Heart, Lung, and Blood Institute for a project titled "Options for Delivery of Short-Course Tuberculosis Preventive Therapy: The 3HP Options Trial."

Philanthropic Support

The Department of Medicine received more than $136 million in philanthropic support in 2018 and 2019, through which donors generously invested in our research, clinical and educational endeavors.

Top DOM recipients of philanthropic support include:

Benioff Homeless and Housing Initiative

Benioff Center for Microbiome Medicine

Benioff Epithelial Cancer Research

Kalmanovitz Pancreas Center Fund

Smoking Cessation Leadership Center

Mark Cuban Foundation Fund for Atrial Fibrillation

Ann Marie Goode Endowed Pulmonary Research

Center to Advance Trauma-Informed Health Care

International Criminal Justice Innovation Program

JUSTInnovate UCSF Project

Edward and Pearl Fein Endowed Professorship in Cardiology

UCSF Haile T. Debas Academy oF Medical Educators (AME)

New Inductees

2018

Lynnea Mills, MD

Sirisha Narayana, MD

Stephanie Rennke, MD

2019

Anand Dhruva, MD

Megha Garg, MD, MPH

Katherine Lupton, MD

Sarah Schaeffer, MD, MPH

Leslie Sheu, MD

Geoffrey Stetson, MD

Excellence in Teaching Award Recipients

2018

David Chia, MD, MS

Stephanie Christenson, MD

Sneha Daya, MD

Adeena Khan, MD

Katie Raffel, MD

Varun Saxena, MD, MAS

Josue Zapata, MD, MBA

2019

Jessica Beaman, MD, MPH

Rabih Geha, MD

Yaron Gesthalter, MD

Lawrence Haber, MD

Molly Heublein, MD

Meshell Johnson, MD

Era Kryzhanovskaya, MD

Mitchell Luu, MD

Leticia Rolon, MD

Pallabi Sanyal-Dey, MD

David Sears, MD

Michele Tana, MD

Master Clinicians

Each year, the Department of Medicine recognizes outstanding physicians who have exceptional knowledge, superior teaching and communication skills, and an ability to provide compassionate, appropriate, effective, and high-quality patient care.

The 2018 Master Clinicians were **infectious disease specialist Jennifer Babik, MD, PhD; cardiologist Teresa De Marco, MD; pulmonologist Jeffrey Golden, MD; hepatologist Marion Peters, MD;** and geriatrician Edgar Pierluissi, MD.

The 2019 Master Clinicians were **HIV and infectious disease specialist Monica Gandhi, MD, MPH; hospitalist and hematologist expert Tracy Minichiello, MD; general internist Don Ng, MD;** and **cardiologist Jeffrey Zimmet, MD, PhD.**

THE SPIRIT OF DOM Staff Award

Staff Professionalism, Inspiration, Responsibility, Integrity, and Teamwork (SPIRIT)

Our staff members are the heart of the Department of Medicine (DOM). Without the hard work and dedication of our staff, we could not sustain our tradition of excellence. This award aims to recognize four staff members each year who exemplify UCSF's PRIDE Values (Professionalism, Respect, Integrity, Diversity, and Excellence), and who make our department and UCSF a better place to work. At right are the award winners from 2018 and 2019.

Melody Davenport-McLaughlin
Clinical Operations Manager, Central Administration at ZSFG

Kathryn Fontwit, PA
Physician Assistant, Nephrology at ZSFG

Marlena Hartman-Filson
Clinical Research Coordinator, General Internal Medicine at ZSFG

Kelly Kiser
Division Analyst, General Internal Medicine at ZSFG

Sarah Ngo
Clinical Research Coordinator, Geriatrics

Christine Nguyen, CCRP
Clinical Research Manager, Pulmonary, Critical Care, Allergy and Sleep Medicine at UCSF Health

Rosemary Yau
Administrative Analyst, Hospital Medicine at UCSF Health

Karen Yuan
Assistant Division Manager, Geriatrics

ROBERT WACHTER, MD

Chair, Department of Medicine

MARIA NOVELERO, MA, MPA

Associate Chair, Administration

MICHAEL CHEN

Associate Chair, Finance

Jon Rueter, MBA

Director of Research Administration and Revenue Management

Kimberly Koenigsberger, MA

Administrative Director of Education

Cardiology

Jeffrey Olgin, MD

Alyse Miluck

Endocrinology/ Metabolism

David Gardner, MD

Tony Barlow, MPH

Gastroenterology

Jonathan Terdiman, MD

Annamaria Flamburis

General Internal Medicine

Mitchell Feldman, MD, MPhil

Diana Kim

Hematology and Oncology

Tom Martin, MD (interim)

Andrew Ko, MD (interim)

Deborah Grantz

Hospital Medicine

Bradley Sharpe, MD

Annie Droste, MPA

Infectious Diseases

Joanne Engel, MD, PhD

Leonard Telesca

Pulmonary, Critical Care, Allergy and Sleep Medicine, and ZSFG Lung Biology Center

Dean Sheppard, MD

Clarice Estrada, MPA

Site Leadership

Our faculty and staff leaders work collaboratively to support our people, promote innovation, and turn ideas into action.

