

Care Improvement Research Team

Kaiser Permanente Southern California | 2021 Annual Report





Message from the Directors

In 2021, we celebrated the availability of the COVID-19 vaccine and the promise of some semblance of “normal” life. The Care Improvement Research Team funding portfolio reflects this pivot in the pandemic as well as ongoing efforts to improve the quality of acute, chronic, and serious illness care across the continuum in Kaiser Permanente Southern California.



We appreciate the continued support and executive sponsorship of Nancy Gin, MD, FACP, regional medical director for Quality and Clinical Analysis, and Benjamin Broder, MD, PhD, assistant medical director for Quality and Clinical Analysis and interim senior director of research for the Southern California Permanente Medical Group.

As we look to the future and a transition in the CIRT leadership, we are heartened by the many collaborative research-clinical partnerships that CIRT has catalyzed to achieve the Department of Research & Evaluation’s mission of having “a demonstrable positive impact on health and well-being” of our members and communities.

Adam L. Sharp, MD, MSc
CIRT Director, 2020–2021

Huong Q. Nguyen, PhD, RN
Interim CIRT Director, 2022

Photo captions

Front cover: Dr. Amandeep Sahota in her office at the Los Angeles Medical Center

Top: Dr. Benjamin Broder, Dr. David Glass, and Dr. Brian Mittman in the cafeteria at Walnut Center

Opposite page, top: Part of the CIRT team met up during the Healthcare Systems Research Network conference in Pasadena in April 2022. Left to right: Dr. Bruno Lewin, Dr. Matthew Mefford, Jessica Vallejo, Angel Alem, Dr. Hui Zhou, Thearis Osuji, Dr. Bing Han, Dr. Huong Nguyen, Dr. Ernest Shen, In-Lu Amy Liu, Dr. Stacy Park, Dr. Benjamin Broder, Natalie Firmeza, and Dr. Claudia Nau



Care Improvement Research Team

Kaiser Permanente Southern California

CIRT works to build capacity for research embedded in clinical practice. The team aims to improve access, quality, and affordability of care delivery, and the health of patients, families, and communities. CIRT initiated and continued 13 projects during 2021.

Ongoing projects

Developing and testing an equitable risk stratification tool to identify patients for serious illness care in the era of COVID-19

— Claudia Nau, PhD

Background: Patients with serious illness often receive SPC (Specialty Palliative Care) at the end of life. Kaiser Permanente Southern California wanted to participate in national efforts to develop a decision-support tool for planning and early identification of patients who need SPC, including those with COVID-19. This study supports the Kaiser Permanente Dignified Journeys regional team in evaluating and comparing end-of-life indices, including the EPIC End of Life Care Index, and other usable, diverse, and inclusive tools.



Key results:

- A high-performing model was developed to identify patients who are likely and very unlikely to need palliative care.
- The model capitalizes on the strength of risk scores, and input from clinicians and literature.
- The model is thought to be the first end-of-life decision-support tool accounting for COVID-19.
- The model was assessed for statistical fairness and was improved to provide high and comparable performance for all ethnic and racial populations.
- The tool helps support a staged approach to serious illness care. It may improve shared decision-making, timeliness, access to palliative medicine, and allocation of health care resources.

Ongoing projects

continued

Impact/ongoing work:

- The abstract was accepted by California State University's San Marcos National Symposium on Academic Palliative Care Education and Research.
- The poster was presented to the American Academy of Hospice and Palliative Medicine.
- The summary of work was shared with regional palliative care chiefs.
- The model's statistical fairness was assessed and improved.
- Clinician validation is planned.
- Publication is planned on Kaiser Permanente model and statistical fairness assessment of existing models.

Implementing systematic depression screening in medical oncology

— Erin E. Hahn, PhD, MPH

Background: The American Society of Clinical Oncology and other organizations recommend screening cancer patients for depression. Kaiser Permanente Southern California understands that addressing depression can improve patient outcomes and foster excellence in cancer care. The study partnered with the Southern California Permanente Medical Group to launch a depression screening program for all newly diagnosed cancer patients. It includes technology to support the implementation of a screening system, training of oncology and depression care teams, and rollout and monitoring of a well-functioning system.



