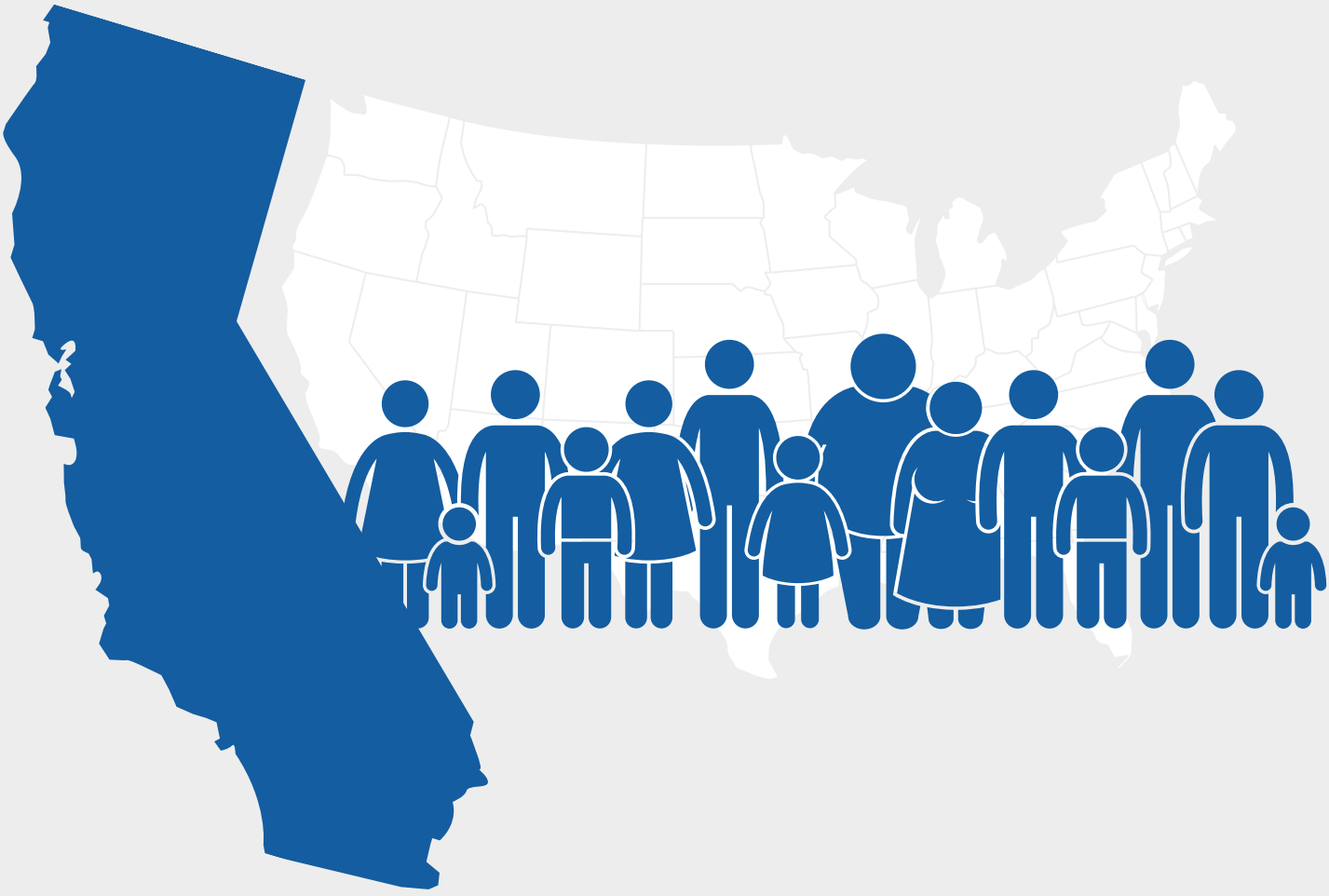
California Initiative to Advance
Precision Medicine

2023 Annual Report



California Initiative to Advance Precision Medicine

2023 ANNUAL REPORT TO THE CALIFORNIA LEGISLATURE

Report prepared by the Governor's Office of Land Use and Climate Innovation (formerly the Governor's Office of Planning and Research):

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EXECUTIVE SUMMARY

Since the Governor's State of the State Address in 2014, the California Initiative to Advance Precision Medicine (CIAPM) has been funding research projects and supporting state and federal efforts at the leading edge of accelerating cross-sector and community-focused biomedical research aimed towards equitable outcomes.

CIAPM recognizes that while historical advances in medicine have occurred in recent years, minoritized communities have not been adequately represented in the biomedical research enterprise. Our program seeks to identify and facilitate meaningful studies, interventions, and collaborations that engage research participants and community-based organizations (CBO) as co-directors toward the ultimate goal of whole-person health care.

Our research projects have been pivotal in developing and integrating novel prevention and treatment strategies and building and deploying data systems that better connect patients, researchers, and health and social care practitioners. CIAPM also bridges collaborations between the state's research, healthcare, nonprofit, government, and biotechnology sectors to hasten the pace of discovery and translation to community impact. Staff and funded investigators have been cited at national and international conferences as pioneers of a new approach to elevating equity through research.

As CIAPM approaches our tenth year, we will launch our fourth research program and evaluate the results of concluded projects. Our goal is to continue defining the types of interventions that eliminate the traditional and costly trial-and-error approach, looking at all aspects of a patient's life, so that the right health strategies are dispatched to the right patients at the right time.

Significant milestones of the CIAPM program in 2023 include the following:

- In support of ARPA-H, the new federal Advanced Research Projects Agency for Health, staff partnered with the University of California Office of the President, McKinsey & Company, and CMG Consortium Management Firm to establish a first-of-its-kind national health innovation network spanning all 50 states plus territories (7,000+ locations) as a network of universities, healthcare systems, industry, venture capital firms, community-based organizations, biotech incubators and accelerators, local and state government agencies, and others, collectively titled the Health BRIIDGE (Bringing Research, Innovation, and Investment to Drive Growth and Equity) Consortium.
- Depression Research Program leadership conducted CIAPM's first-ever state-wide listening sessions and facilitated a Request for Information to gather core insights and information about community needs to shape its Request for Proposals (RFP), which went public in Sep-

tember.

- The program launched the Representative Research Collaborative, entailing the hiring of talent, drafting a landscape analysis and gap assessment, and preparing a Memorandum of Understanding with the National Institutes of Health's (NIH) *All of Us* Research Program.
- CIAPM-funded researchers, past and present, contributed 92 peer-reviewed, in press, or pre-print publications to the field of precision medicine, 91 presentations at domestic and international conferences, and six news stories.
- Staff hosted two research symposia for the Cancer Disparities Research Program and the ACEs Research Program, showcasing project results and facilitating discussions among researchers, community partners, government collaborators, CIAPM Advisors, and others.
- The California Assembly Select Committee on Biotechnology highlighted CIAPM through a public presentation and testimony during an informational hearing on precision medicine and biomanufacturing.
- The CIAPM Director was recognized as the 2023 Government Official of the Year by Biocom California, an award bestowed on federal or state leaders for their contributions to advancing the life sciences.
- Sixteen California-based graduate and undergraduate student interns and fellows joined CIAPM to further programmatic efforts and train in research administration, science policy, and public policy procedures.
- Four annual site visits were conducted of project teams around the state in the Cancer Disparities and Adverse Childhood Experiences (ACEs) Research Programs.
- CIAPM staff, researchers, collaborators, and advisors hosted and presented workshops, panels, and an educational booth at the 2023 Precision Medicine World Conference.

2024 Priorities

- Onboard specialized staff to lead equity and science communications efforts.
- For the new Depression Research Program, facilitate an out-of-state Expert Selection Committee to assess proposals and recommend impactful projects to fund.
- For the Cancer Disparities Research Program, recruit an out-of-state Expert Evaluation Committee and publish a comprehensive Evaluation Report for the Legislature.
- Expand our capability to attract philanthropic investment in precision medicine research.
- Explore potential partnerships with the biomanufacturing sector to further Executive goals of in-state pharmaceutical capabilities.

Recognizing the public and the Legislature's continued interest in the strides CIAPM has made, the Governor's Office of Land Use and Climate Innovation (formerly the Governor's Office of Planning and Research) respectfully submits this report. [Health and Safety Code, Division 110. § 130302, subd. (4)(A)]

MESSAGE FROM THE DIRECTOR

Honorable Members of the State Legislature,

On behalf of the Governor's Office of Land Use and Climate Innovation (formerly the Governor's Office of Planning and Research), we proudly present to you the California Initiative to Advance Precision Medicine (CIAPM) 2023 Annual Report to the California Legislature. Among numerous highlights, this monumental year elevated CIAPM to a national stage as a leader and co-founder of a 50-state cross-sector network, the Health BRIIDGE Consortium, which materialized in support of unprecedented federal investment in high-risk, high-reward health research under the umbrella of a new agency, the Advanced Research Projects Agency for Health (ARPA-H).

As has become CIAPM's signature impact, staff extended beyond expectations and statutory duties to further the promise and potential of a new approach to medical research, centering equity and community-driven, cross-sector collaboration for sustained impact. In preparation of launching a Request for Proposals (RFP) for its new nine-million-dollar Depression Research Program, staff conducted a thorough process to design and implement a framework to award cross-sector research projects that best rise to the needs of underserved communities. Alongside statewide listening sessions with Asian-American/Pacific Islander (AAPI), youth of color, Latinx, tribal, farmworker, and underserved communities, expert informational interviews, an expansive literature review, and a funding gap analysis, CIAPM staff hosted a public Request for Information to finalize the most rigorous evidence-based RFP in the program's history.

Two additional moments from 2023 are worth spotlighting, which exemplify the quality of CIAPM's leadership in the research policy and health equity spheres: 1. In June, the Assembly Select Committee on Biotechnology invited CIAPM to deliver a testimonial at its informational hearing on California's Preeminence in Biotechnology; and 2. In November, CIAPM was recognized by the state life sciences community when its director was named 2023 Government Official of the Year by Biocom California.

From its tireless efforts establishing the nationwide health innovation network, to continuing to lead ten active precision medicine research project teams scattered across all corners of the state, plus engaging the National Institutes of Health in designing a first-ever cooperative agreement to boost representation in biomedical research, CIAPM solidified California State Government's role as a national convener, honest broker, and visionary strategist in the health innovation ecosystem.

To learn more, I invite you to page through this detailed report to better understand the depth and breadth of this small-but-mighty state research program. We thank you for your continued support of CIAPM's important work.

Sincerely,

Samuel Assefa

Director, Governor's Office of Land Use and Climate Innovation (formerly the Governor's Office of Planning and Research)

BACKGROUND AND HISTORY

What is Precision Medicine?

Medical research has been foundational to societal progress, primarily by preventing, treating, and curing diseases and disorders. As scientific research has advanced, so too has our knowledge of the importance of individual differences, from biological and behavioral factors to social and environmental conditions. What works for one person may be the very opposite strategy for another. Greater awareness of the range of variables which impact one's health status has prompted a necessary shift toward a more individualized and whole-person approach.

