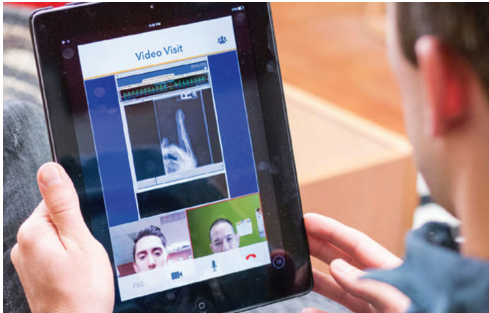
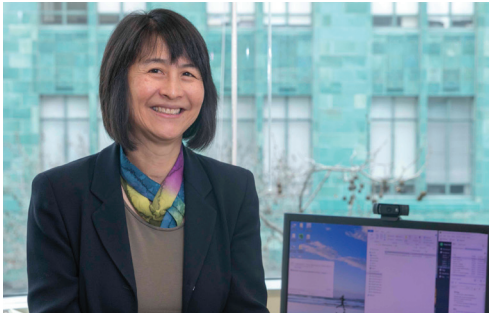
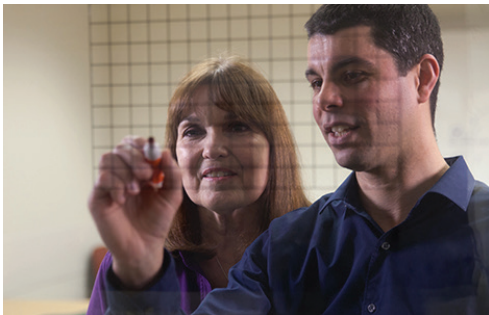
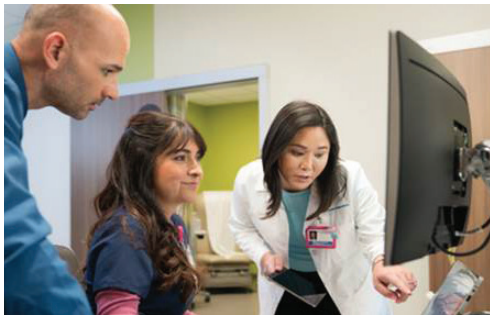
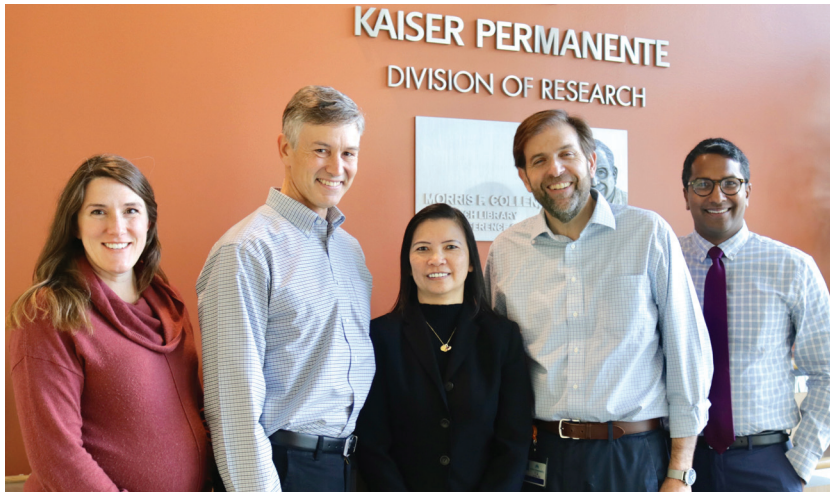


DIVISION OF RESEARCH
2019 Annual Report



Using Data to See Health Care's Future

Using Data to See Health Care's Future



The new class of physician researchers with Doug Corley, head of the Delivery Science and Applied Research program: (L-R) Kathryn Ridout, Corley, Mai Nguyen-Huynh, T.R. Levin, and Vignesh Arasu.

As we turn our calendars to a new year (and new decade!), we think ahead to what the future brings. Of course, in health care, it's no easy task to predict what's to come. Still, anticipating what's next is one of the things the **Division of Research** does well. Our decades of research history give us both data and insight that our investigators can bring to bear on some of the toughest questions in medicine and health care delivery.

One of the primary ways we are looking ahead is in predictive analytics and artificial intelligence. Consider work by **Gabriel J. Escobar, MD, Vincent Liu, MD, MSc**, and others who are looking for ways to identify patients with complex conditions before they need more treatment. In a **recent study** led by Dr. Liu, his team developed a machine learning algorithm that will help patients with sepsis by organizing them into treatment subgroups. His lead author, **Alison E. Fohner, PhD**, now an assistant professor at the University of Washington, worked on the project as a delivery science fellow in informatics at the Division of Research, where she remains an adjunct researcher.

