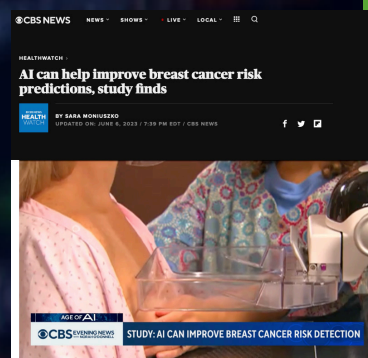


2023 ANNUAL REPORT

Integrating Augmented Intelligence in Research





Integrating Augmented Intelligence in Research

Looking back on 2023, we experienced an accelerating pace of change amid post-pandemic shifts in the way we work each day. This rapid evolution is echoed in the world of scientific innovation, judging by the number of headlines and journal articles containing the terms “artificial intelligence.”

Here at the Division of Research, AI has long been a part of our research agenda, thanks to the forward thinking of physician investigator [Vincent Liu](#), MD, his mentor, former DOR research scientist Gabriel Escobar, MD, and their Systems Research Initiative team. They had the pioneering vision that sophisticated analysis of the vast amounts of data generated by a large integrated health system could be harnessed for lifesaving insights.

Their work has put us at the leading edge of the latest thinking about AI, using tools such as machine learning and large language models. Their predictive analytics team has been long embedded in our medical centers, working closely with clinicians to identify new medical use cases for their advanced data techniques. These include the [Advance Alert Monitor](#) program, [COVID-19 surge prediction](#), earlier identification of patients with [sepsis](#) and people who could benefit from [preventive HIV therapy](#), evaluating [suicide prediction models](#), and so many more examples.

Now Vinnie Liu has emerged as a national leader in the field of AI in health care, invited to speak on the [national stage](#) about this work. The Gordon and Betty Moore Foundation turned to Vinnie to manage the newly formed [Augmented Intelligence in Medicine and Healthcare Initiative](#). Recipients of the initiative’s grants will test real-world applications of AI to improve health care delivery.

Our organization thinks the best term for this new technology is actually “augmented intelligence,” not artificial intelligence, denoting that these advanced analytics are meant to assist our clinicians, not replace them. A main goal is to make doctors’ jobs easier, such as with the new AI scribe that transcribes and summarizes doctor-patient interactions to accelerate notetaking.

As these innovations speed along, we can also take a moment to look back, as I did in November when I heard that DOR’s founder, [Morris Collen](#), MD, is now honored in a [Wikipedia entry](#). Morrie, a founding partner of The Permanente Medical Group and an early innovator in the field of medical informatics, would have greatly enjoyed the idea of being immortalized online that way.

I think Morrie would also appreciate the role our researchers are taking in using augmented intelligence — the most modern iteration of information technology — to fulfill our goals and aspirations in delivering medical care.



Tracy Lieu

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

9 BIG RESEARCH STORIES

FROM 2023

Telehealth May Be Just as Effective as In-person Checkups, New Research Finds

► [Read Story](#)

► [More from Yahoo News](#)

AI Can Help Improve Breast Cancer Risk Predictions, Study Finds

► [Read Story](#)

► [More from CBS Evening News](#)

Female Cancer Survivors Experience Accelerated Declines in Physical Function

► [Read Story](#)

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Women's Problem Drinking is Catching Up to Men's

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► [More from The Wall Street Journal](#)

Clot Risk Generally Low for COVID Outpatients

► [Read Story](#)

► [More from MedPage Today](#)

Air Pollution Might Make People 16% More Likely to Die From Heart Disease

► [Read Story](#)

► [More from Forbes](#)

Kids' Screen Time Rose During the Pandemic and Stayed High

► [Read Story](#)

► [More from Education Week](#)

Study Finds No Serious Side Effects From COVID Vaccines for Young Children

► [Read Story](#)

► [More from San Francisco Chronicle](#)

Mix of In-Office, Telehealth Visits Safe for Prenatal Care

► [Read Story](#)

► [More from HealthDay](#)

Research Highlights

Behavioral Health and Aging

Alcohol check-in at primary care visit may benefit other conditions

Patients with hypertension and unhealthy alcohol use were more likely to see a decline in their blood pressure if they were asked about their alcohol drinking habits and provided a brief intervention during a visit with their primary care team, according to research published in [BMJ Open](#). The study supports the value of the Alcohol as a Vital Sign program at Kaiser Permanente Northern California, said senior author [Stacy Sterling](#), DrPH, MSW. Study lead author was **Felicia Chi**, MPH, a DOR senior data consultant.