Precision medicine is used as an umbrella term, representing what is also coined as precision health, individualized or personalized medicine/health, precision population health, precision public health, and other similar, more nuanced fields. This is a modern approach to healthcare and research which better accomodates the uniqueness of patients and communities to tailor prevention, diagnostics, measurements, and treatment plans. In doing so, medicine can better combat their physiological realities, or social determinants of health, including housing and utilities stablity, environmental safety and quality, access to care, education, and nutrition, among others. Advancements in the field of precision medicine have led to the following capabilities:

- Determining the most effective medication depending on an individual's metabolism
- Managing behavioral and environmental risk factors for disease based on a patient's history and life circumstances
- Advancing technologies to pinpoint the cause of infection with a single test, compared to thousands of individual tests
- Tailoring patient care with culturally and linguistically appropriate educational resources
- Applying cutting-edge data science and large datasets to identify appropriate interventions

About CIAPM

CIAPM is a first-of-its-kind state-funded biomedical health research program that is patient-focused and engages stakeholders across community, academic, nonprofit, and private sectors to transform health outcomes and improve health equity. Established in 2015 after first declared a priority in the 2014 State of the State Address, the program has focused on two goals: 1) Designing and implementing a novel approach to fund research which fills knowledge gaps that lead to health disparities; and 2) Convening diverse players across the health and research ecosystems to accelerate the discov-

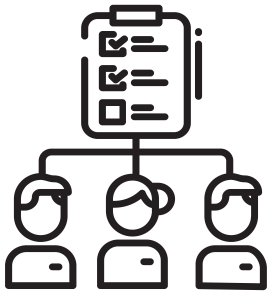
ery-to-impact pipeline. CIAPM's work advances California as a leader in precision medicine by incentivizing and forging new collaborations, sharing knowledge and methodologies across institutions, and enhancing the quality and access to health and social care, especially to those most in need. To better introduce new contributors to research and facilitate cross-sector collaborations, CIAPM hosts the California Precision Medicine Asset Inventory, a publicly available, online searchable database of organizations, projects, datasets, and other entities relevant to precision medicine throughout the state.

CIAPM Allocation of Funds

Budget Year	Budget Appropriation for Precision Medicine (in millions)	Number of Demonstration Projects Funded	Demonstration Project Topics
2014/2015	$3.0	2	• Pediatric cancer • Infectious disease diagnostics
2016/2017	$10.0	6	• Traumatic brain injury • Remote heart monitoring • Mobile mental health devices • Multiple sclerosis • Prostate cancer • Rare diseases
2017/2018	$10.0	3	Cancer health disparities
2018/2019	$30.0*	3-4	Adverse Childhood Experiences (ACEs)
2020	$-18.2**		
2021/2022	$12.415*	3-4	ACEs
2022/2023	$19.25*	3-7	• Depression • Representative Research Collaborative [formerly Equitable Participation in Research]

*Currently funded projects

**In 2020, $18.2 million from CIAPM's 2018/2019 appropriation were diverted to the General Fund to support critical services due to the COVID-19 pandemic.



DEMONSTRATION PROJECTS

The cornerstone of CIAPM is the support of precision medicine research which advances health equity. Demonstration projects are competitively selected, composed of cross-sector partners and center community needs, perspectives, and processes.

In 2023, CIAPM led two ongoing demonstration project programs, addressing the health impacts of Adverse Childhood Experiences (ACEs) and disparities in cancer mortality and access to care. The ACEs Research Program funds seven projects which began in 2021 or 2022. CIAPM funded three cancer disparities projects from 2019 to 2023.

Through the Budget Act of 2022, CIAPM was appropriated funds for the new Depression Research Program to apply precision medicine approaches for the prevention, diagnosis, and treatment of depression and/or depressive disorders. In 2023, CIAPM launched a request for proposals (RFP) for depression research demonstration projects, received proposals, and began the competitive selections process. To inform the development of the RFP, staff jointly hosted listening sessions with community-based organizations and local government agencies throughout California with generous support from the Mental Health Services Oversight and Accountability Commission (MHSOAC), conducted a literature review and drafted a gap assessment and a landscape analysis, administered the first-ever Request for Information, and initiated dozens of informational interviews with out-of-state subject matter experts.

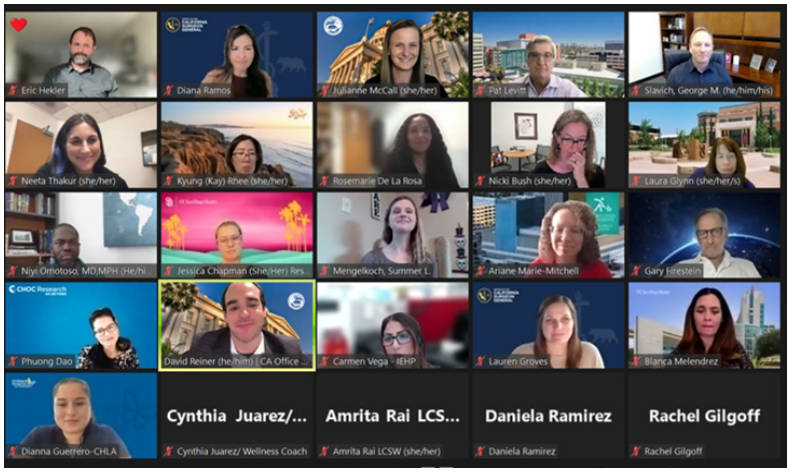
Adverse Childhood Experiences Research Program

ACEs refer to 10 types of adversity that people can experience during their first 17 years of life. These challenges fall into three domains: 1) child abuse, which includes physical, emotional, and sexual abuse; 2) neglect, encompassing both physical and emotional neglect; and 3) household challenges, such as losing a parent, being exposed to a caregiver with untreated mental illness, a family member experiencing substance use or incarceration, undergoing parental separation or divorce, or witnessing instances of intimate partner violence. ACEs can trigger toxic stress, leading to an ongoing and heightened activation of the physiological stress response system during development. This toxic stress can result in enduring physiological changes that put individuals at higher risk for many physical and mental disorders throughout the lifespan.

The burden of ACEs is not equally distributed, with a greater risk of exposure and negative outcomes among individuals in low socioeconomic and minoritized communities. Championed by the State's Surgeons General, Dr. Nadine Burke Harris from 2019-2022 and Dr. Diana Ramos since 2022, ACEs have been a priority of the Newsom Administration, leveraging existing leadership and long-term efforts across state agencies, including at the Departments of Health Care Services, Public Health, and Social Services and MHSOAC. CIAPM's support of ACEs research seeks to advance new methods to address the health impacts of ACEs through a collaborative precision medicine and community-centered approach.

Research Symposium

On November 1, 2023, CIAPM virtually hosted its annual ACEs Research Symposium. CIAPM's Drs. Julianne McCall and David Reiner overviewed the research portfolio and California Surgeon General Dr. Diana Ramos provided opening remarks. ACEs research team leads from Children's Hospital Los Angeles, Stanford University, Loma Linda University, UC Irvine, UC Los Angeles, UC San Francisco, and UC San Diego gave brief presentations of their projects, and project team members engaged in rich discussions of challenges and lessons learned regarding measuring ACEs and ACEs-related biological markers and health conditions, as well as opportunities for additional collaborations and sustainability.



Caption: The 2023 Annual Symposium for Adverse Childhood Experiences Research engaged scientific and community research team leaders from all seven state-funded projects as well as California government officials.

Site visits

A critical element of the partnership between CIAPM and its funded researchers is the opportunity to visit the project teams on location. ACEs project teams coordinated with CIAPM staff and led site visits to satisfy contractual goals of touring facilities and showcasing cutting-edge equipment, meeting community partners and other cross-sector leaders and collaborators, learning about milestones achieved and challenges experienced, hearing directly from trainees, and engaging in fruitful discussions about research directions and impacts, among other activities.

Summaries of ACEs Projects

Scalable Measurement and Clinical Deployment of Mitochondrial Biomarkers of Toxic Stress (2021–2024)

Lead Principal Investigator: Dr. Pat Levitt, Children's Hospital Los Angeles

Partners (listed alphabetically): Fiesta Educativa, Inc.; Kaiser Permanente of Southern California; Karsh Family Social Service Center; Maternal Mental Health Now; Para Los Niños; St. Anne's Family Services; Ventura County Medical Center

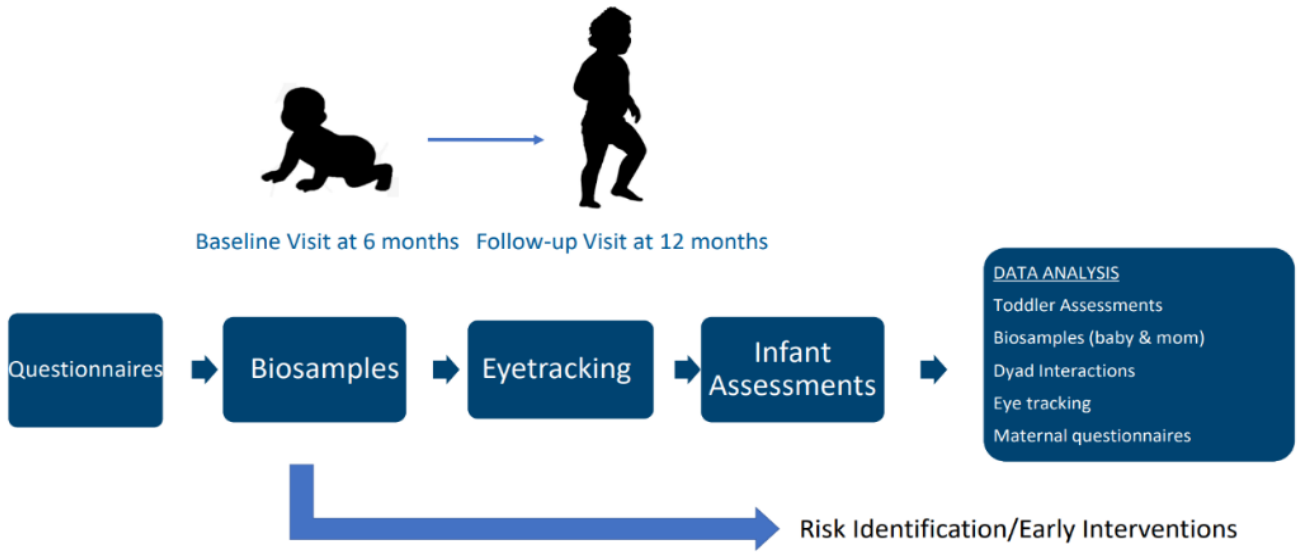
The best health outcomes can be achieved by identifying infants at the greatest risk for ACEs and toxic stress and intervening early to reduce the likelihood of negative health outcomes. Dr. Levitt's project aims to develop a comprehensive precision medicine approach for this early screening, by combining questionnaires with innovative laboratory assessments of metabolic health, a key indicator of toxic stress. To achieve this, the CHLA team and its community partners, including Kaiser Permanente of Southern California and Ventura County Medical Center, are recruiting 300 mother-infant pairs, seen at six and twelve months. The CHLA team strives to close the equity gap in access to quality behavioral health programs for families through screening and a greater understanding of infant-caregiver well-being.