We also look to influence the future by expanding our role in educating the researchers of tomorrow, with both our fellowship program and our ties to our parent organization, **The Permanente Medical Group**.

This past year, we welcomed a new class of 4 **physician researchers** to our **Physician Researcher Program**, led by **Doug Corley, MD, PhD**, regional medical director for Delivery Science and Applied Research. **Vignesh A. Arasu, MD**, a radiologist, psychiatrist **Kathryn K. Erickson-Ridout, MD**, **Theodore R. ("T.R.") Levin, MD**, a gastroenterologist, and neurologist **Mai N. Nguyen-Huynh, MD, MAS**, will each have a 4-year term with 20% to 40% of their effort devoted to research.

And, in 2019, 3 new **Delivery Science Fellows** joined the Division of Research. These early-career investigators come from around the country and bring diverse research interests.

Josh Smith, PharmD, Jessica Poon, PhD, and **Tainayah Thomas, PhD**, bring to 11 the number of research fellows currently working at DOR. Our 11 current fellows conduct a broad range of studies in epidemiology and health services, identifying the key drivers of health and disease as well as the best ways to deliver care.

And we continue looking into the future of health care with a robust, and growing, clinical trials program. Led by **Alan Go, MD**, the regional medical director of the **KPNC Clinical Trials Program** (CTP), and Victor Chen, the CTP's managing director, the number of Northern California clinical trials increased from 400 in 2018 to 415 in 2019. Clinical trials offer patients a chance to participate in new tests and treatments that may one day become standard of care.

What will 2020 bring us? While we can't promise to see the future, here at the Division of Research, our discoveries make the view a little clearer.

Tracy A. Lieu, MD, MPH
Director, Division of Research

10 BIG RESEARCH STORIES FROM 2019

Projects from across the Division of Research made a splash in 2019. Here are some of the year's attention-grabbing stories:

Epidemic of deaths due to heart failure underway in U.S. **Read Story »**

More from *Time*

New study finds both components of blood pressure predict heart attack, stroke risk.

Read Story »

More from *NBC News*

Prediction tool could identify more patients at risk of getting HIV.

Read Story »

More from *FierceHealthcare*

Waning potency of pertussis vaccine a significant contributor to recent whooping cough outbreaks. **Read Story »**

More from *CNN*

Video visits convenient and high quality, Kaiser Permanente members say.

Read Story »

More from *Reuters Health*

Use of insulin among older adults with type 2 diabetes not aligned with national guidelines.

Read Story »

More from *HealthDay*

More women using cannabis daily before and during pregnancy, Kaiser Permanente research finds.

Read Story »

More from *NBC Nightly News*

At-home dialysis improves quality of life. **Read Story »**

More from *Medscape*

New study data suggests revising heart disease management guidelines for colon cancer survivors.

Read Story »

More from *ASCO Post*

Fewer reproductive years may be linked to an increased risk of dementia.

Read Story »

More from *HealthDay*



Behavioral Health and Aging

Prostate Screening Guideline Impacts

Since the U.S. Preventive Services Task Force recommended against PSA-based screening in all men, many fewer men were diagnosed with prostate cancer but more were found to have advanced cancers. “Too often, men who were screened with the PSA test underwent unnecessary interventions, such as biopsies for falsely elevated PSA levels or unnecessary treatments for cancers that posed no threat to the patient,” said senior author **Andrew L. Avins, MD, MPH**, on their study published in the **Journal of General Internal Medicine**, and led by **Joseph Presti, MD**, Kaiser Permanente urologist and adjunct researcher. [Read More»](#)

Researchers Strategize with Clinicians

The Division of Research’s behavioral health section often works with clinicians to explore concerns that arise in practice. One example is work by researcher **Esti Iturralde, PhD**, on use of metformin to stave off weight gain from psychiatric medications. **Stacy Sterling, DrPH, MSW, MPH**, said the division’s investigators welcome the chance to address problems their clinical colleagues wrestle with. “We have a great working relationship that benefits both clinicians and researchers, as well as Kaiser Permanente members, and we are expanding our portfolio of mental health-focused research significantly,” Sterling said. [Read More»](#)

Adolescent Substance Abuse Referrals

Screenings, interventions, and referrals to substance abuse treatment can have long-term benefits for adolescents, including sustained reductions in mental health conditions, a study in Pediatrics, led by **Stacy Sterling, DrPH, MSW, MPH**, found. The finding “suggests that providing access to SBIRT may plant a seed for patients and their care teams, creating awareness about substance use that may help kids avoid future problems,” Sterling said. [Read More»](#)

Reproductive Years and Dementia

Women who have fewer total reproductive years by starting their period later, going through menopause earlier, or having a hysterectomy have a greater risk of developing dementia, according to research published in **Neurology**. “Since women are 50 percent more likely to develop dementia over their lifetimes than men, it’s

important to study any risk factors that are specific to women that could eventually lead us to potential points of intervention,” said study author **Paola Gilsanz, ScD**. [Read More»](#)