Key results:

- More than half of all Kaiser Permanente oncology patients (approximately 4,000) were screened and rated for depression risk, from low to high. Approximately 83% of patients scored low risk, 15% moderate, and 2% high. Those with moderate and high risk were referred to behavioral health services.
- Depression screening is critically important and feasible to achieve.



Dr. Claudia Nau, principal investigator for one of the 2021 CIRT projects, with R&E colleague Dr. Corinna Koebnick at the Pasadena Convention Center

- Patients who might not be screened for depression elsewhere, or in treatment with a behavioral health clinician, were identified and referred for follow-up. This is a core goal of Kaiser Permanente's complete-care approach.
- Ongoing work includes providing support and training to clinical teams, modifying the program for each medical center's needs, and an assessment of screening and referral outcomes.

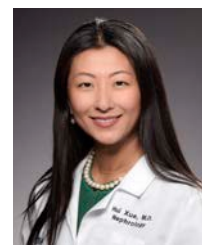
Impact/ongoing work:

- Study results were published in *JAMA*, presented at the American Society of Clinical Oncology Quality Symposium, and submitted to other publications.
- Presentations were made to SCPMG oncology chiefs, behavioral health specialists, and the Kaiser Permanente National Oncology Workgroup.

Observed role of cooling on hemodynamics in inpatient dialysis (ORCHID)

— Hui Xue, MD, MMSc

Background: Hemodialysis patients are 10 to 30 times more likely to have cardiovascular morbidity and mortality. Intradialytic hypotension occurs in 20 to 40% of all dialysis treatments. Cooling dialysate to $<36.5^{\circ}\text{C}$ has improved outcomes for outpatients, but little is known about inpatients in acute physiologic distress who are at maximum



vasoconstriction. This study tested whether cooling dialysate in the inpatient setting prevents intradialytic hypotension.

Key results:

- Project compared the rate of intradialytic hypotension using dialysate at different temperatures.
- Expected outcome will save costs and reduce hospital stays by preventing intradialytic hypotension, or improved comfort for patients, by ceasing the practice of decreasing the temperature of the dialysate.
- Improved processes and/or outcomes.

Impact/ongoing work:

- 8 inpatient hospitals are participating in the first phase of temperature intervention, including West Los Angeles Medical Center; Los Angeles Medical Center; and sites in San Bernardino, Orange County, and San Diego.
- Results will be shared with chiefs at regional leadership meetings.

Piloting approaches to improve cultural sensitivity and humility in the care of patients with depression

— Karen J. Coleman, PhD, MS

Background: The study set out to develop a culturally sensitive shared decision-making process to improve depression treatment options in primary care. It also focused on creating a system to train therapists and depression care managers in cultural humility principles to improve therapeutic alliance and patient adherence to depression treatment.



Key results:

- A culturally sensitive shared decision-making tool for depression was created and widely distributed to depression care management teams for use and feedback.
- Patients and providers are being interviewed about their depression care experiences to



Dr. Nancy Gin, one of the executive sponsors of CIRT, at her office in Walnut Center

better understand which facilitators and barriers impact treating depression effectively in primary care.

- A core team of therapists and department administrators have been trained in cultural humility. The training is being shared, and its impact evaluated, on the therapist/patient alliance and a patient's return to treatment.
- The project serves the research, training, and dissertation needs of students at RAND and the Kaiser Permanente Bernard J. Tyson School of Medicine.

Impact/ongoing work:

- The research team continues to work with physicians, providers, and patients to develop, test, and implement tools, curricula, and processes to provide the best depression care.

Venous thromboembolism prevention in high-risk abdominal surgery patients

— Michael K. Gould, MD, MS

Background: Kaiser Permanente implements all possible safety measures to prevent VTE (venous thromboembolism), or blood clots, during hospitalization. VTE is especially common following discharge after abdominal surgery for cancer and other non-elective abdominal procedures. Patients who have extended preventive treatment at home can reduce VTE by 50%, and avoid bleeding complications. Kaiser Permanente Southern California designed,



Ongoing projects

continued

implemented, and evaluated an at-home intervention to prevent VTE that includes extended chemical prevention with heparin.