In 2023, the CHLA team continued enrollment in their study, reaching a cumulative enrollment of 210 infant-mother pairs by December 2023, with almost 75% completing the 12-month follow-up. Only 5 families left the study after the 6-month visit. The CHLA team is also pursuing long-term follow-up visits, supported by outside funds, and has seen two infant-caregiver pairs at 24-months. For assessment of ACEs, approximately 26% of mothers confirmed 4 or more ACEs, exceeding the reported epidemiological data from California of 17%. In an ongoing analysis of 148 mothers, the CHLA team found a statistically significant relationship between ACEs score and their score on the Patient Health Questionnaire-9 (PHQ-9, assessment of depression symptoms) at both 6 and 12 months and at 12 months for the Perceived Stress Scale (PSS).

Led by the CHLA Center for Personalized Medicine, the team developed a robust procedure for measuring metabolic health using mitochondrial genetics from cheek swab samples. The CHLA team verified quality control assessments of samples from infant-caregiver pairs and is proceeding with data analysis to assess metabolic health and determine correlations with other study measures. In addition, the CHLA team is also monitoring attention using a novel eye tracking technique, measuring infant-caregiver interactions to assess attachment and social engagement, and assessing heart rate variability, a noninvasive way to measure potential imbalances in the brain-body connection.

The CHLA team continued to hold Community Advisory Committee (CAC) meetings in 2023, in which they summarized research program progress, discussed recruitment and retention, and disseminated the study newsletter. Composed of Fiesta Educativa, St. Anne's Family Services, Maternal Mental Health Now, Para los Niños, and the Karsh Family Social Service Center, the CAC helps the research team in recruitment efforts, development of visual aids, and understanding research from the community perspective. The CHLA team has trained a computer science graduate student, a neonatologist clinical fellow, and a postdoctoral fellow. The CHLA team also participates in regular meetings on clinical research, metabolic biomarker, developmental neuroscience, and child brain development. Additionally, enrollment for a newly created Master's Program in Developmental Origins of Health and Disease at the University of Southern California is planned for Fall 2024. In 2024, the CHLA team will continue to work towards their recruitment and study goals and analyze the clinical assessments and laboratory measures.

CIAPM-ACEs Funded Protocol Studying Neurodevelopment Across Childhood



Caption: Protocol of CHLA's ACEs research project showing assessments of questionnaires, biosamples, eye-tracking, and infant-caregiver interactions at 6 and 12 months. Following data analysis, the team will develop methods for risk identification for early interventions.

A Multi-Component Intervention to Strengthen Families and Build Youth Resilience (2021-2024)

Lead Principal Investigator: Dr. Ariane Marie-Mitchell, Loma Linda University

Partners (listed alphabetically): FIRST 5 San Bernardino; Help Me Grow Inland Empire; Inland Empire Health Plan; Loma Linda University Faculty Medical Group; Loma Linda University Institute for Community Partnerships; San Bernardino City Unified School District; Social Action Community Health in San Bernardino; University of California, Los Angeles; Walden Family Services

Health and education systems are often fragmented and fail to accommodate families based upon different levels of need. Dr. Marie-Mitchell's directed project uses Health, Education, And Learning (HEAL) partnerships with pediatricians, community health workers (CHWs) and Nurturing Families (NF) educators to optimize the delivery of vital information and resources to a diverse population of families with ACEs. The LLU team coordinates regularly with Social Action Community (SAC) Health System, Inland Empire Health Plan, Help Me Grow Inland Empire, Walden Family Services, LLU Faculty Clinics and LLU Institute for Community Partnerships.

To carry out the project, pediatricians, CHWs, and NF educators are trained in an evidence-informed curriculum called Families Implementing Resilient Systems Together (FIRST). To evaluate the efficacy of HEAL FIRST, pediatric patients will be invited to participate in repeat evaluations within 2 weeks, 3 months, 6 months and 12 months after their well-child visit. Pediatricians initiate the referral process to CHWs and NF educators and are randomized to training in FIRST (intervention) or no training (usual well-child care control). The LLU team collects data on ACEs, biomarkers of toxic stress, child health and psychosocial problems, and potential mediators and moderators.

Through 2023, the LLU team has trained a total of 184 residents and 40 faculty in Pediatrics and Family Medicine, 9 CHWs, and 8 NF educators in the FIRST curriculum. To verify the success of the training for medical providers, the LLU team completed a chart review of encounters at SAC. Trained medical providers are more likely to document counseling about ACEs and include education handouts about ACEs and resilience compared to untrained providers. The LLU team implemented a new referral order and algorithm in August 2023, resulting in meeting the target goal of at least 60 referrals per month at the SAC clinic and representing approximately 10% of all well-childcare visits. Approximately 1/3 of medical provider referrals resulted in successful contact with a CHW, and ~65% of these families remained in contact with the CHW for over 6 months. In total, CHWs made assessments of over 400 families, connecting them to a range of community resources, including distribution of goods, behavioral health for adults, parenting support, and dental care. Over 250 referrals have been sent from study clinics to Walden Families Services to date. Although families may express initial interest in participating in the parenting curriculum to the pediatrician and NF educator, follow

through with attending workshops, either in person or online, has been low (about 30 clinic families have participated in one or more workshops). The LLU team is continuing to try different workflows and outreach strategies to increase family participation in parenting workshops.

Through 2023, the LLU team has recruited 104 participants, which represents 48% of the no ACEs comparison group, 30% of the ACEs control group and 22% of the ACEs intervention group, and have completed 49 three-month follow-up visits, 33 six-month follow-up visits, and 22 twelve-month visits. In 2024, the LLU team will continue trainings in the FIRST curriculum and develop strategies for disseminating these trainings. In addition, the LLU team will continue to streamline referral processes, recruit subjects, conduct Family Voice interviews and work with clinic and community partners to implement new strategies to increase participation in the study.

Caption: Recruitment flyers in English (left) and Spanish (right) to participate in Loma Linda's CIAPM-supported ACEs research study to build resilient families.

Systems-based, Multidisciplinary Assessment of Adversity and Toxic Stress for Individualized Care (The SYSTEMAATIC Project) (2022-2025)

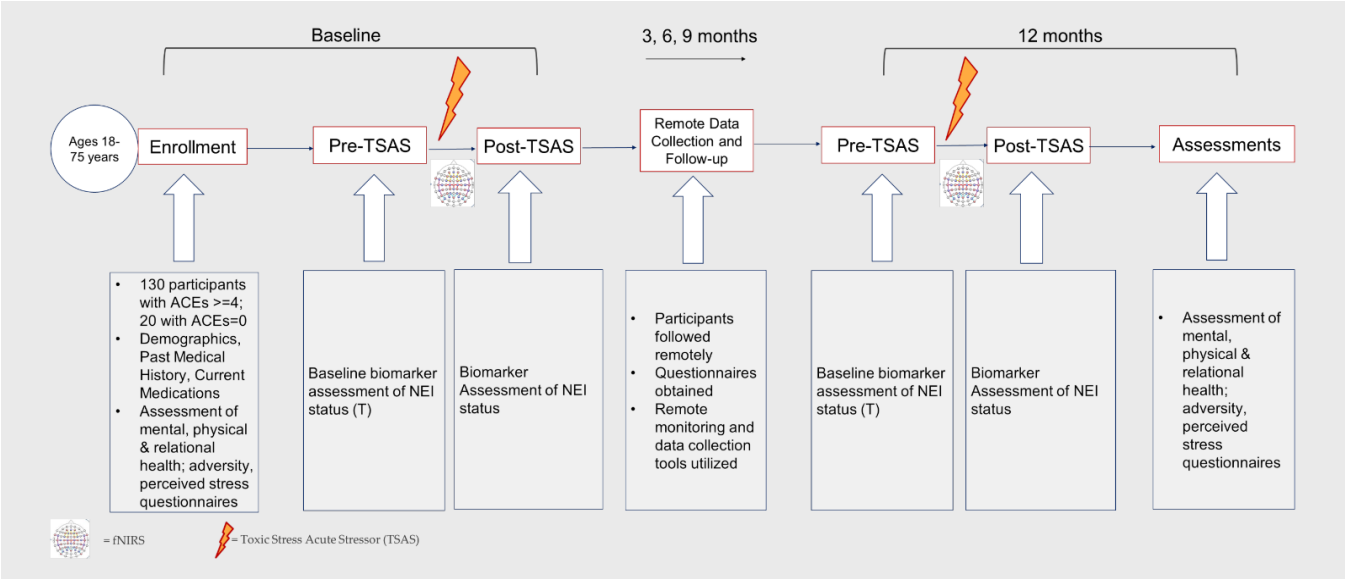
Lead Principal Investigator: Dr. Sayantani Sindher

Partners (listed alphabetically): California Health Collaborative; Center for Youth Wellness/Safe and

Sound; Central Valley Community Foundation; Federally Qualified Health Center (FQHC) clinics of San Mateo Medical Center; Fresno Community Health Improvement Partnership; Sean N. Parker Center for Allergy & Asthma; South San Francisco Clinic; Stanford Precision Health for Ethnic and Racial Equity; The Primary School in Palo Alto

The main goal of the SYSTEMAATIC project is to use precision medicine approaches to develop a multidisciplinary toxic stress assessment profile that identifies disruptions in the neurologic, endocrine, and immune (NEI) pathways under stress and pilot the feasibility, adaptability, and validity of this assessment profile and impact of available resources within partner clinics and organizations.

To achieve these goals, the Stanford team is recruiting adults that experienced 4 or more adverse childhood experiences/events (ACEs) compared to adults that do not experience any ACEs to assess toxic stress and the response to an acute stressor at 0 and 12 months (see figure below for study design). To identify biomarker patterns in adults impacted by ACEs that predict dysregulation of biological systems, the Stanford team measures changes across the NEI pathways, including a toxic stress assessment panel, stress-related biomarkers, a protective biomarker, and neurological activity with functional near-infrared spectroscopy. Participants also complete surveys on mental, physical, and relational health during the 12 months of the study. This information will be used to develop a pre-and post-Toxic Stress Assessment Profile to evaluate changes in NEI system biomarkers.