Smoking Cessation with Surgery

A pilot program to help people quit smoking by focusing interventions around the time of surgery led to significant improvements in provider referrals for smoking cessation counseling and patients’ sustained quitting in the 30 days following hospital discharge. The study appeared in the **Journal of Surgical Research**. “Our study provides compelling evidence that smoking cessation interventions can be successfully embedded into standard preoperative care and holds promise for helping smokers undergoing elective surgery to quit smoking,” said lead author **Kelly Young-Wolff, PhD, MPH**. [Read More»](#)

Cannabis Use in Pregnancy

The number of women using cannabis in the year before they get pregnant and early in their pregnancies is increasing, and their frequency of use is also rising, according to data published in **JAMA Network Open**. The study was based on women’s self-reported cannabis use. “These findings should alert women’s health clinicians to be aware of potential increases in daily and weekly cannabis use among their patients,” said lead author **Kelly Young-Wolff, PhD, MPH**. [Read More»](#)

NIH funds National Network of Addiction Researchers

As part of the Health Systems Node of the NIDA Clinical Trials Network, behavioral health researchers partner with health systems across the country to improve access to – and quality of – care for people with addiction. A current project led by **Cynthia Campbell, PhD**, leverages electronic health data from 10 health systems to address the opioid crisis by developing a de-identified prescription opioid registry. The study examines who is at risk for opioid misuse and the impact of changes in prescribing on adverse events, such as emergency room visits and mortality. Findings can inform how to reduce risky opioid use safely. [Read More»](#)



Telomere Length and Socioeconomic Status

A large Kaiser Permanente study in [Environmental Epidemiology](#) identified links among a genetic marker of aging, how much education a person has, and the degree of socioeconomic deprivation in their neighborhood. Previous studies have shown links between shorter telomeres and an increased risk of cancer, diabetes, heart and autoimmune diseases, and dementia, not to mention cellular inflammation and psychological stress. "The motivation for this work was to look at neighborhood socioeconomic status and try to understand if there were effects on the aging process that could be seen through associations with telomere length," said lead author [Stacey E. Alexeeff, PhD](#). [Read More»](#)

NIH Study of Transfusion Recipients

A large study found that the sex or pregnancy history of red blood cell donors does not influence the risk of death among patients who receive their blood. The research appeared in [JAMA](#) and analyzed 3 large blood donor/transfusion recipient databases for a total of more than 1 million transfusion recipients between 2003 and 2016. Division of Research investigators participated in the multi-institution collaborative analysis, which supported the safety of current transfusion practice within Kaiser Permanente's network of community hospitals. "Using Kaiser Permanente data, we were able to contribute to analyses of both in-hospital mortality and long-term deaths," said study co-author [Catherine Lee, PhD](#), a biostatistician with the Division of Research. [Read More»](#)

Health Impact of Medications

A new award from the [Patient-Centered Outcomes Research Institute](#) (PCORI) is supporting the development of statistical methods to improve how EHR data are analyzed to understand the effect of medication non-adherence and to compare the effectiveness of medications used to treat chronic conditions such as diabetes. The effort, led by [Romain Neugebauer, PhD](#), will help researchers identify medication refill patterns that increase the risks of poor health outcomes and also help them avoid making incorrect assumptions about whether patients use medicines as directed after filling a prescription. [Read More»](#)



Cancer

Top Colorectal Screening Rates

Kaiser Permanente Northern California received the National Colorectal Cancer Roundtable's prestigious "80% by 2018" **National Achievement Award**, in recognition of screening rates over 83% for colorectal cancer. "The most gratifying aspect of this work is the knowledge that there are parents and grandparents spending time with their families who wouldn't have otherwise, because the physicians and staff of Kaiser Permanente Northern California did the hard work of improving our screening performance," said Walnut Creek gastroenterologist **Theodore (TR) Levin, MD**, a research scientist with the Division of Research.

[Read More»](#)

Body Fatness Affects Chemo Dosages

Women with greater adiposity, or body fatness, were significantly less likely to receive all of the recommended chemotherapy dose to treat their breast cancer, and they were subsequently 30% more likely to die from the disease as a result, according to Kaiser Permanente research published in **JAMA Oncology**. "Most chemotherapy is dosed based on measurements of the body's surface area using formulas that have been around for more than 100 years," said lead author **Elizabeth C. Feliciano, ScD**. "Our studies are showing that body composition may also need to be considered in order to ensure proper dosing for all women." [Read More»](#)

Social Jet Lag

Adolescent sleep timing preferences and patterns should be considered risk factors for obesity and cardiometabolic health, according to a study published in **JAMA Pediatrics**. Poor quality and short duration of sleep are known to increase obesity and cardiometabolic risk among children. What's rarely been studied, however, is how sleep timing and teens' own preferences for when to sleep and engage in other activities can influence their risk of obesity and poor cardiometabolic health. "While the reasons for these differences between girls and boys are not fully understood, they may include biological and sociocultural influences as teens enter puberty," says lead author **Elizabeth C. Feliciano, ScD**.