►[Read More](#)

State-level educational quality linked to risk of dementia

People attending schools in states with higher state-level educational quality are less likely to develop dementia in late life, according to a Kaiser Permanente [analysis](#) published in JAMA Neurology. “This study underscores the importance of investing in education quality accessible by all for us to reach our goal of healthy brain aging for all,” said senior author [Paola Gilsanz](#), ScD. The study was led by research fellow **Yenee Soh**, PhD.

►[Read More](#)

Doctors less likely to ask women about their drinking

Among patients who reported problem levels of drinking alcohol, women were less likely than men to have a conversation with their doctors about it, according to a [study](#) in the journal Addiction. “Our study identifies a potential gap in counseling of women who may have moderate drinking problems, which can worsen quickly,” said senior author [Stacy Sterling](#), DrPH, MSW. The study was led by DOR health economist **Sujaya Parthasarathy**, PhD.

►[Read More](#)

Study finds more patients sought addiction treatment for drug use during early pandemic

More Kaiser Permanente Northern California patients sought out addiction treatment during the early months of the COVID-19 pandemic, compared with a similar period in 2019. The study’s authors suggest their findings could reflect an increase in problem drug use as well as patient preference for telehealth treatment by phone or video. The [study](#), published in JAMA Health Forum, was led by DOR data consultant **Vanessa Palzes**, MPH, and research scientist [Cynthia Campbell](#), PhD, MPH.

►[Read More](#)

Pregnant patients seek open-minded support from doctors on cannabis

People who have used legal cannabis during pregnancy say they would welcome non-judgmental advice from their doctors about its possible negative side effects, according to a focus group [study](#) published in Obstetrics & Gynecology. “Patients want to have a back-and-forth dialogue with their clinicians,” said lead author **Tara Foti**, PhD, a former DOR research fellow. “Pregnant individuals desire concrete information about the risks associated with prenatal cannabis use,” added senior author [Kelly Young-Wolff](#), PhD, MPH.

►[Read More](#)

Association of clinical and behavioral factors with genetically determined cataract

Researchers led by DOR research scientist [Hélène Choquet](#), PhD, published [findings](#) in Investigative Ophthalmology and Visual Science identifying genetically determined primary open-angle glaucoma and myopia as risk factors for cataract. They did not find an association between cataract risk and blood pressure, weight, cigarette smoking, alcohol consumption, or genetically determined type 2 diabetes.

►[Read More](#)

Research Highlights

Biostatistics

Comparative effectiveness study of carotid intervention for long-term stroke prevention

A study appearing in the [Journal of Vascular Surgery](#) led by [Romain Neugebauer](#), PhD, and Adjunct Investigator [Robert Chang](#), MD, compared the observed effectiveness of carotid endarterectomy (CEA) and standard medical therapy versus standard medical therapy alone to prevent ipsilateral stroke in a contemporary cohort of patients with asymptomatic carotid stenosis. The authors found that CEA appears to have a small but statistically significant effect on stroke prevention out to 8 years.

►[Read More](#)

Initial antiretroviral therapy regimen and risk of heart failure

Heart failure risk is elevated in people with HIV. A study in the journal [AIDS](#) led by [Romain Neugebauer](#), PhD, and [Michael Silverberg](#), PhD, investigated whether initial antiretroviral therapy regimens influenced heart failure risk. People with HIV who initiated an antiretroviral therapy regimen between 2000 and 2016 were identified from 3 integrated health care systems. The researchers found that those who initiated protease inhibitors may be at higher risk of heart failure compared with those initiating nonnucleoside reverse transcriptase inhibitors.