Caption: Schematic of Stanford's ACEs research project, showing data collected at baseline and 12 months, participant criteria, and assessments. [1) Enrollment phase of participants 18-75 years old,

including data like demographics, past medical history, current medications, label participants with and without ACEs, assess mental, physical and relational health, adversity, and perceived stress. 2) Pre-psychosocial stress test with a baseline biomarker analysis of toxic stress. 3) Post-psychosocial stress test with biomarker analysis. 4) Remote data collection and follow up for 12 months, including remote follow up, obtaining questionnaires. 5) After 12 months, pre-psychosocial stress test baseline biomarker analysis for toxic stress. 6) Post-psychosocial stress test with biomarker analysis. 7) Assessment of physical, mental, and relational health, adversity, and perceived stress]

In 2023, the Stanford team initiated a collaboration with the California Health Collaborative and Fresno Community Health Improvement Partnership to set up a clinical site to expand the participant cohort to Fresno. The Stanford team developed the toxic stress assessment profile to evaluate the impact of stress on participants' health outcomes and enhance the trial's ability to assess treatment efficacy comprehensively. The team further established the regulatory approvals and infrastructure for the project to ensure smooth operations, reliable data collection, and recruitment of study participants at all sites. The team also made substantial progress in establishing a biobank of collected samples, laying the foundation for future investigations and enabling comprehensive analyses beyond the scope of the current trial. The Stanford team facilitates the career development of junior staff by mentoring and training students through a wide range of programs. This program has previously mentored 3 students, which facilitated their successful completion of their master's degrees and advanced their career goals.

In 2024, the Stanford team will collect the first round of toxic stress assessments, including biomarker collection, complete the one-year follow-up assessments, and begin enrolling participants with their community partner in Fresno to expand the collection of study data. Community ambassadors will coordinate focus groups to facilitate protocol refinement and support study participants by connecting them with appropriate interventions. Lastly, the Stanford team will collaborate with university colleagues to identify the key neurological structures for study, enriching the trial's scientific approach and deepening understanding of the condition's underlying neurological mechanisms.

Using Precision Medicine to Tackle Impacts of Adverse and Unpredictable Experiences on Children's Neurodevelopment (2021–2024): The SoCal Kids Study

Lead Principal Investigator: Dr. Tallie Z. Baram, University of California, Irvine (UCI)

Partners (listed alphabetically): Allevato Pediatrics; Chapman University; Children's Hospital of Orange County (CHOC); CHOC Health Center Centrum; CHOC Health Center Garden Grove; CHOC Primary

Care Network; Clínica CHOC Para Niños; First 5 Orange County; Illumina, Inc.; Illumination Foundation; Los Alamitos Pediatrics; Madison Park Neighborhood Association; MOMS Orange County; Orange County Health Care Agency; Orange Doctors of Kids and Teens; Pediatric and Adult Medicine; Premier Pediatrics; Santa Ana Boys & Girls Club; Sea View Pediatrics; Simms/Mann Family Foundation; Southern Orange County Pediatric Associates; Syntropy Technologies, LLC; Total Pediatrics of Orange County; University of California Irvine Institute for Clinical and Translational Science

There is a critical need for providers to be able to quickly determine which children who have been exposed to ACEs are most at risk for poor health outcomes so that interventions can be delivered where needed most urgently. Dr. Baram's project has two goals: (1) to better understand the role of a novel ACE—unpredictability of caretakers and environment—in influencing neurodevelopment and (2) to discover a biomarker that predicts a child's intrinsic level of vulnerability or resilience to all ACEs.

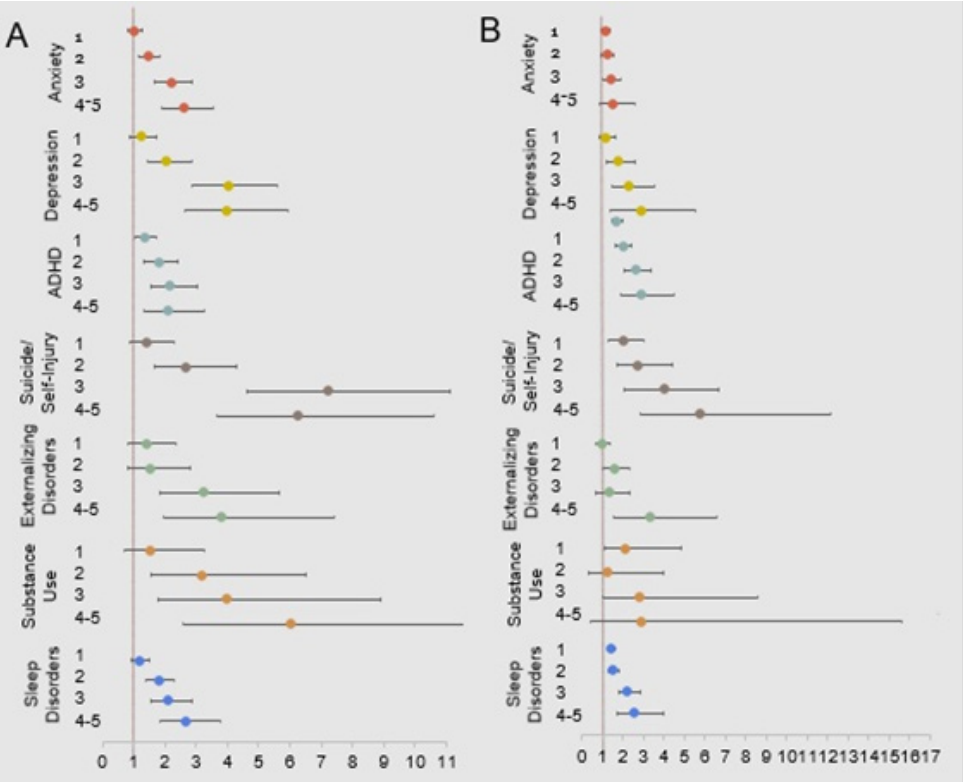
To achieve the first goal, the collaborative UCI, Chapman University, and Children's Hospital Orange County (CHOC) team are testing a screening instrument for unpredictability in childhood (Questionnaire of Unpredictability in Childhood; QUIC) to enhance the precision of identifying children at risk for neurodevelopmental problems beyond predictions offered by existing ACEs screening. The team aims to assess correlations between the pediatric ACEs screen (PEARLS), QUIC, and a range of neurodevelopmental and mental health outcomes. To achieve the second goal, the team is collecting cheek/saliva samples at birth and at 12-months of age to identify changes in a biomarker, DNA methylation, in infants exposed to ACEs who are vulnerable, and differentiate from those who are resilient.

Through 2023, the UCI, Chapman, and CHOC team has received 45,000 QUIC screens from clinics across Orange County that serve families of diverse socioeconomic status and race/ethnic backgrounds representative of the county and California. Exciting preliminary data indicates that both child and caregiver reports of unpredictability associate with risk for a range of child mental health conditions (see next figure). The team has recruited 156 newborns into the biomarker study, surpassing their goal of 120, and have collected 95 samples at the 1-year timepoint. The team obtained promising results in a preliminary analysis of DNA methylation from a pilot sample, enabling correlations between this biomarker and study outcomes.

To guide the research process, the team held a series of Community Engagement Studios, a structured program to enhance design, implementation, and dissemination of research studies by gathering project-specific input from relevant community stakeholders. During these studio sessions, the team gathered key perspectives on challenges and recommendations for conducting a research study on ACEs, biomarkers, and health with CHOC physicians and allied health providers as well as a group of Orange County mothers. The team is in the final stages of drafting a manuscript for publication based on the Community Engagement Studios. The team also continues to meet quarterly with

their Community Advisory Board, which provides excellent feedback about recruitment efforts, study measures, research questions and analysis. In 2023, the team trained 5 undergraduate students, 3 post-baccalaureate trainees, one graduate student, and one postdoc across the UCI and Chapman sites.

In 2024, the team will continue screening and analyses linking the QUIC-5 and PEARLS data to the child mental and physical health outcomes, conclude the 6-month infant assessments, continue to conduct study assessments at 12 and 18 months of age and the first assessment at 2 years of age. The team will also continue collecting and analyzing samples to identify biomarker changes. They also will work towards publication of findings from the Community Engagement Studios and continue meetings with the Community Advisory Board.



Caption: Child (left) and caregiver (right) reports of unpredictability in the home obtained from screening in pediatric primary care predicts child mental health. The data show the likelihood of specific mental and behavioral health conditions, based on unpredictability in the home (1 more predictable, 5 more unpredictable).

Identifying Social, Molecular, & Immunological Processes for Mitigating Toxic Stress & Enhancing Personalized Resilience (2021-2024)

Lead Principal Investigator: Dr. George Slavich, UCLA

Partners (listed alphabetically): All Children Thrive, Am I Hungry Organization; Burnham Benefits; Donna Jackson Nakazawa; Los Angeles County Department of Health Services; Nutritious Movement; Palo Alto University; Stanford University; UC Berkeley; UC Health; UCLA Online Teaching and Learning Team; UCLA STAND Program; UCLA-UCSF ACEs Aware Family Resilience Network (UCAAN); UCSF; Yale University

Through engagement in educational, training, and scientific activities related to stress, health, and resilience, Dr. Slavich and his team aim to mitigate toxic stress effects and enhance personalized resilience in California and beyond. To achieve these goals, the UCLA team developed the California Stress, Trauma, & Resilience (CAL STAR) Network, which presently includes eight UC campuses and Stanford University.

For their educational and training activities, the UCLA team is developing a Massive Open Online Course (MOOC) and a research training program on stress, health, and resilience. The UCLA team developed the MOOC for a wide audience with speakers who are experts in psychology, public health, and medicine, as well as individuals with lived experience. The research training program is designed for researchers and clinicians to develop and sharpen their interests. Altogether, the UCLA team aims to train future leaders, build the workforce needed to reduce toxic stress effects, and develop programs devoted to enhancing health and wellbeing.

For their research activities, the UCLA team is monitoring the stress levels and physiological and biological functioning of 725 adults using state-of-the-art tools for life stress and ACEs assessment, including mobile/smartwatch physiologic assessments, non-invasive blood microsampling, biomarker assessments, and electronic health record (EHR) mining and analysis. In their intervention study, these data inform the delivery of personalized online resiliency training for up to 425 high-stress participants by targeting five key pathways that are commonly dysregulated by stress: thinking style, social relationship, eating, sleep, and physical activity.

In 2023, the UCLA team completed recruitment of MOOC speakers and video recording of ~20 minute lectures with all 25 content experts. The UCLA team also received additional grant funding for the MOOC from the UCLA-UCSF ACEs Aware Family Resilience Network (UCAAN) and the Association for Psychological Science, which enabled additional recording materials the ability to properly compensate speakers for their contributions. The UCLA team also launched the research training program in October 2023, with 125 participants from 93 universities, 22 U.S. states, and 17 countries.

For research activities in 2023, the UCLA team launched a pilot study to test out the logistics and feasibility of the data collection protocol and address any issues to ensure the success of the main study. Following success of the pilot study, the UCLA team launched the main study, worked with the UCLA Clinical and Translational Science Institute (CTSI) for recruitment, and enrolled 223 participants.

In the baseline phase, participants setup all devices (i.e., smartwatch, continuous glucose monitor, exposome monitor), collected and shipped back samples (i.e., blood, saliva, stool, urine), and responded to two sets of surveys. In the intervention phase, participants complete an online precision stress intervention for 12 weeks in one of the five common pathways dysregulated by stress. After the intervention phase, participants collect their second sample and device (i.e., exposome monitor and/or continuous glucose monitor) collection and the follow-up phase begins.