[Read More»](#)

Medical Imaging Rates Rise

Despite a broad campaign among physician groups to reduce the amount of imaging in medicine, the rates of use of CT, MRI, and other scans have continued to increase in both the United States and Ontario, Canada, according to a study of more than 135 million imaging exams. The study, published in **JAMA**, is the first of its size to determine imaging rates across different populations. "Our capture of medical imaging utilization across 7 U.S. health care systems and Ontario, Canada, over a 16-year period provides one of the most comprehensive assessments to date of imaging from children to older adults in North America," said **Marilyn Kwan, PhD**, co-author and senior research scientist. [Read More»](#)

Body Fat and Cardiovascular Risk

Body composition, particularly excess central adiposity or intra-abdominal fat, can result in an increased risk of cardiovascular disease in normal-weight breast cancer survivors, a large Kaiser Permanente study showed. "The greatly increased cardiovascular risk among normal-weight patients with visceral adiposity would go undetected with BMI alone," said senior author **Bette J. Caan, DrPH**, senior research scientist. The study was published in the **Journal of Clinical Oncology**. [Read More»](#)

Trends in Pregnancy Imaging

The use of computed tomography (CT) scans during pregnancy – which exposes mothers and fetuses to ionizing radiation – has increased significantly over 21 years in the United States and Ontario, Canada. According to the first large, multicenter study of advanced medical imaging in pregnancy, the rates of use increased nearly fourfold in the United States and doubled in Ontario over 21 years of the study. The study was published in **JAMA Network Open**. "This study has given us a chance to look more closely at the use of advanced imaging in pregnancy," said **Marilyn Kwan, PhD**, co-lead author and senior researcher. [Read More»](#)

Continued on page 6



Cancer (Continued)

Mother's Pregnancy Weight and Puberty

A Kaiser Permanente study of more than 2,000 mothers and daughters found that the amount of weight mothers gained during pregnancy – whether too much or too little – was linked to the earlier onset of puberty in their daughters. The associations between too much or too little weight gain and early puberty were even stronger when the mothers were overweight or obese at the beginning of the pregnancy. “Our results highlight the importance of raising awareness among women of childbearing age to maintain a healthy weight, and among pregnant women to gain within recommended guidelines based on their body mass index,” said senior author **Ai Kubo, MPH, PhD**, research scientist. The study was published in **American Journal of Epidemiology**. [Read More»](#)

New Guidelines for Colon Cancer Survivors?

Colorectal cancer survivors' risk for heart attack – 5 times that of the average person – was linked to the amount of fat stored within the abdomen and abdominal muscles, not to survivors' body mass index (BMI), according to a study of 2,800 colon cancer survivors from Kaiser Permanente's Northern California region. The study was published in **JAMA Oncology**. “This study demonstrates the importance at every BMI level of having more precise measures of muscle and fat to help identify those patients who are at high risk of developing cardiovascular disease,” said co-author **Bette J. Caan, DrPH**, senior research scientist. [Read More»](#)



Cardiovascular and Metabolic Conditions

National Trend of Heart Failure-related Deaths

Deaths related to heart failure are increasing in the United States, particularly among the over-age-65 population, according to research published in [JAMA Cardiology](#). Heart failure is a chronic, progressive form of heart disease in which the heart muscle does not pump blood as efficiently as it should. About 1 in 8 deaths from heart disease in the United States have heart failure listed as the underlying cause, and about 9 out of 10 of those deaths are in people over age 65. "The United States is now experiencing a dramatic increase in the number of older people dying from heart disease, and especially heart failure," said lead author [Steve Sidney, MD, MPH](#).

[Read More»](#)

At-home Dialysis

The rate of people starting at-home peritoneal dialysis rose from 15% to 34% over 10 years in Kaiser Permanente's Northern California region (vs. only ~10% nationally), providing a convenient and safe way to manage advanced-stage kidney disease compared with center-based hemodialysis, according to a study published in [JAMA Internal Medicine](#).

"The large-scale expansion of in-home dialysis was made feasible using a multidisciplinary, integrated, coordinated-care approach, with excellent outcomes in patients with advanced kidney disease," said senior author [Alan S. Go, MD](#).

[Read More»](#)

Both Numbers Count

Both numbers in a blood pressure reading – the "upper" systolic and the "lower" diastolic – independently predicted the risk of heart attack or stroke in a very large Kaiser Permanente study that included more than 36 million blood pressure readings from more than 1 million people. The study, published in the [New England Journal of Medicine](#), runs counter to decades of previous research. "This research brings a large amount of data to bear on a basic question, and it gives such a clear answer," said lead author [Alexander C. Flint, MD, PhD](#), stroke specialist and adjunct researcher with the Division of Research. "Every way you slice the data, the systolic and diastolic pressures are both important."