NEIL POWE, MD, MPH, MBA

Vice Chair of Medicine

LAURAE PEARSON

Director of Administration

Christine Khuu, MBA

Associate Director of Finance and Administration

Melody Davenport-McLaughlin

Clinical Operations Manager

Cardiology

Mary Gray, MD (interim)

Jason Rahman

Center for Vulnerable Populations

Margot Kushel, MD

Gato Gourley, MSc

Endocrinology/ Metabolism

Elizabeth Murphy, MD, PhD

Mary Ellen Kelly, MPH

Experimental Medicine

Joel Ernst, MD

Justin Moore, EdD

Division Chief	All Sites
	UCSF Health
Division Manager	San Francisco Veterans Affairs Health Care System
	Zuckerberg San Francisco General Hospital and Trauma Center

Nephrology

Chi-yuan Hsu, MD, MS

Ryan Rieger, MHPA

Palliative Medicine

Steven Pantilat, MD

Angela Marks, MSEd

Prevention Science

Marguerita Lightfoot, PhD

David Scarbeary-Simmons, MPA

Rheumatology

Maria Dall'Era, MD

Tony Barlow, MPH

Geriatrics

Louise Walter, MD

Maxine Davis

KENNETH MCQUAID, MD

Vice Chair of Medicine

KIMBERLY CANTERO

Director of Administration

Occupational and Environmental Medicine

Paul Blanc, MD, MSPH

Cardiology

Jorge Kizer, MD

Emergency Medicine

Jody Garber, MD

Endocrinology/ Metabolism

Anne Schafer, MD

Gastroenterology

Amandeep Shergill, MD (interim)

General Internal Medicine

Jeff Kohlwes, MD, MPH (interim)

Hematology and Oncology

Sunny Wang, MD

Hospital Medicine

Lenny Lopez, MD, MDiv, MPH

Infectious Diseases

Harry Lampiris, MD (interim)

Nephrology

Michelle Estrella, MD, MHS (interim)

Pulmonary, Critical Care, and Sleep Medicine

Meshell Johnson, MD

Rheumatology

Gabriela Schmajuk, MD

Gastroenterology

Jacquelyn Maher, MD

Amy Akbarian

General Internal Medicine

Neda Ratanawongsa, MD, MPH (interim)

Jennifer Thomas

Hematology and Oncology

Terence Friedlander, MD

Mary Ellen Kelly, MPH

HIV, Infectious Diseases, and Global Medicine

Diane Havlir, MD

Eunice Chang, MBA

Hospital Medicine

Sumant Ranji, MD

Jena Desai

Nephrology

David Pearce, MD

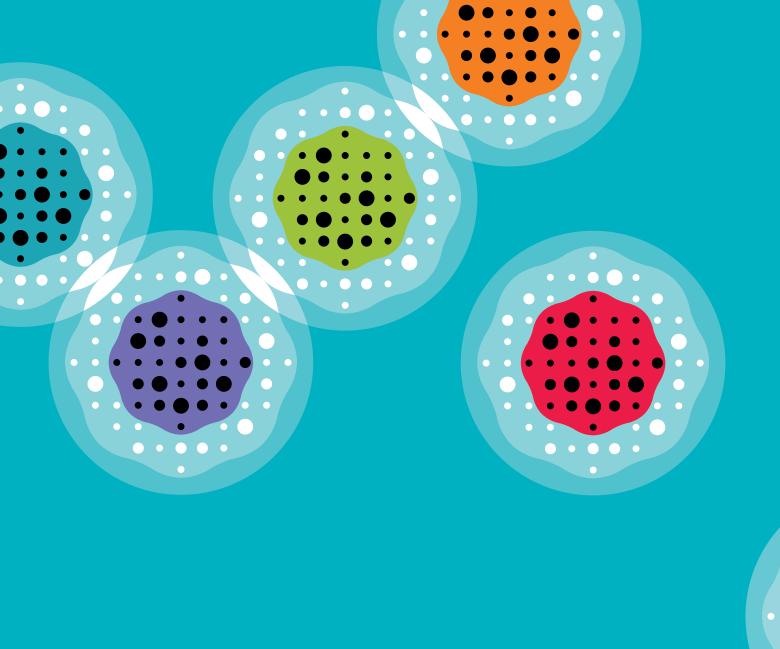Jep Poon

Pulmonary and Critical Care

Brian Graham, MD

Jason Rahman

Rheumatology

Jinoos Yazdany, MD, MPH

Amy Akbarian

From left: Bogdan Popescu, MD,
Theodore Tarver, Catherine
Smith, MD, and Tanya Kumar

UCSF Department of Medicine