►[Read More](#)

Current air pollution standards are insufficient to reduce heart risks

Long-term exposure to air pollution is tied to an increased risk of having a heart attack or dying from heart disease — with the greatest harms impacting under-resourced communities, new Kaiser Permanente research shows. The [study](#), published in JAMA Network Open and led by [Stacey Alexeeff](#), PhD, is one of the

largest to date to look at the effects of long-term exposure to fine particle air pollution, also known as PM_{2.5}. These particles, which are 2.5 micrometers in diameter or smaller, are emitted from sources such as vehicles, smokestacks, and fires. The research lends support to current efforts to make the country's air pollution standards more stringent.

►[Read More](#)

Similar outcomes for pregnant patients who received prenatal care in person or in a combination of telehealth and in-person visits

Pregnant patients who received some of their prenatal care during the COVID-19 pandemic in a combination of virtual and in-office visits had similar health outcomes as those who were seen mostly in person before the pandemic. The [study](#), led by [Charles Quesenberry](#), PhD, and [Assiamira Ferrara](#), MD, PhD, also found no significant differences in the uptake of telehealth prenatal care and how it affected people from varying racial and ethnic groups or socioeconomic backgrounds, and those using a language other than English or living in a rural area.

►[Read More](#)

Trends in cocaine and methamphetamine use among pregnant individuals

Cocaine use and methamphetamine use during pregnancy have potential short- and long-term health consequences. Rates of self-reported prenatal stimulant use have increased globally, but epidemiologic studies have not included biochemical verification. In a [study](#) in JAMA Network Open, [Stacey Alexeeff](#), PhD, and [Kelly Young-Wolff](#), PhD, examined trends in cocaine use and methamphetamine use at prenatal care entrance from 2011 to 2019 using data from the Kaiser Permanente Northern California health care system with universal screening via self-report and urine toxicology.

►[Read More](#)

Research Highlights

Cancer

Drinking alcohol not likely to increase breast cancer recurrence risk

The largest prospective study to look at short-term alcohol use after breast cancer provided new information that could help oncologists answer a common question breast cancer survivors have: Is it safe for me to drink alcohol? “We know that women who drink alcohol are at increased risk of developing breast cancer and the risk increases as alcohol use increases,” said lead author [Marilyn Kwan](#), PhD. “But our study found that, overall, drinking alcohol after a breast cancer diagnosis does not impact a patient’s prognosis.” The study was published in [Cancer](#).

[►Read More](#)

Lung cancer rates increase in never-smoking Asian American and Pacific Islander adults

At least 10% of lung cancers occur in adults who have never used tobacco. A study of close to 4 million adults led by [Lori Sakoda](#), PhD, found that overall incidence rates of lung cancer are remaining relatively constant in non-smokers — except for those of Asian and Pacific Islander origin, whose incidence rates increased by 2%. The research team, which included [Nancy Gordon](#), ScD, [Charles Quesenberry](#), PhD, and [Jeffrey Velotta](#), MD, said their findings underscore the need to learn more about the causes of lung cancer in non-smokers. The findings were published in [Chest](#).

[►Read More](#)

Treating common stomach bacteria reduces risk of stomach cancer

People treated for *Helicobacter pylori* (H. pylori) — a type of bacteria that infects the stomach — had a 63% lower risk of developing stomach cancer than those not treated. First author Adjunct Investigator [Dan Li](#), MD, and senior author [Douglas Corley](#), MD, PhD, reported the findings in [Gastroenterology](#). Their study, which included more than 716,000 Kaiser Permanente Northern California members tested for H. pylori between 1997 and 2015, is the first large community-based study in the U.S. to assess the effect of H. pylori treatment on stomach cancer incidence.