[Read More»](#)

Infant Temperament and Obesity

A Kaiser Permanente prospective study found that easier-to-soothe babies were more likely to be obese by age 5, and more likely to have started drinking sugared beverages during the first 6 months of life. Among children whose mothers had gestational diabetes, those who were easier to soothe as infants were more than twice as likely to subsequently be obese as toddlers. "We're not aware of any prior research examining the role of infant temperament in influencing the subsequent risk of obesity among children whose mothers had pregnancies complicated by gestational diabetes," said senior author and study principal investigator, [Erica P. Gunderson, PhD, MPH, MS](#), of the study published in [JAMA Pediatrics](#).

[Read More»](#)



Reduced Hospitalizations

An analysis of patients admitted to Kaiser Permanente Northern California hospitals over 7 years found a steadily declining rate of hospitalizations and readmissions, in line with federal health policy that encourages hospitals to reduce the number of patients who end up back in the hospital. Published in [JAMA Network Open](#), the findings suggest an integrated health system such as Kaiser Permanente can use its close connections to make significant improvements in patient care, said lead author [Gabriel Escobar, MD](#). "Kaiser Permanente is actually reducing the hospitalization rate," he said. "The best way to prevent a readmission is to not admit the patient in the first place." [Read More»](#)

Personalizing Care

Over the next 5 years, Division of Research investigators will receive \$3.2 million from the National Institute of Aging to collect information about older patients with Type 2 diabetes to create tools for doctors to assess their specific needs. [Andrew Karter, PhD](#), a principal investigator for the project, will collaborate with colleagues from other institutions on the study. "Most clinical guidelines acknowledge that older people with diabetes are different from younger patients and should be treated with their unique needs in mind," Karter says. "But the various guidelines conflict on target blood glucose levels and medication use." [Read More»](#)

Chronic Disease by Asian Subgroup

Asian-Americans from different parts of Asia have very different cardiovascular risk factors and chronic conditions such as diabetes, hypertension, and heart disease. "Based on a relatively small body of previous research, we suspected that we would see differences," said lead author [Nancy Gordon, ScD](#). "But we didn't expect them to be so large. For instance, Filipino-Americans in the study were twice as likely to have diabetes than those of Chinese ethnicity." The study was published in [BMC Public Health](#) and used electronic health record (EHR) data for 1.4 million adults aged 45 to 84 who were Kaiser Permanente Northern California members during 2016. [Read More»](#)

Lower Surgical Opioid Dosage

Surgical patients given less opioids and more alternative methods of pain control were less likely to continue using opioids 6 months to a year later, an analysis by Kaiser Permanente Northern California researchers found. A research letter, published in [Annals of Surgery](#), compared long-term opioid use by groups of surgery patients during the periods before and after an Enhanced Recovery After Surgery (ERAS) program was put in place, and found a significant difference. "A standardized and targeted approach to pain management in the ERAS program could have long-term benefits," said [Vincent Liu, MD, MSc](#), the study's lead author. [Read More»](#)

Clinical Tool Predicts Appendicitis Risk

Using a simple new risk calculator, Kaiser Permanente emergency doctors were able to accurately gauge the risk of appendicitis in children, according to a study published in the [Annals of Emergency Medicine](#). The study looked at the pediatric Appendicitis Risk Calculator (pARC) in a community emergency department setting. "For the pARC to be a useful tool in general practice, it had to perform well in the emergency departments of community hospitals that care for patients of all ages," said co-author [David R. Vinson, MD](#), senior emergency physician in Kaiser Permanente's Sacramento Medical Center and adjunct researcher. [Read More»](#)



Infectious Diseases

Referrals for Transgender Care Up

The number of children and teens referred for care at a Kaiser Permanente Northern California pediatric transgender clinic rose fourfold between 2015 and 2017 and continued to rise in 2018, research showed. “Our findings highlight the growing demand for pediatric transgender and gender nonconforming care,” said [Carlo Hojilla, RN, PhD](#), a research fellow with the Division of Research. Hojilla was a co-lead author on research published in the journal [Pediatrics](#). The study reported referrals to the [Proud Clinic](#) but did not determine whether treatment was actually provided. [Read More»](#)

Motivational Interviews for Intervention

A single, 45-minute “motivational interview” with two 20-minute follow-up phone calls may help people with HIV who report unhealthy drinking reduce their alcohol intake. This approach may be particularly effective for those drinkers who are unmotivated or ambivalent about changing, say researchers at UC San Francisco and Kaiser Permanente. The study was published in the [Journal of General Internal Medicine](#). “For patients in treatment for HIV, excessive alcohol use can be especially harmful,” said lead author [Derek Satre, PhD](#), of the [UCSF Department of Psychiatry](#) and the Division of Research. [Read More»](#)