In 2024, the UCLA team plans to launch the MOOC, conduct a second wave of the research training program after incorporating participant feedback, and complete the second cohort for the research study. In all, the UCLA team has trained nearly 50 post-doctoral fellows, graduate students, undergraduates, and project coordinators.

Caption: Flyer of Experts in the Massive Open Online Course of the California Stress, Trauma, and Resilience Network.

Advancing a Precision Population Health Approach to ACEs to Reduce Health Disparities (HEALthy4You) (2021-2024)

Lead Principal Investigator: Dr. Gary S. Firestein, UC San Diego

Partners (listed alphabetically): American Academy of Pediatrics, California Chapter 3; Chicano Federation; Comité Organizador Latino de City Heights; Family Health Centers of San Diego; Olivewood Gardens and Learning Center, Kitchenistas; San Diego County Childhood Obesity Initiative; San Diego

County Promotores Coalition; San Diego State University School of Public Health; South Bay Community Services; StreetWyze; Vista Community Clinic/Poder Popular; YMCA Partners in Prevention

The goal of Dr. Firestein's project is to collaborate with Latino populations, promotoras, and community clinics to create a precision medicine community-based approach to mitigate childhood trauma, build resiliency to toxic stress, and reduce childhood obesity within Latino communities. The team is developing and implementing a community-designed intervention tailored to different families according to their unique needs. Through academic-community networks and a system of learning and improvement, the UCSD team is strengthening communications, needs assessment, and researcher-community relationships to better design and deliver the right preventive and treatment services at the right time.

To achieve these goals, the UCSD team (1) engaged with community resident stakeholders and community health workers (promotoras) to adapt prior evidence-based, family-focused interventions for both resiliency to ACEs and obesity to local community needs and develop culturally appropriate ways to detect ACEs in families, (2) designed a data integration system for tailoring family-based interventions to local needs, and (3) is conducting the clinical trial to determine if their precision, community-based approach to ACEs and comorbid childhood obesity improves ACE-related health outcomes.

For the first goal, the UCSD team worked with several community-based organizations, such as the Chicano Federation, Comité Organizador Latino de City Heights, and South Bay Community Services to guide how to deliver interventions for each family.

For the second goal, the UCSD team is working with community-based organizations to collect data through Streetwyze, a web-based mapping program for sharing community-generated and -centered information and stories about resources and needs. Streetwyze data supports advancement of family and communal resiliency to ACEs and obesity management. Through 2023, the UCSD team has collected Streetwyze data from 723 participants at 5 community-based organizations that work near clinic sites, including Chicano Federation, Comité Organizador Latino de City Heights (COLCH), Olivewood Gardens, South Bay Community Services, and Vista Community Clinic. The Streetwyze data, along with the data gathered via other projects across San Diego, now includes 7,000+ stories from more than 1,500+ residents from areas high on the social vulnerability index. Additionally, the UCSD team trained almost 50 community members with Streetwyze in 2023. Researchers are coding these data and tagging for use in this project as a variable for more fully describing their participants' exposome.

For the third goal, the UCSD team enrolled 102 participants into the Healthy4You study through

2023 by recruiting from two clinic locations, Family Health Centers of San Diego (FHCSD) North Park and Logan Heights. Throughout the study, the UCSD team has collected feedback to help refine the implementation process, which included changes in staffing, streamlining the number of times they contact participants, improving the coordination and flow between the care coordination team, and increasing promotoras' engagement with families for guidance and support. To monitor changes made during the implementation process, the UCSD team has stratified participants into 3 six-month cohorts.

In 2024, the UCSD team will complete enrollment and data collection, continue to assess the effectiveness of their recruitment strategies, and implement any changes needed.

Caption: UCSD team and CIAPM staff gather for 2023 annual site visit

The Collaborative Approach to Examining Adversity and Building Resilience (CARE) Program (2021-2024)

Lead Principal Investigator: Dr. Neeta Thakur, University of California, San Francisco

Partners (listed alphabetically): Futures Without Violence; LifeLong Medical William Jenkins Health Center; Santa Barbara Neighborhood Clinics (SBNC); UCSF Benioff Children's Hospital Oakland; UC Berkeley; UC Santa Barbara; University of Delaware

Dr. Thakur's project is an ambitious, transdisciplinary study aimed at improving the understanding of the biology of ACEs (discovery research), how the negative effects of ACEs may be buffered or mitigated (intervention research), and how the science of ACEs be implemented across diverse practice settings (implementation research).

For the discovery research, the CARE team is measuring stress-related biomarkers from biospecimens collected at a five-year follow up visit from a previously existing cohort from the Pediatric ACEs and Resiliency Study (PEARLS). For the intervention research, the team is testing the effectiveness of resilience-promoting, caregiver-child interventions on caregiver stress and behavioral and biological outcomes. For the implementation research, the CARE team is conducting focus groups with the partner sites and developing a resilience toolkit. To develop the toolkit, the teams at UCSF, Futures Without Violence, and Lifelong Medical conduct focus groups with caregivers of children receiving care at Lifelong Medical, Benioff Oakland, and Santa Barbara Neighborhood Clinic. The UCSF team then codes and completes qualitive analysis to identify preliminary themes. The UCSF and Futures Without Violence teams then share results with the CARE Family Board and co-create the resilience toolkit.

In 2023, the CARE team completed five-year follow-up visits for 180 participants from the original PEARLS Cohort, around 50% of the 350-participant goal. The team is refining their strategy to facilitate an increased recruitment rate of the PEARLS cohort, including phone calls at off-hours and preparing for weekend recruitment options, as scheduling constraints during the week are a common barrier. The CARE team has recruited 93 out of 300 planned participants for the intervention study and is optimizing recruitment efforts through increased coordination with clinic sites, and the team anticipates reaching the 300-participant goal by the end of 2024. The CARE team conducted three Family Board meetings in 2023 and discussed the caregiver's experiences with the pediatric ACEs screener, expectations of the clinical staff, best practices to deliver information and resources, and the three caregiver-child interventions. The CARE team also completed trainings at partner clinic sites to develop a script around the screener and incorporate it into existing electronic health record systems. The CARE team continues to develop the implementation toolkit with input and learnings from caregivers and community members, partner clinic sites, and Futures Without Violence. The CARE Program also provides a rich exposure and training environment for undergraduate and graduate trainees who are interested in pursuing careers in medicine and science. Over the course of the grant, they have supported over six trainees at various stages and currently have three graduate trainees and two early career faculty as members of the CARE team and supported by this CIAPM-funded project.

In 2024, the CARE team will continue to work towards their recruitment and study goals and further develop the implementation toolkit.

Lastly, the CARE team wishes to acknowledge a beloved co-investigator and community collaborator, Dr. Andria Ruth, who passed away in June 2023. Dr. Ruth was a true advocate and was instrumental to bringing childhood adversities to the forefront not just in the care of patients at SBNC but throughout the Santa Barbara community.

Caption: Flyer for psychoeducation training for team members and pediatric participants in UCSF's ACEs research study.

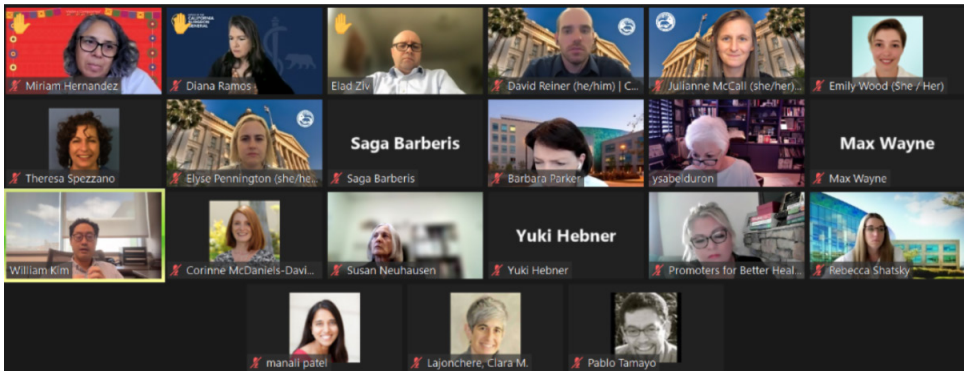
Cancer Disparities Research Projects

In the 2017/2018 State Budget, California allocated nine million dollars to fund demonstration projects that reduce cancer disparities through collaborative precision medicine care. Based on the recommendations of an out-of-state expert selection committee, CIAPM awarded three research teams with three million dollars each to investigate the causes of, and potential solutions, to higher rates of cancer mortality in California's Latino and Hispanic communities. These three-year projects began in 2019, received a one-year no cost extension due to delays caused by the COVID-19 pandemic, and concluded in 2023. In 2024, CIAPM will conduct a comprehensive evaluation of these recently concluded projects with the expertise of an out-of-state expert committee and publish an Evaluation Report for the Legislature.

Annual Symposium

CIAPM hosted its final Cancer Disparities Research Annual Symposium on September 14, 2023, held virtually. CIAPM's Drs. McCall and Reiner overviewed the Cancer Disparities Research Program portfolio. Principal Investigators Dr. Manali Patel (Stanford University), Drs. William Kim and Pablo Tamayo (University of California, San Diego), and Dr. Elad Ziv (University of California, San Francisco) delivered brief lectures summarizing project achievements, and project team members engaged in rich discus-

sions of lessons learned and paths forward. The CIAPM team was honored to include three members of the Advisory Council during the symposium: Chair Dr. Clara Lajonchere, Ms. Ysabel Duron, and California Surgeon General Dr. Diana Ramos.



Caption: 2023 Annual Virtual Symposium of Cancer Disparities Research Projects supported by the California Initiative to Advance Precision Medicine.

Summaries of Cancer Disparities Projects

Reducing Cancer Disparities through Innovative Community-Academic Partnership

Lead Principal Investigator: Manali Patel, MD MPH MS FASCO, Stanford University

Partners (listed alphabetically): Cancer Patients Alliance, Clinica de Salud del Valle de Salinas, The Latino Cancer Institute, Pacific Cancer Care

The Addressing Latinx Cancer Care Equity (ALCANCE) project sought to use deep community engagement to develop, implement, and test a Community Health Worker (CHW)-based approach to increase access to high-quality, equitable cancer care for low-income and minority communities, who face disproportionate rates of cancer-related morbidity and mortality. The project focused on Latino communities in Monterey County and Salinas Valley and was comprised of: (1) improving screening and prevention for primary care patients at Clinica de Salud del Valle de Salinas (CSVS) and (2) a randomized clinical trial among patients diagnosed with cancer and treated at Pacific Cancer Care (PCC).

Project aims included: 1) establishing a Community Advisory Board (CAB) of community advocates and cancer survivors, partners in industry, government, and public or private health care and clinical systems, 2) developing a CHW-based, prevention and clinical trial, cancer intervention for low-income and racial and ethnic minoritized patients with cancer in Monterey County, 3) implementing and evaluating the intervention, and 4) assessing the financial impact of the intervention.