[►Read More](#)

Cancer diagnosis hastens aging in women

Postmenopausal women with cancer report a greater decline in physical function than women who have not had cancer. “We know that cancer is a disease of aging, and that as we grow older our risk of getting cancer increases,” said lead author [Elizabeth Cespedes Feliciano](#), ScD. “What has only been appreciated more recently is that cancer and its treatments can actually speed up the biological processes that are associated with aging.” The study was published in [JAMA Oncology](#).

[►Read More](#)

Research Highlights

Cardiovascular and Metabolic Conditions

Blood pressure patterns in first half of pregnancy improve early prediction of preeclampsia, gestational hypertension

A large retrospective study led by [Erica P. Gunderson](#), PhD, MPH, published in the [Journal of the American Heart Association](#), found that routine office-based blood pressure readings recorded in the first half of pregnancy can be divided into 6 distinct temporal patterns that can effectively stratify patients by their risk of developing preeclampsia and gestational hypertension later in pregnancy. The research team hopes to develop an automated tool within the electronic health record system to risk stratify patients in real time based on early pregnancy blood pressure patterns.

[►Read More](#)

Improving outcomes for patients with aortic stenosis

One of the largest studies on aortic stenosis found that fine-tuning assessments of patients with moderate aortic stenosis could help improve outcomes and better determine which patients might benefit from surgery to replace the aortic valve. “Moderate aortic stenosis represents a wide spectrum of disease,” said [Matthew D. Solomon](#), MD, PhD. “Our results show that moderate aortic stenosis patients have a different trajectory than those with severe aortic stenosis, and that many can be safely followed with close surveillance.” The findings, published in the [American Heart Journal](#), will be used to design a future population management program.

[►Read More](#)

Racial and ethnic differences seen in marker of early diabetic kidney disease

Among adults with diabetes whose kidney function was perceived to be normal, a high urine albumin level — a marker for early diabetic kidney damage — was more common in Asian adults than in white, Black, or Hispanic adults. Distinct differences also were seen within the Asian and Pacific Islander populations. The findings, published in [Diabetes Care](#), add to a growing body of evidence in support of research that looks at Asian subgroups rather than Asians as a whole, said co-senior author Adjunct Investigator [Sijie Zheng](#), MD, PhD.

[►Read More](#)

Atrial fibrillation may increase risk for dementia

People diagnosed with atrial fibrillation, the most common type of irregular heartbeat, have an increased risk of developing other heart problems. A study published in the [Journal of the American Heart Association](#) suggests they may also be at increased risk for dementia. “We know that atrial fibrillation is one of the strongest risk factors for ischemic stroke,” said senior author [Alan S. Go](#), MD. “Whether it increases the risk of developing dementia completely independent of having a stroke has been unclear. If it does, it would have important clinical and public health implications.”

[►Read More](#)

Research Highlights

Improving outcomes for patients with blood clots

Patients with blood clots who are on blood thinners for more than 6 months have a lower risk of developing a new blood clot if they are treated with direct oral anticoagulants rather than with the drug warfarin, according to a new study led by Kaiser Permanente and UCSF researchers. The retrospective [study](#), published in JAMA Network Open and led by [Alan Go](#), MD, included 18,495 adults diagnosed with a blood clot in their vein — venous thromboembolism — between 2010 and 2018 who were treated with blood thinners for at least 6 months.

[▶Read More](#)

Teens with reproductive health condition more likely to have high blood pressure

Teenage girls with polycystic ovary syndrome, a condition associated with menstrual irregularity and metabolic abnormalities, had a 30% higher risk of having high blood pressure than girls without the condition. The findings were presented by first author [Sherry Zhang](#), MD, at the 2023 American Heart Association [Scientific Sessions](#). “We know that adult women with polycystic ovary syndrome are more likely to have hypertension and other cardiovascular risk factors,” said senior author [Joan C. Lo](#), MD. “Our study found that this increased risk of elevated blood pressure — which is a risk factor for future cardiometabolic diseases, such as heart attack, stroke, and diabetes — is also seen in teenage girls.”