Waning Potency of Pertussis Vaccine

In a large Kaiser Permanente study, children who were up to date on their pertussis vaccine schedule were far less likely to develop the disease than unvaccinated children. However, most pertussis cases were in fully vaccinated children. The risk of vaccinated children becoming ill increased with the time since vaccination, suggesting that waning effectiveness between doses was a significant contributor to recent outbreaks. The study was published in the journal [Pediatrics](#). “Most DTaP research has explored either vaccination status or waning effectiveness, but we looked at both at once,” said [Ousseny Zerbo, PhD](#), lead author of the study and a Research Scientist with the [Vaccine Study Center](#) at the Division of Research. [Read More»](#)

Prediction Tool for HIV Risk

Researchers have developed a new analytical tool that identifies people at risk of contracting HIV so they may be referred for preventive medication. A study describing the tool was published in [The Lancet HIV](#) by Kaiser Permanente investigators and colleagues. Looking at medical records of 3.7 million Kaiser Permanente patients, researchers developed a machine-learning algorithm to predict who would become infected with HIV during a 3-year period. “Development of the tool required a setting like Kaiser Permanente Northern California that had high-quality individual-level data on enough people to identify new HIV infections, which are rare events,” explained [Michael Silverberg, PhD, MPH](#), a co-author of the paper and Division of Research investigator. [Read More»](#)



Women's and Children's Health

Reducing Racial Disparities

Kaiser Permanente's Northern California hospitals significantly increased minimally invasive surgery for hysterectomy and found the change also reduced racial disparities in the types of hysterectomies patients get. The analysis was published as a research letter in [JAMA Network Open](#). Senior author [Tina Raine-Bennett, MD, MPH](#), said quality improvement can reduce disparities by spreading higher quality care to all patients. [Read More»](#)

Averting Gestational Diabetes

Kaiser Permanente researcher [Monique Hedderson, PhD](#), received \$3 million from the National Institutes of Health for a 5-year project to test whether a mobile phone app could help overweight and obese women avoid excess weight gain while pregnant. "We know what works – self-monitoring of weight, diet, and exercise," Hedderson said. The mobile app will make support easier for women to access. With the new NIH funding, Hedderson and colleagues will study the app in a cluster randomized controlled trial of 56 Kaiser Permanente obstetricians caring for 2,000 overweight and obese pregnant women. [Read More»](#)

Diabetes and Minority Groups

Members of racial and ethnic minority groups were much more likely to have diabetes or prediabetes at lower weights – even at normal or below-normal body mass index (BMI), according to research published in [Diabetes Care](#). The findings could signal a change in how doctors screen racial and ethnic minority patients for diabetes and prediabetes, said senior author [Assiamira Ferrara, MD, PhD](#), a senior research scientist with the Division of Research. Lead author [Yeyi Zhu, PhD](#), a research scientist with DOR, called for better understanding of how the physiological mechanisms of diabetes may vary. [Read More»](#)

Maternal Infection and Childhood Obesity

Women who had an untreated infection during pregnancy were more likely to have a child who later went on to be obese than pregnant women who never had an infection, according to a study published in the [International Journal of Obesity](#). The study adds to a growing body of research suggesting infection, not antibiotics, is the significant factor in a suspected link between the microbiome of early childhood and childhood obesity later on, said lead author [De-Kun Li, MD, PhD](#), a research scientist with the Division of Research. "Clinicians shouldn't be worried about prescribing antibiotics, as the infection is a greater concern than the antibiotic in relation to childhood obesity," Li said. [Read More»](#)

Perinatal Depression Guideline Update

New recommendations from the U.S. Preventive Services Task Force (USPSTF) suggest that clinicians should provide or refer pregnant and postpartum women who are at increased risk of perinatal depression to counseling interventions. An accompanying editorial from Kaiser Permanente research scientists and doctors was published with the guidelines in [JAMA Pediatrics](#). "The recommendations highlight the need to overcome barriers to screening and preventive interventions for depression, and the need for further research on other preventive interventions," wrote lead author [Lyndsay Avalos, PhD, MPH](#), a research scientist with the Division of Research. [Read More»](#)

Maternal Diet Influences Fetal Growth

A pregnant woman's poor diet, in addition to being bad for her own health, is linked to poor fetal growth, concluded research published in the [International Journal of Epidemiology](#). "Our finding of a more pronounced association between poor diet quality in pregnancy and higher risk of delivering a large-for-gestational age baby among women without gestational diabetes highlights the importance of promoting diet quality among all pregnant women, regardless of their status of gestational diabetes," said co-first author [Yeyi Zhu, PhD](#), a research scientist. Her co-first author was [Monique Hedderson, PhD](#), a senior research scientist at the Division of Research. [Read More»](#)



Delivery Science

Delivery Science research includes projects that have high impact on health care delivery. Researchers in this arena are supported by numerous sponsors and programs including the Physician Researcher Program, Delivery Science Research Program (2-year awards), Rapid Analytics Unit (12-month projects), Targeted Analysis Program (6-month projects), Delivery Science Fellowships, and by support from The Permanente Medical Group (TPMG). The TPMG efforts are coordinated under the [Delivery Science and Applied Research \(DARE\)](#) program.