Key results:

Prior to the implementation of home-based VTE prevention for patients following abdominal surgery, the study found that:

- VTE events were higher than benchmarks from other randomized controlled trials occurring in 44 of 1,872 procedures (2.4%).
- About half of all VTE events occurred less than 30 days after discharge.
- More than 90% of patients received chemical prophylaxis, including 91% of patients with VTE.
- Only 5% of patients received extended duration prophylaxis.

Impact/ongoing work:

- The team will collaborate with chiefs of general surgery to implement and evaluate new order sets and information sheets for extended duration prevention. The team will also publish the results.

Enhanced implementation of lung cancer screening and pulmonary nodule evaluation

— Michael K. Gould, MD, MS

Background: As part of its National Strategic Plan for Cancer Care, Kaiser Permanente Southern California is committed to reducing lung cancer deaths. The organization is improving its regional lung cancer screening practices, including processes for patient selection, test ordering, results reporting, and follow-up. In addition, Kaiser Permanente wants to improve benchmarking data, and to develop standardized practices to evaluate pulmonary nodules detected by screening.

Key results:

Three important barriers to successful screening were identified:

- Uncertain eligibility: Details about smoking intensity and the number of years since quitting – 2 key criteria to determine screening



CIRT Administrative Lead Natalie Firmeza with CIRT Program Manager Angel Alem at the Pasadena Convention Center

eligibility—were missing for about 30% of members who are smokers or have smoked.

- Gaps in appropriateness: Almost 50% of patients who were screened didn't meet standard eligibility requirements.
- Limited uptake: Out of an eligible population of 14,000, only about 5,000 low-dose CT scans were performed in 2020.

Impact/ongoing work:

- Developed and implemented updated ordering sets for scheduling low-dose CT, including built-in alerts, and provider education materials and templates for reporting results.
- Collaborating with the Inter-Regional Cancer Care Team to improve patient adherence with repeat annual screening.

Implementation and evaluation of an enhanced Adverse Childhood Experiences (ACEs) screening and referral system in pediatric primary care

— Sonya Negriff, PhD

Background: Children who have ACEs (adverse childhood experiences) have poor physical and mental health, especially in minority and low-income families. Screening children for ACEs at a pediatric visit is recommended throughout California. The study tested an individualized approach to screen children with ACEs, and a referral process using a social-



worker triage system. The study also assessed the effectiveness of case-manager follow-up services.

Key results:

- An increase in visits to behavioral health services.
- ACEs screening is likely identifying children in need of behavioral health services.
- After implementation of the new screening workflow, children with a positive ACEs screening score were 7.5 times more likely to have a behavioral health visit than before the implementation.
- 57% of families were referred to behavioral health services and/or parenting classes.
- Referral completion is low, with only half keeping referral appointments.

Impact/ongoing work:

- Results were shared with pediatric, social work, and psychiatry partners at the Bellflower Medical Office.
- Results will be presented to regional leadership as part of the regional ACEs screening rollout.
- The abstract was accepted by the Health Care Systems Research Network.

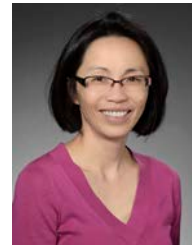


Dr. Cheng-wei (Charlie) Huang, one of CIRT's clinical collaborators, at the healing garden at the Los Angeles Medical Center

Improving care transitions and reducing (re)admissions

— Huong Q. Nguyen, PhD, RN

Background: Since 30-day readmission rates affect Medicare 5-star ratings and financial penalties, reducing avoidable readmission without causing patient harm is a high priority for Kaiser Permanente Southern California. This study describes the sociodemographic and clinical factors associated with the completion of in-person and telehealth follow-up visits within 7 days of hospital discharge, and the association between visit completion and 30-day readmissions. The study also assessed patient satisfaction with a new post-hospitalization home-delivered meal benefit, and sought ways to improve implementation of the program.



Key results:

- A dramatic shift from in-person to telehealth follow-up visits during the COVID-19 pandemic showed no remarkable effect on 30-day readmission rates.
- Telehealth may provide more equitable access to follow-up care.
- Three of 4 survey respondents found home-delivered meals helpful for their post-hospital recovery. Frail members, diabetics, and those more likely to have poorer outcomes did not find the meals as helpful. Common complaints included that the food was too salty, sweet, or heavy.