[▶Read More](#)

Research Highlights

Delivery Science

Mammography AI may have a role in breast cancer risk prediction

Artificial intelligence algorithms trained to read mammograms were a better predictor of a woman's future breast cancer risk than a commonly used breast cancer risk assessment tool. The research, published in [Radiology](#), suggests the risk-related imaging biomarkers seen on mammograms — that computers can identify and use to generate a risk score — may help doctors provide women with more personalized breast cancer screening recommendations, said study lead author [Vignesh Arasu](#), MD, PhD.

[▶Read More](#)

Emergency physicians correctly identify patients with lung blood clots who should be hospitalized

Most patients who develop a blood clot in their lungs are seen in the emergency department, where a physician must determine if they should be hospitalized or safely managed at home. A study in [Annals of Emergency Medicine](#) found patients who have a high heart rate or certain type of blood clot are more likely to be seen as high risk and subsequently hospitalized, even if they are categorized as low risk on a commonly used risk assessment tool. “Not all patients who appear to be at low risk for bad outcomes are good candidates for home care,” said first author and Delivery Science Fellow [Scott Casey](#), MD, MS.

[▶Read More](#)

Peer support program helps ease physician burnout

A Kaiser Permanente physician peer support program designed to reduce burnout helped improve doctors' well-being and had a positive impact on the culture of the medical departments that took part in the program.

The [study](#), published in PLOS ONE and led by Adjunct Investigator [Dana Sax](#), MD, and first author **Molly L. Tolins**, MD, an emergency medicine physician with The Permanente Medical Group, analyzed the impact of the Peer Outreach Support Team (POST) program, now active in 10 Kaiser Permanente Northern California hospitals. POST was designed to complement other types of support programs the hospitals make available to physicians, nurses, and other staff.

[▶Read More](#)

Remote telemonitoring for patients with heart failure did not prevent hospitalizations

Enrolling recently hospitalized heart failure patients in a telemonitoring program did not reduce their chance of going back to the hospital or help them live longer, research shows. The retrospective [study](#) published in the Journal of Cardiac Failure evaluated a pilot post-hospitalization daily telemonitoring program for heart failure patients that alerted doctors to sudden changes in a patient's blood pressure, weight, or oxygen levels. “There is a large push to introduce technology into staff workflows in health care throughout the country,” said senior author [Alan S. Go](#), MD.

[▶Read More](#)

Identifying surgical timing to optimize outcomes for early-stage lung cancer surgery

National guidelines recommend large-scale lung cancer screening among at-risk patients and Kaiser Permanente Northern California has instituted these programs. However, the ideal time to surgery for early-stage lung cancer is unknown, including if currently recommended minimal diagnosis-to-surgery time recommendations accurately decrease the risk of stage progression. The findings, published in the [World Journal of Surgery](#), were led by **Jeffrey Velotta**, MD, of The Permanente Medical Group and supported by the Delivery Science and Applied Research Program.

[▶Read More](#)

Research Highlights

Health Care Delivery and Policy

Timing of invasive mechanical ventilation in COVID-19-related respiratory failure

Patients with COVID-19-related respiratory failure hospitalized at Kaiser Permanente Northern California or Kaiser Permanente Southern California who received invasive mechanical ventilation each day after reaching $\geq 80\%$ fractional inspired oxygen (FiO₂) had higher in-hospital deaths than patients on non-invasive respiratory support. First author [Laura C. Myers](#), MD, MPH, and senior author [Vincent Liu](#), MD, said the findings, published in the [Journal of Critical Care](#), suggest providing non-invasive respiratory support does not appear harmful in patients who have reached a high FiO₂.

[►Read More](#)

Better outcomes seen in people with severe aortic stenosis who have scheduled common valve procedure

Most patients with aortic stenosis — a common and potentially life-threatening heart valve problem — have time to plan and prepare for a transcatheter aortic valve replacement. But outcomes for hospitalized patients who urgently need the procedure because their heart is in acute distress appear to be much worse. The study, led by first author and DOR Fellow [Justin J. Slade](#), MD, and senior author [Jacob Mishell](#), MD, a cardiologist with The Permanente Medical Group, was published in [Structural Heart](#).