Prostate Screening Guideline Impacts

Since the U.S. Preventive Services Task Force recommended against PSA-based screening in all men, many fewer men were diagnosed with prostate cancer but more were found to have advanced cancers, according to a large study. "Too often, men who were screened with the PSA test underwent unnecessary interventions, such as biopsies for falsely elevated PSA levels or unnecessary treatments for cancers that posed no threat to the patient," said senior author [Andrew L. Avins, MD, MPH](#). The study, published in the [Journal of General Internal Medicine](#), was led by [Joseph Presti, MD](#), Kaiser Permanente urologist and adjunct researcher. [Read More»](#)

Pharmacogenetics of Phenytoin

A Kaiser Permanente analysis found that neurological side effects from the anti-seizure medication phenytoin are more common in patients with certain genetic variants. The study was published in the journal [Pharmacogenetics and Genomics](#). "Knowing whether the patient has a genetic variant that leads to higher or lower concentrations of the drug in their blood could be useful information for balancing the pros and cons of prescribing a particular medication at the standard dose," said senior author [Catherine Schaefer, PhD](#), research scientist with the Division of Research, who cowrote the paper with adjunct investigator [Alison Fohner, PhD](#). [Read More»](#)

Research Findings Change Guidelines

Black patients being treated for hepatitis C can take 8 weeks of certain direct-acting antiviral drugs rather than the previous recommendation of 12 weeks, according to [new practice guidelines](#). The guidelines cite [research](#) from the Division of Research for the change in advice. DOR investigator [Michael Silverberg, PhD, MPH](#), said it was encouraging that the work had a direct influence on national practice guidelines, which had previously singled out black patients for a longer regimen of hepatitis C drugs based on prior research. "This is especially gratifying since the study was motivated by clinicians at Kaiser Permanente Northern California, who had long suspected that the prior race-specific guidance was outdated since they were based on older data," Silverberg said. [Read More»](#)

Improved C-section Care

An effort to improve the experience of women having scheduled cesarean section deliveries found they can use less opioids without increased pain, research published in the journal [Obstetrics & Gynecology](#) found. Taking less pain medication, along with moving around sooner after the surgery, can allow women to recover more quickly and care for their newborns, the researchers said. "This study provides evidence we can successfully implement Enhanced Recovery After Surgery with patients undergoing cesarean deliveries, and that hasn't been shown before," said lead author [Monique Hedderson, PhD](#), a research scientist. [Read More»](#)

Continued on page 12



Delivery Science (Continued)

Deprescribing Insulin

Patients with type 2 diabetes who were in poor health were more likely to continue taking insulin after age 75 than their counterparts in better health, according to research published in [JAMA Internal Medicine](#).

“Leading medical specialty organizations recommend reducing diabetes treatment intensity for older patients, particularly when they have multiple, life-limiting health conditions. But in current practice we found that these sicker patients were less likely to stop taking insulin,” said senior author [Richard W. Grant, MD, MPH](#).

[Read More»](#)

Machine Learning to Analyze Sepsis

A new machine learning algorithm reveals the complexity of sepsis by sorting patients into recognizable treatment subgroups. While hospital clinicians have made major strides in identifying sepsis, sepsis patients don’t all look the same. The results were published in the [Journal of the American Medical Informatics Association](#) (JAMIA). “Sepsis patients have incredibly diverse presentations and combinations of health conditions. Instead of simply grouping them under a single ‘sepsis’ umbrella, we now can develop more targeted research and treatment guidelines,” said [Vincent Liu, MD, MSc](#), the paper’s senior author.

[Read More»](#)

Video Visits Convenient

Nine out of 10 Kaiser Permanente members who had a primary-care video visit were confident in the quality of care received, reported that the provider was familiar with their medical history, and felt that their health care needs were adequately addressed. In a research brief published in the [Annals of Internal Medicine](#), Kaiser Permanente researchers surveyed patients who scheduled video visits during the last quarter of 2015, a few months after the option became available to patients and providers across the region. “We believe this is the first large study of patient experiences integrating video visits into primary care with existing providers,” said Research Scientist [Mary Reed, DrPH](#).