Impact/ongoing work:

- Findings/recommendations were presented to the Kaiser Permanente Southern California Readmission Reduction Steering Committee, Medicare Strategy Team, and Heart Failure champions. External dissemination is in process.
- Planned work continues to assess patient satisfaction with delivered meals, and to examine the association between receiving meals and a 60-day health care utilization.

Ongoing projects

continued

A Bayesian latent phenotype model to estimate risk for COVID-19 in the presence or multiple and/or missing biomarker data

— Ernest Shen, PhD

Background: COVID-19 knowledge has improved markedly over the last year and has resolved some drawbacks to testing and diagnostic data. But work still remains. Building on the efforts of a COPD cohort at Kaiser Permanente Southern California, this study developed a Bayesian Latent Variable (LV) model that incorporates various and potentially different clinical indicators of COVID-19, including missing diagnostic markers and relevant patient covariates. The team used a COVAS cohort of suspected COVID-19 cases. COVAS (Comorbidities, Obesity [BMI], Vital signs, Age, and Sex) is an assessment tool developed by Kaiser Permanente to ensure that patients with COVID-19 symptoms get the right care by accurately predicting the probability of experiencing severe disease or death. Since Kaiser Permanente has gold-standard measurements for phenotyping a subset of the COVAS cohort, this should avoid previous issues for latent phenotype models.



Key results:

The project updated the 2021 models to include:

- Lack of convergence for several variables from the initial model version, and a further reduction in the variable set.
- Reduced previous variables, including missing indicators, from 93 to between 10 and 15, plus a few missing indicators.
- Continuous work on tuning prior specification and other Markov Chain Monte Carlo parameters, to achieve model convergence for the reduced set.

Impact/ongoing work:

- Comparing the phenotype assignment from the LV model to rule-based assignment using information from any of the following: 1) a single diagnostic test, 2) a series of diagnostic tests,

3) diagnostic tests and codes, and 4) any other combination of factors that are measurable in an electronic health record.

- Conducting external validation of the model in predicting the COVID-19 phenotype in the COVAS cohort, using a more recent cohort in which testing was better established.

Completed projects

COVID long-hauler study: patient-reported outcomes

— David Glass, PhD

Background: A portion of COVID-19 survivors, known as long-haulers, experience symptoms and complications weeks and months after recovery. Kaiser Permanente Southern California sought to better understand who becomes a long-hauler and why, and how many COVID survivors still feel ill months after recovery. The study focused on survivors 2 to 10 months after testing positive for COVID-19.



Key results:

1,650 Kaiser Permanente members who had COVID-19 completed a survey. The response rate was 32%. The survey found that:

- 27% of survivors are long-haulers, reporting symptoms “now and then” or “continuously” more than 2 months after testing positive.
- The prevalence of long-haulers remains constant across the months – constituting, for example, 28% of survivors who are 7 months out from testing positive.
- 7% of survivors reported experiencing symptoms in the previous week.
- The long-haulers, while all reporting COVID-related symptoms, are not equally healthy. Three segments of long-haulers were identified as healthier, mixed health, and severely sick.
- Those reporting severe symptoms constitute 20% of all long-haulers, and seem likely to need the most support and care.

Impact:

- Preliminary results were shared with SCPMG's Post Acute Sequelae Syndrome (PASC, or long COVID) workgroup.
- Results were shared at the Interregional PASC Interregional Leaders Meeting.
- There are plans for manuscript publication submission.
- There is a planned follow-up for qualitative, in-depth interviews with long-haulers.

Evaluating the impact of high-sensitivity Troponin implementation on patient outcomes and health care utilization for Kaiser Permanente Southern California members

— Adam L. Sharp, MD, MSc

Background: Chest pain accounts for 8 million annual emergency department visits, and is a leading cause of mortality and morbidity. It's unclear how changing standard Troponin testing will impact serious patient outcomes and KPSC care. The study compared the impact of high-sensitivity Troponin versus the conventional Troponin decision-support algorithm on 30-day outcomes, and high-sensitivity Troponin versus the conventional Troponin decision-support algorithm on hospitalizations and cardiac testing.