In 2023, the project completed and analysis began to study the impact of the project on hypothesized outcomes. In addition, the team held two CAB meetings, sharing preliminary findings and plans for sustainability with the community members and research partners. The team also trained clinicians and CHWs in PCC on various aspects of clinical care, including advance care planning and precision cancer care.

For prevention and screening, in collaboration with the local clinic CSVS, community health workers educated patients about cancer risk factors and assisted 153 of the 158 enrolled women in completing an initial personal and family history to determine the benefit of genetic testing options. Seven patients of the 153 completed a pre-genetic test counseling visit with their clinician and received cancer genetic testing.

For the randomized clinical trial in collaboration with PCC, 110 patients with cancer were randomized to either usual cancer care (control group) or cancer care augmented with a multi-level intervention for 12 months (intervention group), comprised of education and encouragement to discuss precision medicine with their clinical teams via CHWs. Participants also received health-related social needs screening and connection to relevant community-based resources.

All participants completed baseline demographic and clinical assessments at 3-, 6-, and 12-months follow-up. Demographics revealed that 70% of participants spoke Spanish as their primary language; 81% identified as Hispanic; 67.3% attained a high school diploma/GED or less; 35.5% were diagnosed with gastrointestinal cancer; 24.5% were diagnosed with breast cancer; and 64.5% were diagnosed with stage 3 or 4 disease. By 2023, the research team had completed all follow up assessments, revealing improvements in precision medicine knowledge, patient satisfaction, and active seeking of precision medicine testing and treatment among the intervention group.

Results were disseminated to the broader community at the October 2023 CAB meeting and at the American Society of Clinical Oncology Quality Care Symposium in Boston. The project generated five peer-reviewed publications in 2023, Dr. Patel led several talks, and the team presented five posters and 15 oral presentations at national and international conferences. The support period for this project concluded in 2023, and they are in the process of publishing the data, a budget impact analysis, and a plan to scale the demonstration project to other areas.

Caption: Collage of pictures for the Community Health Workers at work, with patients, at symposia, at informational and patient recruitment sites, and at the community advisory board meetings for the Stanford CIAPM-supported project, Reducing Cancer Disparities through Innovative Community-Academic Partnership.

Integrated Machine-Learning Platform to Inform Precision Therapy in Underrepresented Triple-Negative Breast Cancer Patients

Lead Principal Investigators: Pablo Tamayo, PhD, and William Kim, PhD, University of California, San Diego (UCSD)

Partners (listed alphabetically): American Cancer Society, Cancer Resource Center of the Desert, El Centro Regional Medical Center, Michigan State University, Moores Cancer Center, Quality Partners, Rady Children's Hospital, San Diego State University, Sanford Burnham Prebys Medical Discovery

Institute, Tri-City Medical Center, University of Guadalajara

The UCSD Cancer Demonstration Project set out to apply a machine-learning computational approach to profile the genome of a limited number of Triple Negative Breast Cancer (TNBC) tumors by comparing with nationwide genomic and clinical trial data to accurately identify novel treatments and match patients to potential cancer therapies.

The team motto, Project CELSUS (named after the Roman scholar Aulus Cornelius Celsus, an early pioneer of evidenced-based medicine), maintained a nationwide consortium of scientific, clinical, and computational partners to achieve their goals.

The project aims included: 1) launching an initial database of breast and all-cancer genomes and developing and testing if their computer model could accurately characterize the genome and tumor states of samples to predict a best therapeutic, 2) evaluate a series of evidence-based drug combinations from their computer program that could treat TNBC tumors and verify against cancer cells in a lab, 3) acquire patient tumor samples from both living and deceased Latinas who were positive for TNBC and test the accuracy of the computer-generated therapy options in the lab, and 4) interpret and disseminate the efficacy of the program to the community and implement an optimal workflow with stakeholders to recruit Latina cancer patients for this precision medicine pipeline.

In 2023, major project milestones included: 1) acquiring 29 Latina TNBC tumors and performing profiling of their 'transcriptomes' (RNA), 2) refined the modeling capabilities of their computer algorithm to characterize tumor characteristics, like acquired tumor-resistance as a result of common therapeutic treatments, 3) finalizing the studies for the lab-tested tumor-drug treatment combinations, and 4) developing two additional cancer models to study how drugs can be tested against these models in the lab.

As a result of this CIAPM-support demonstration project, the Project CELSUS team tested 48 existing drug combinations in lab against cancer cells and found that there were some promising results for drugs already used for other types of cancers, including non-small cell lung cancers. They also showed the predictive capability of the computer-genomic data program to differentiate what genes/pathways were being activated and could potentially confer resistance after treatment with common, often toxic cancer chemotherapies.

The team also generated a report from 44 patients and community stakeholders (including physicians, social workers, caregivers, support group managers, community liaisons, and clinical/research coordinators) that determined that low-English and health literacy are major barriers to care for breast cancer patients, including misunderstandings of treatments and the healthcare system. Geographic proximity to care also remained a barrier, as well as fears regarding their immigration status, and feelings of dismissal of one's symptoms. However, support groups played a key protective role in

education and navigation of care and treatment.

The project also studied the economic impacts of their pipeline of care, and found that factors such as disease progression, desired quality of life while receiving care, drug tolerability, and ultimately survival may affect the applicability of this drug-to-treatment pipeline.

For an annual total, Project CELSUS generated eleven peer-reviewed publications, and the team also presented at two domestic symposia and were cited in the San Diego Union Tribune and the Baltimore Sun.

Improving Precision Medicine for Breast Cancer in Latinas: A Multi-Tiered Approach

Lead Principal Investigator: Elad Ziv, MD, University of California, San Francisco (UCSF)

Partners (listed alphabetically): Bay Area Cancer Connections, City of Hope, Latino Cancer Institute, Pomona Health, Stanford University, University of California, Davis, Vision y Compromiso, Zuckerberg San Francisco General

The UCSF Cancer Demonstration Project initially set out to characterize the genomes of Latinas and determine what genetic variations indicated higher risk to develop cancer, and how to encourage genetic testing to determine a Latina's cancer risk.

Their project goals included: 1) assessing genetic breast cancer risk using genetic data from 3,500 Latina breast cancer cases and compare to non-cancer cases to determine which genetic markers indicate highest cancer risk for Latinas, and subsequently educate Latinas about breast cancer heredity and the importance of genetic testing using culturally-competent community educators (Promotoras), and 2) analyze novel cancer-associated mutations in nearly 500 tumor samples and determine if those genetic markers are commonly captured in commercially-available genetic tests, and determine treatment outcomes of Latinas who have those cancers.

In 2023, major project milestones included: 1) several genes were found with the highest association to occur in estrogen-receptor positive and negative tumors, including one, which had been suggested in prior studies and verified with a high level of significance, suggesting that it should be added to risk assessment genetic testing panels, 2) recruited 1500 Latinas (supplemented with another 1000 cases with data from a Peruvian cancer study) to test targeted and whole genomes, 3) found genetic mutations most associated with cancer risk among Indigenous Latinas, 4) implemented a bilingual training program in San Francisco, Sacramento, and Los Angeles that has educated over 1300 Latina women about hereditary breast cancer risk and referred more than 100 women to genetic testing, half of whom consented to testing, 5) tested over 800 tumors from Latinas from both UCSF and City of Hope cancer patients and found cancer biomarkers most common to Mexican women, and 6) con-

trasted these genetics with a larger diverse dataset to determine how these mutations compare with mutations common in other racial and ethnic populations (i.e. East Asian, South Asian, African, and Indigenous American ancestry).

As a result of this CIAPM-supported project, the project team identified 45 women with genetic variants of health concern and informed their providers. The project also provided education of genetic testing and hereditary cancer risk to over 1300 Latinas, including some who were identified as high-risk upon initial survey and learned of genetic testing as a tool. This support was also the first of its kind to generate a dataset based on both large-scale recruitment and large/scale genetics analysis in the same budget. For an annual total, the team generated three peer-reviewed publications in 2023.

The team also performed an economic impact analysis that found that among key healthcare providers, while there were few financial barriers to test for breast and ovarian cancer in Latinas, low or no-cost-testing using laboratory patient assistance programs may not be sustainable and these genetic screens may not often include genetic biomarkers relevant to Latinas.

Former Projects Overview

CIAPM's first eight demonstration research projects concluded in December 2018. CIAPM continues to collect and report on the ongoing impact of the work. Summaries about the first eight projects, as well as 2023 publications and presentations from these projects, are listed in Appendix B. Detailed reports about the first eight projects can be found in the 2019 Evaluation Report to the California Legislature.

Depression RFP Development and Selections Process

In 2023, CIAPM invested unprecedented energy and time to propel its equity-centric research administration to the next level. Before finalizing a Request for Proposals (RFP) for the new Depression Research Program, staff studied the current landscape of mental health challenges and funding gaps across the U.S., engaged over 160 community members and experts through in-person and virtual listening sessions across the state, gathered public feedback through a formal Request for Information, and solicited input from leaders at fellow public agencies. By the end of the year, a record number of initial applications (60) responded to the call for proposals. Subsections below describe the process in greater detail.

Development

To inform the development of the RFP on precision medicine approaches for depression prevention, diagnosis, and treatment and to ensure the RFP was responsive to community needs, CIAPM staff pursued several avenues, including the following:

- Drafting a landscape analysis to better understand published statistics about depression prevalence
- Preparing a gap assessment of past, current, and forthcoming research programs on depression to avoid duplication of existing funding opportunities
- Holding in-person and virtual listening sessions throughout California with underserved communities
- Offering the public the option to provide anonymous feedback or suggestions via a formal Request for Information
- Conducting informational interviews with out-of-state subject matter experts

Gap Assessment

CIAPM drafted a landscape analysis of published statistics on the prevalence of depression across the nation, within California, and across racial/ethnic groups and the lifespan. CIAPM also conducted a gap assessment of active grants and funding opportunities within the U.S. for depression research. Through surveys of NIH, National Science Foundation (NSF), Substance Abuse and Mental Health Services Administration (SAMHSA), and the Centers for Disease Control and Prevention (CDC), CIAPM identified four aspects of precision medicine-focused depression research: machine learning and big data, community focus, research about historically underrepresented groups, and inclusion of social determinants of health for individualized treatment. CIAPM identified four opportunities for the depression RFP development: focus on communities that are representative of California, include community-based organizations and/or patient groups in research, acknowledge and address social determinants of health as factors in precision medicine research, and focus on the diagnosis and prevention of depression.

Listening Sessions

CIAPM connected with community-based organizations and local government mental health departments through the Mental Health Services Oversight and Accountability Commission's network of partners to jumpstart a series of listening sessions in underserved areas across many different areas of the state. Additionally, CIAPM promoted a public call for any organizations interested in co-hosting a listening session in their local community, leading to the below list of five entities who hosted:

- Fresno County Department of Behavioral Health, Fresno County, July 28th, hybrid, ~18 youth
- Cancer Patients Alliance, Monterey County, August 2nd, virtual, ~30 community members
- Cambodian Family Center, Orange County, August 3rd, in person, ~18 community providers

- Riverside University Health System, Riverside County, August 3rd, in person, ~60 community members and providers
- Two Feathers Native American Family Services, Humboldt County, August 4th, virtual, ~35 community and tribal members

Altogether, CIAPM hosted five listening sessions, engaging members of the public in the far northern region of the state, the Central Valley, Central Coast, Inland Empire, and Orange County. CIAPM staff specifically posed questions to participants about the challenges that their communities face, resources they and their neighborhoods are lacking, their vision for what an optimal future looks like for their community related to depression, and how academic researchers can more effectively partner with communities.