[►Read More](#)

Blood test often incorrectly estimates blood sugar control in Black adults

A study published in [Diabetes Technology and Therapeutics](#) of 1,788 Kaiser Permanente Northern California patients with diabetes who used a continuous glucose monitoring device found that the hemoglobin A1c lab test often incorrectly estimates average blood sugar levels

in Black patients. However, differences between individual patients within racial and ethnic groups were much more significant than differences between them. First author [Andrew J. Karter](#), PhD, and senior author [Lisa Gilliam](#), MD, PhD, an endocrinologist with The Permanente Medical Group, said the study highlights the need for individualized patient care.

[►Read More](#)

Blood thinner still often used to treat patients with small lung blood clots

Guidelines recommend that certain low-risk patients with blood clots undergo structured surveillance rather than receive blood thinners. A study in [JAMA Network Open](#) that used data from 21 Kaiser Permanente Northern California hospitals found very few patients with small blood clots are eligible for surveillance — and those who are eligible are almost always still treated with blood thinners. “If it’s not happening here, it’s unlikely to be happening in hospitals that do not have our infrastructure,” said senior author [David R. Vinson](#), MD, an adjunct Investigator and The Permanente Medical Group emergency physician.

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Telehealth primary care outcomes remained steady well into 2021

A study in [Annals of Internal Medicine](#) reported that Kaiser Permanente Northern California patients who visited their primary care doctor between April and December 2021 had similar medical outcomes whether they saw their doctor in person or virtually. “These findings, on top of our previous research, suggest that telemedicine looks like it’s addressing a need, without generating major signs of safety concerns,” said lead author [Mary Reed](#), DrPH. “The ideal future state will be finding the balance in choosing the primary care modality that reflects both patient preference for convenience along with clinical appropriateness,” said senior author [Anjali Gopalan](#), MD, MS.

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Research Highlights

Infectious Diseases

COVID-19 vaccination of mother during pregnancy protects infant, though protection wanes

Being vaccinated against COVID-19 during pregnancy provides protection for the baby through its first several months of life, according to a [study](#) published in Nature Communications. “Our analysis supports the continued value of vaccination during pregnancy in protecting not only the mother, but the child as well,” said lead author [Ousseny Zerbo](#), PhD.

[►Read More](#)

Common HIV medication associated with improved COVID-19 outcomes

Tenofovir, a medication used to treat HIV and to prevent at-risk people from contracting the virus, may improve COVID-19 outcomes for both groups, according to [research](#) published in Clinical Infectious Diseases. The findings could inform medication choice for both treatment and prevention of HIV, said senior author [Michael Silverberg](#), PhD, MPH. The study was led by Alexandra N. Lea, MPH, a DOR senior research project manager.

[►Read More](#)

Study identifies undiagnosed cognitive impairment in people with HIV

Of a group of 47 study participants — all taking antiretroviral therapy for HIV — 20 were found to have mild cognitive impairment or possible dementia. The study, published in [Open Forum Infectious Diseases](#), suggests undiagnosed cognitive impairment is common among people with HIV and may be accompanied by difficulty with activities of daily living. The study was led by [Jennifer Lam](#), PhD, MPH. Senior author was [Michael Silverberg](#), PhD, MPH.

[►Read More](#)

No serious side effects for mRNA COVID-19 vaccines in young children

A review of more than 245,000 doses of mRNA COVID-19 vaccines given to young children (most of them age 4 and younger) found no indications of serious side effects. The [study](#) was published in Pediatrics and used data from the Vaccine Safety Datalink project. “Parents can protect their young children from COVID-19 in the same way they vaccinate their children to protect from other serious childhood diseases,” said senior author [Nicola Klein](#), MD, PhD; study lead author was [Kristin Goddard](#), MPH, a DOR research project manager.