Key results:

After testing 17,384 patients at 6 Kaiser Permanente Southern California sites, the study found that:

- High-sensitivity Troponin rollout had no differences in death, and recategorized 2.6% of acute myocardial infarction patients (2% conventional vs. 4.6% high sensitivity).
- High-sensitivity Troponin rollout decreased overall utilization: hospitalization - 2.8%; stress testing - 2.6%; cardiac catheterization or coronary artery bypass graft - 1.7%.
- HEART scores low, moderate, and high remained similar: 88% of patients are categorized as low risk. HEART stands for History, ECG, Age, Risk Factors and Troponin).



Dr. Adam Sharp with R&E colleague Justine De Jesus in front of the convening stairs in the Medical Education Building of the Kaiser Permanente Bernard J. Tyson School of Medicine

Impact:

- Laboratory validation and implementation at all KPSC medical centers.
- Order sets changed and necessary updates to AURA/HealthConnect were coordinated and implemented with the Systems Solutions and Deployment team.

To scan or not to scan: Utilization of transient elastography in a tertiary care center before and after implementation of an electronic medical record-based clinical decision support tool

— Amandeep Sahota, MD

Background: More than 450,000 KPSC patients are diagnosed with fatty liver disease. More patients will likely request early-detection liver screening, especially since drugs are being approved to fight fatty liver disease. Kaiser Permanente sought a unified strategic approach to screen patients, assure quality of care, and foster access. The study looked at the benefits of the Fib-4 AURA-based clinical decision support tool with fibrosis calculator, the most common way to assess liver disease.



Key results:

- The AURA tool increased the number of patients being scanned, and identified significantly more early signs of disease.

Completed projects

continued

- The tool encouraged appropriate care by avoiding costly and invasive liver biopsies, and encouraged more patients with advanced disease to seek treatment.
- Providers at other centers will also recognize the power of the Aura tool.

Impact:

- Presentations to the American Association for the Study of Liver Disease, and submission to the *Annals of Internal Medicine*.

Understanding and supporting COVID-19 vaccine confidence among health care providers at Kaiser Permanente Southern California

— Katia Bruxvoort, PhD, MPH

Background: Vaccine hesitancy is a major threat to controlling the COVID-19 pandemic. Health care providers are patients' trusted sources for COVID-19 vaccination recommendation. High vaccine confidence among health care providers can increase the number of patients getting vaccinated. Prior vaccine studies have found that a provider's recommendation is a strong predictor of a patient's willingness to be vaccinated. To inform strategies to increase COVID-19 vaccine uptake and boost provider certainty in recommending the vaccine, this mixed-method study examined vaccine confidence among health care providers and their adolescent children. The study asked their opinion on the vaccination, how willing they were to recommend it, what influenced hesitancy, and how to improve their certainty on safety and effectiveness.



Key results:

Through brief surveys and phone interviews with health care providers (approximately 3,000 in Phase 1 and 2,000 in Phase 2), the study found that:

- Physicians had the highest level of confidence in vaccine safety and effectiveness compared to other provider types.



Research scientist Dr. Sara Tartof and physician Dr. Bruno Lewin, who leads the Regional Immunization Practice Committee, are among CIRT's many collaborators

- In adjusted analyses, nurses relative to physicians were 15% less likely to perceive the COVID-19 vaccine to be safe, 27% less likely to perceive the vaccine to prevent COVID-19, and 11% less likely to plan to recommend the vaccine to others.
- Hispanic/Latinx providers were 10% less likely to perceive the vaccine as preventing COVID-19 relative to white providers.
- Qualitative themes included: no need for the vaccine, distrusting vaccine research and rollout, caretaking barriers, uncertainty and potential to change one's mind, and framing vaccine decisions around personal beliefs.

Impact:

- Published findings in *JMIR Infodemiology*, the *Journal of Transcultural Nursing*, and *Workplace Health & Safety*. Additional publications are under review and in development.
- Phase 1 findings were presented to the United Nurses Association of California, Kaiser Permanente Southern California's COVID-19 vaccine leaders meeting, and the American Academy of Nursing Health Policy Conference.
- Phase 2 findings were presented at the COVID-19 and flu work groups for LAMC and KPSC and at the KPSC Regional Town Hall.

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Produced in July 2022

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