Request for Information

To supplement the listening sessions and collect feedback from a wider audience throughout California, CIAPM released an RFI, open from July 17 to August 18, 2023. CIAPM received 37 responses from community-based organizations (CBOs), research institutions, public agencies, and providers.

The RFI consisted of 13 questions covering five topics: demographics, community perspectives, impact of research, provider perspectives, and additional information. Questions included specific communities with high rates of depression, community needs and difficulties, ways in which research can respond to community needs, and guidance for partnerships between researchers and CBOs.

Informational Interviews

CIAPM staff held informational interviews with out-of-state subject matter experts in depression, mental health, stigma, and/or community-engaged research. The collection of accomplished experts included those who serve on NIH Councils, received NIH grants, and/or have been featured lecturers at national and international conferences.

CIAPM staff facilitated the interviews, which included the experts' responses about major challenges in depression research, academic-community partnerships, private sector collaborations, and a wish list of improved research outcomes.

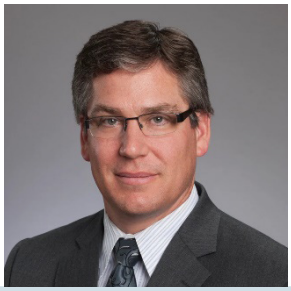
Subject matter experts

Nii Addy, Ph.D.

Yale University

Teresa Brockie, Ph.D.

Johns Hopkins University

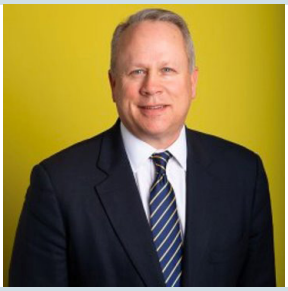


Boadie Dunlop, M.D.

Emory University

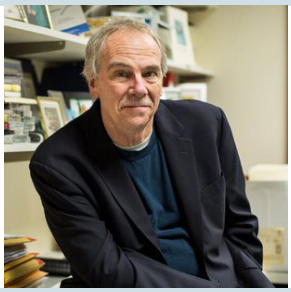
Valerie Earnshaw, Ph.D.

University of Delaware



Joseph Himle, Ph.D.

University of Michigan



Steven Hollon, Ph.D.

Vanderbilt University

Darrell Hudson, Ph.D.

Washington University

Sahnah Lim, PhD, MPH, MIA

New York University

Samantha Meltzer-Brody, M.D.

University of North Carolina

Shiv Tandon, Ph.D.

Northwestern University

Susan Shortreed, Ph.D.

Kaiser Permanente Washington Health Research Institute

Madhukar Trivedi, M.D.

University of Texas-South-western

Release

The activities described above ensured that the Depression Research Program would be responsive

to community needs and informed by subject matter experts. The program aims to drive innovation by applying a precision medicine approach to improve outcomes for patients with, or at risk for, depression, particularly as a path to reduce health inequities. CIAPM will award up to nine million dollars total across three to five independent research teams ($1.8 to $3 million per team) over a three-year project term.

CIAPM released the RFP on September 22, 2023, disseminated a press release (see Appendix), and held an informational webinar on October 2, 2023. The proposal submission process is divided into three stages:

Stage 1: Letters of Intent (LOI), due October 30, 2023 (required, but non-binding and not scored)

Stage 2: Concept Proposals, due December 1, 2023 (required, scored, need prior LOI submission)

Stage 3: Full Proposals (by invitation) due February 15, 2024 (only a subset will advance to this stage)

California-based research teams must be co-led by at least one non-profit academic research institution and at least one non-profit community-based organization, patient advocacy group, community clinic, or public or tribal entity that provides support to people with, or at risk for, depression. Co-leadership by academic and community partners is defined in greater detail as a co-equal partnership with shared decision-making authority and involvement from the design phase through implementation and evaluation. Candidates were provided a two-page list of resources curated by CIAPM staff about developing and fostering effective academic-community partnerships. By the full proposal stage, projects must also include at least one collaborator from the private sector who contributes in-kind, financial, or other resources to the project.

	Total Number	Number of California Institutions
Letters of Intent	60	25
Concept Proposals	41	22
Expected Finalists	10-15	≥5
Expected Awardees	3-5	3-5

Selections Process

CIAPM recruited an out-of-state expert selection committee (full biographies in Appendix E) to review Concept and Full Proposals, recommend which proposals advance to the Finalist stage and are invited to submit Full Proposals, and recommend awardees from the Finalist pool. CIAPM intends to announce awards in Summer 2024 with project start dates likely to occur in Fall 2024.

Expert Selection Committee

Chair

Olusola Ajilore, MD, PhD

Professor

University of Illinois at Chicago

Bruno Anthony, PhD

Professor

University of Colorado

Justin Baker, MD, PhD

Associate Professor

Harvard University

Crystal Barksdale, PhD, MPH

Program Director

National Institute on Minority Health and Health Disparities

Joyonna Gamble-George, MHA, PhD

Associate Research Scientist

Yale University

Annie Fox, PhD

Associate Professor

Massachusetts General Hospital Institute of Health Professions

Yolangel Hernandez Suarez, MD, MBA

Associate Professor

Florida International University

Darrell Hudson, PhD, MPH

Associate Professor

Washington University in St. Louis

Patricia Kerig, PhD

Professor

University of Utah

Sahnah Lim, PhD, MPH, MIA

Assistant Professor

New York University

Ziad Nahas, MD, MSCR

Professor

University of Minnesota

Katherine Sanchez, PhD, LCSW

Associate Investigator

Baylor Scott & White Research Institute

Anne Saw, PhD

Associate Professor

DePaul University

Arash Shaban-Nejad, PhD, MPH, MSc

Associate Professor

University of Tennessee Health Science Center

Susan Shortreed, PhD

Senior Biostatistics Investigator

Kaiser Permanente Washington Health Research Institute

Madhukar Trivedi, MD

Professor

University of Texas Southwestern

Jürgen Unützer, MD, MPH, MA

Professor

University of Washington

REPRESENTATIVE RESEARCH COLLABORATIVE

In 2023, CIAPM began designing the Representative Research Collaborative, a program dedicated to increasing the participation of Californians from historically excluded backgrounds in biomedical research studies. Proportionate representation in biomedical research improves the understanding of disease prevention, diagnosis, treatment, and the influence of genetic and socioeconomic factors, thereby helping address health disparities and improving the state of science for all communities.

The Representative Research Collaborative is a multi-year effort, in partnership with the NIH's *All of Us* Research Program, engaging both fellow state agencies and organizations across Californian academia and non-profits, to implement evidence-driven informational campaigns and encourage enrollment in *All of Us*. In its efforts to build one of the largest and most diverse health research databases of its kind, *All of Us* aims to enroll at least one million participants nationwide, with a special focus on including people from underrepresented communities. The Representative Research Collaborative will demonstrate the novel contributions our state government can make, given its longstanding relationships with underserved communities. To this end, CIAPM will publish learnings from the State perspective as an *All of Us* partner, offering potential guidelines for other state and local government entities interested in furthering representative research and the mission of the *All of Us* Research Program.

In 2023, CIAPM formalized its status as a nonfunded partner of the *All of Us* program, the first such state government partner, with a Memorandum of Understanding in draft form by the end of the year. In preparation, CIAPM completed a landscape analysis of sister state agencies that are best poised to join the Representative Research Collaborative and collected best practices in community engagement, with a focus on the Central Valley, from leaders and experts across public agencies and academic campuses:

- California Labor and Workforce Development Agency (LWDA)
- California Department of Health Care Services (DHCS)

- California Department of Social Services (CDSS)
- Office of Community Partnerships and Strategic Communications (OCPSC)
- Strategic Growth Council (SGC)
- California Health Workforce Education and Training Council, Department of Health Care Access and Information (HCAI)
- California Health and Human Services Agency (CalHHS)
- University of California, Merced Community and Labor Center
- Central California Center for Health & Human Services (CCCHHS) at California State University, Fresno
- Multiple offices at University of California, San Francisco
- University of California, Davis

CIAPM staff conducted a site visit in May 2023 to learn more about local *All of Us* recruitment efforts, when enrollment popup events were jointly conducted at the Stanford University School of Medicine by the *All of Us* Journey[1] (the program's mobile exhibit) and PRIDEnet[2].

Staff drafted and will continue to add to a gap analysis examining the causes for, and solutions to, the historical underrepresentation of communities in research, including those from racially minoritized groups, people who identify as LGBTQ+, rural residents, older Californians, and individuals with physical or developmental disabilities, among others. CIAPM also made significant progress in onboarding specialized staff and student fellows with expertise in community engagement, program administration, and behavioral economics in healthcare.

1 *All of Us* Journey Exhibits and Events: https://www.joinallofus.org/journey-and-events
2 PRIDEnet, joint project at Stanford University and UCSF: https://pridenet.org/

IMPACT ASSESSMENT

In 2023, the 18 research projects funded past and present by CIAPM contributed over 90 peer-reviewed, in press, or pre-print publications to the field of precision medicine, 90 presentations at domestic and international conferences or invited talks, and several news stories. ACEs project teams have partnered with approximately 60 community-based organizations and clinics to reach over 1,000 research participants. After about two years of their three-year term, ACEs projects have already produced seven novel technologies or innovative research approaches, including those designed for early detection of toxic stress and tailored interventions to reduce the health impacts of ACEs.

In addition, the ACEs Research Program has funded the development of seven new educational toolkits or curricula to help reach community members in their local environments. Workforce development has remained a top priority since the Legislature prompted CIAPM in 2019 to invest more in that area, leading to the training of over 400 community-based health workers, researchers, and clinicians within the ACEs research portfolio through 2023.