[►Read More](#)

Flublok vaccine improved protection from flu for older adults

A higher-dose flu vaccine using recombinant technology was associated with 15% fewer flu cases in older patients than the commonly used, standard-dose flu vaccine. The [study](#), carried out by the Kaiser Permanente [Vaccine Study Center](#), was published in the New England Journal of Medicine. “This large study adds to what we know about relative effectiveness of flu vaccines,” said lead author [Amber Hsiao](#), PhD, MPH, DOR project manager. Senior author was [Nicola Klein](#), MD, PhD.

[►Read More](#)

Women's and Children's Health

Children's screen time rose nearly 2 hours per day during the pandemic

Children increased their screen time by nearly 2 hours per day after the start of the COVID-19 pandemic, and an hour of that increase persisted even after restrictions had eased, according to a new [analysis](#) in JAMA Network Open. "Our study showed screen time use, mostly for entertainment, remained elevated in 2021 even as restrictions eased," said lead author [Monique Hedderson](#), PhD. "Once children have increased their screen time, they may not decrease it," said senior author [Assiamira Ferrara](#), MD, PhD.

[▶Read More](#)

Neighborhood disadvantage linked to postpartum depression

Mothers living in neighborhoods with greater economic disadvantage are more likely to experience depression after giving birth, according to an [analysis](#) published in JAMA Network Open. "As clinicians, it's important to identify contributors of this kind of disparity, so that we are aware of them when we are caring for patients in the clinic," said lead author [Ticara Onyewuenyi](#), MD, MPH, an ob-gyn resident physician with The Permanente Medical Group. The research is part of a portfolio of work about perinatal mental health led by study senior author [Lyndsay Avalos](#), PhD, MPH.

[▶Read More](#)

Cannabis use in pregnancy may raise infant health risks

A large study of more than 360,000 mothers and infants found increased likelihood of low birth weight and admission to the neonatal intensive care unit for babies whose mothers used cannabis during pregnancy. The [analysis](#) was published in the American Journal of Obstetrics & Gynecology. "Our analysis adds

new concerns about the potential for preterm birth and NICU admission, which are associated with immediate, highly stressful situations for the family as well as long-term adverse outcomes for the child," said lead author [Lyndsay Avalos](#), PhD, MPH. The study's senior author was [Kelly Young-Wolff](#), PhD, MPH.

[▶Read More](#)

Asthma, obesity during pregnancy linked to autism in children

Mothers with asthma or obesity during pregnancy had higher rates of children diagnosed with autism, according to an analysis published in the journal Biological Psychiatry: Global Open Science. The [study](#) adds to evidence that maternal inflammation could affect neurodevelopment in children, said study lead author [Lisa Croen](#), PhD. "This analysis provides the research community with directions to pursue in future studies, to paint a more complete picture of what might be happening in the origins of autism," she said.

[▶Read More](#)

Teens in less-privileged neighborhoods more likely to report depression, suicidality