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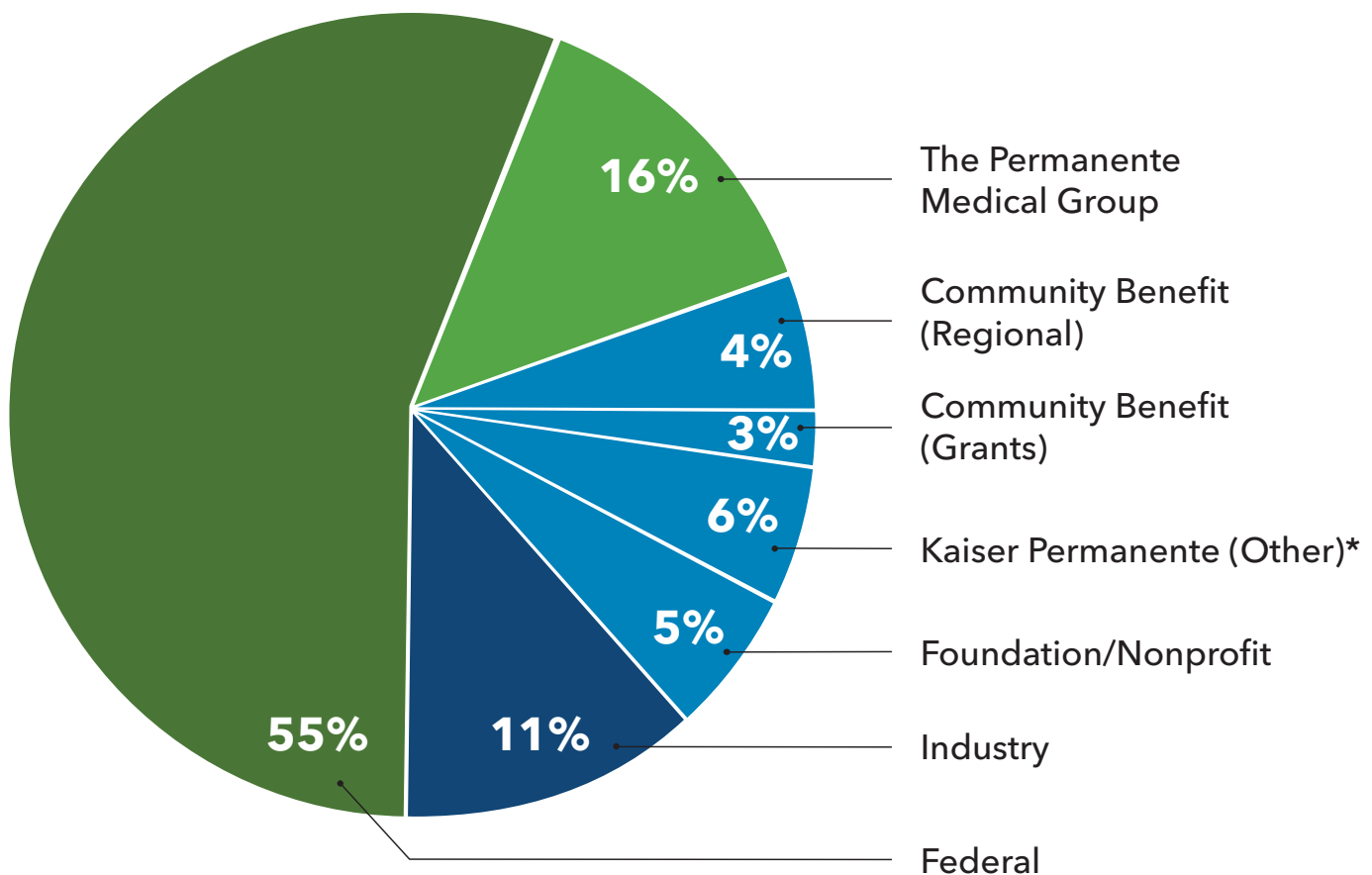
Teledermatology Finds More Cancers

When dermatologists had the opportunity to look at well-photographed skin lesions, they identified nearly 10% more cancers with nearly 40% fewer referrals to the dermatology department, according to a study published in the [Journal of the American Academy of Dermatology](#) (JAAD). The study included adult members who asked their primary care physician to take a look at a worrying skin lesion. “We reviewed these dermatology workflows and analyzed a very large number of cases using natural language processing in Kaiser Permanente’s electronic health records to match skin-related diagnoses with how they were identified,” said senior author [Lisa J. Herrinton, PhD](#), a research scientist. [Read More»](#)

2019 Financial Report

The Division of Research (DOR) is currently home to **63** investigators and staff scientists, **11** research fellows, and nearly **600** employees. The DOR also has **42** adjunct investigators from within Kaiser Permanente and other academic institutions. DOR scientists are involved in **454** ongoing research projects and its Clinical Trials Program supports and guides **415** clinical trials. Since its founding in 1961, DOR researchers have published more than **5,000** peer-reviewed articles including **511** papers in 2019 alone.

2019 TOTAL REVENUE: \$101 MILLION



*(Incl. CESR, Garfield, KP Biobank, etc.)

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