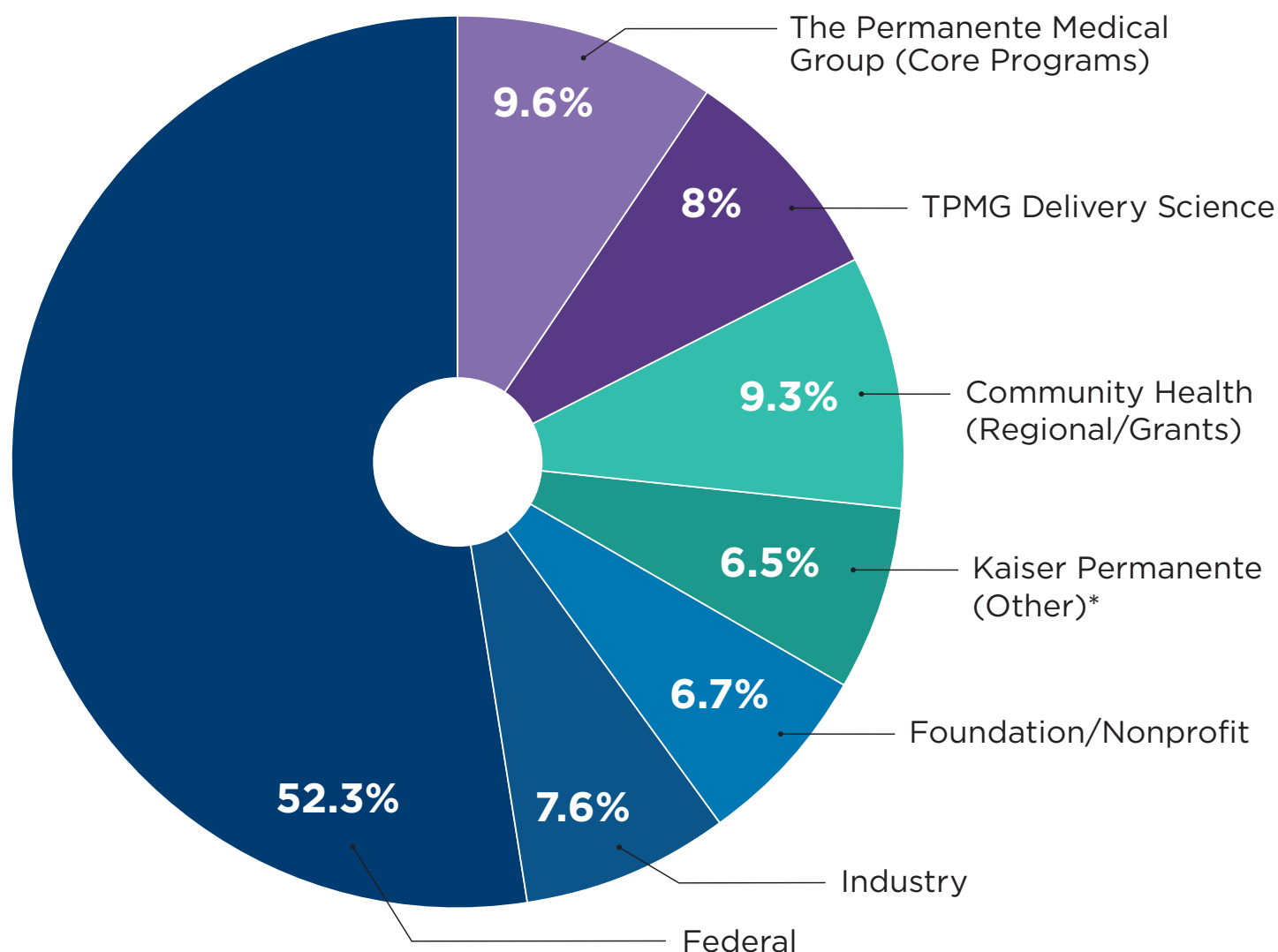
A study of nearly 35,000 Northern California teens found higher rates of depression and suicidality among those living in less economically and racially privileged neighborhoods. The [study](#), in JAMA Network Open, found adolescents from the least privileged neighborhoods had a 37% increased risk of depression and 59% more suicidality. The findings can inform prevention efforts at both the individual and policy level, said senior author [Ai Kubo](#), MPH, PhD. Lead author was Julia Acker, MS, a PhD student at the University of California, Berkeley.

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2023 Financial Report

The Division of Research (DOR) is currently home to **67** research scientists and staff scientists, **12** research fellows, and nearly **663** employees. The DOR also has **46** adjunct investigators from within Kaiser Permanente and other academic institutions. DOR's scientists are involved in **619** ongoing research projects and the Kaiser Permanente Northern California Clinical Trials Program supports and guides **347** clinical trials. Since 2000, DOR researchers have published more than **7,000** peer-reviewed articles, including **556** papers in 2023 alone.

2023 TOTAL REVENUE: \$133.17 MILLION



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

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