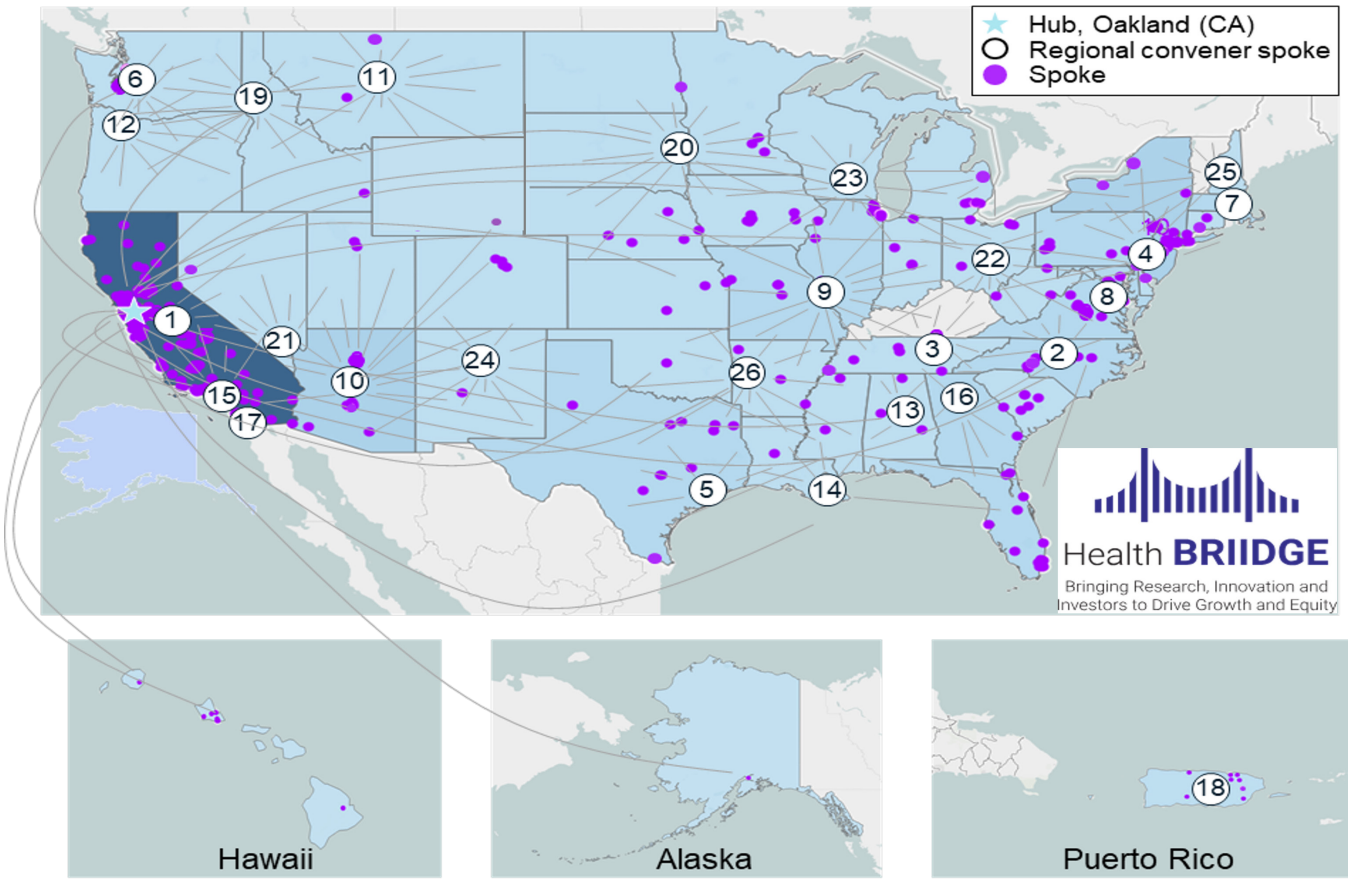
This year marked the conclusion of Cancer Disparities Research Projects, as highlighted in the Demonstration Projects section. Ahead of the forthcoming Evaluation Report of the Cancer Disparities Research Program, a number of achievements are already apparent. The primary goal of the program has been to advance the novel detection and treatment of cancer in underserved Latino/a communities. As of 2023, nearly 1,800 patients have been screened and/or received treatment and over 50 community health workers and researchers were trained. Across the three projects, researchers published 19 peer-reviewed journal articles, delivered 22 professional presentations, and were highlighted in two news articles in 2023.

PROGRAM HIGHLIGHTS

Building a Nationwide Health Innovation Network

In late March 2023, the new federal Advanced Research Projects Agency for Health (ARPA-H), within the U.S. Department of Health and Human Services, launched a public call to develop a first-of-its-kind cross-sector network to bring together players across the health ecosystem, helping to realize its bold mission of investing in high-risk, high-impact projects and research infrastructure. The concept seeks to accelerate the innovation pipeline from research to action by including, from the earliest stages, all organizations with a stake in health outcomes, from academic research and community engagement to commercialization and regulatory processes.

Realizing the once-in-a-generation opportunity to scale up CIAPM's unique approach to cross-sector health research partnerships with an equity lens, staff initiated and co-led the development of a nationwide network alongside key partners at the University of California Office of the President, CMG Consortium Management Firm, McKinsey & Company, and numerous others. Titled the Health BRIIDGE (Bringing Research, Innovation and Investment to Drive Growth and Equity) Consortium, our team established and coordinated a 50-state, 180-organization, 7,000-location web of regional cross-sector orchestrators and agents across health sciences and services, complete with a governance structure and community engagement plan. While we were not granted the managing role with ARPA-H, CIAPM and our partners exposed many of the research organizations, venture capital and industry leaders, and nonprofits in California to the new federal agency and see their recognition reaping benefits from the program. See the map attached that is representative of the geographic spread of primary collaborators and Appendix H for a select list of members.



Caption: CIAPM co-led the development and coordination of a new nationwide health innovation network in support of the new federal Advanced Research Projects Agency (ARPA-H). On the map, purple dots indicate the location of member organizations. Numbers indicate the locations of those organizations which committed to serving the role of a regional convener, to ensure that local insights and contributions were elevated through a representative governance structure. Lines stemming from the numbers represent the approximate reach of the regional conveners' existing communities.

Network Engagement & Outreach

In the past year, CIAPM made strides in outreach and engagement with public, private, and nonprofit partners and state and federal precision medicine leaders, primarily through the Depression RFP activities and ARPA-H network development, as described previously. Below are additional efforts from legislative outreach to a unique award from the biotechnology industry.

Special Recognitions

In December 2023, CIAPM Director Dr. Julianne McCall was honored as the Government Official of the Year at the annual Biocom California Celebration of Life Gala in San Diego. In their press release,

Biocom emphasized, "This recognition is not given every year, but only when a government official has demonstrated an appreciation, understanding, and strong support for the life science industry." Dr. McCall gave acceptance remarks, highlighting the importance of the life science industry and private-sector partnerships in CIAPM's mission to advance health equity in California.

Caption: California Initiative to Advance Precision Medicine Director Receives 2023 Government Official of the Year Award from Biocom California by Chairman Tim Scott.

Outreach to the Legislature

CIAPM was featured on June 20 by the Assembly Select Committee on Biotechnology during a legislative hearing focused on biomanufacturing where legislators, biotechnology corporations, and nonprofit leaders were in attendance, discussing the current state and future of the industry. CIAPM Director Dr. Julianne McCall was invited by the legislative committee and California Life Sciences to deliver an overview of precision medicine and its role in improving equity in healthcare. She also highlighted CIAPM's track record of investing in innovative, high-impact projects which have demonstrated the success of the program's collaborative and community-centric approach.

Individual briefings were additionally delivered in-person during the year to all members of the Legislature who expressed interest, many featuring CIAPM Advisors from across the state, representing academic research institutes, community engagement nonprofit organizations, health care systems, biotech industry, and scientific societies.

Contributions to International and National Conferences

Recognizing the value of making connections, both expected and unexpected, CIAPM staff engaged with participants, speakers, and moderators at numerous events, conferences, and meetings

throughout 2023.

Precision Medicine World Conference

The Precision Medicine World Conference (PMWC) in Silicon Valley remains one of CIAPM's hallmark outreach events of the year. The PMWC Conference is among the world's largest gatherings of precision medicine experts, garnering attendance of global leaders in commercial, academic, government, venture capital, and non-profit organizations. Like prior years, CIAPM's strong network of Advisory Council, community partners, and funded researchers remain central figures at the conference -- chairing sessions, delivering presentations, and moderating panels.

Caption: CIAPM staff Saga Barberis, Dr. Julianne McCall, and Dr. Shannon Muir hosted a booth at the Precision Medicine World Conference 2023 in Santa Clara.

CIAPM staff and our network of investigators were featured heavily throughout the conference, which is held annually in Santa Clara. Co-Director Dr. Shannon Muir kicked off the first day of the conference, chairing the Future Modalities session. She led a discussion on existing challenges and emerging opportunities for precision medicine therapeutics with three distinguished panelists from academia and industry: Drs. Nadav Ahituv (UCSF), Amber Salzman (Epic Bio), and Ben Oakes (Scribe Therapeutics). California Precision Medicine Advisory Council Vice Chair Dr. Keith Yamamoto chaired a panel on how public-private collaboratives could catalyze transformative health breakthroughs. CIAPM's Data Integration Working Group Chair Dr. Hakan Sakul also chaired a fireside chat about the past, present, and future of precision medicine.

CIAPM Cancer Disparities Program Principal Investigator Dr. Manali Patel gave a presentation titled, Equity in Delivery of Precision Cancer Care Through Community-Academic Partnerships. During her

talk, she underscored the importance of CIAPM's research model, "I'm so glad we have policymakers who have funded our work to get precision medicine out to the communities most in need." Former CIAPM-funded PIs Drs. Charles Chiu and Pratik Mukherjee also chaired two sessions and presented in a session, respectively.

Newsletter

CIAPM continued to release regular newsletters, providing its network of over 1,200 recipients with updates and opportunities for involvement. The newsletters shared key CIAPM announcements, provided meeting updates and summaries, introduced new staff, and highlighted upcoming events, among providing other information. The series of Investigator Spotlights continued through 2023, highlighting CIAPM-funded researchers, detailing the goals of their demonstration projects and respective accomplishments, and sharing how CIAPM-funded projects stimulate cross-sector partnerships.

Newsletter issues are publicly available and archived on the CIAPM website.

Social Media

CIAPM continues to utilize social media to keep the public informed of important announcements, upcoming events, research and demonstration project updates, as well as general news in precision medicine. CIAPM staff work closely with the Governor's Office of Planning & Research communications team, to create engaging and informative content for a wide range of public audiences. This year, posts across social media platforms showcased demonstration project team breakthroughs, partnership opportunities, professional achievements from Advisory Council Members, and updates from cross-sector partners.

In 2023, CIAPM was heavily recognized in the private sector. For example, in September, CIAPM Director Dr. Julianne McCall was invited to tour Bayer Pharmaceuticals' Berkeley campus. During this visit, Dr. McCall discussed with Bayer executives approaches to advancing health equity, tailoring workforce development and recruitment of early-career professionals, especially from their local neighborhoods in the East Bay, expanding public-private partnerships, and the promise and potential of biomanufacturing cell and gene therapies, especially for patients across California. Dr. Jens Vogel, Head of Biotech, posted the following news to his social media, marking the first time CIAPM has been recognized so prominently by an industry leader.

Caption: Director Dr. Julianne McCall met with Bayer Pharmaceuticals' Berkeley Site Manager Tina Self and Michelle Nemits from Biocom California.

Research Policy Training Program

A record-breaking 16 new student interns and fellows joined CIAPM in 2023, thanks in part to partnerships with the California Council on Science and Technology and the University of Southern California. Trainees were embedded across programmatic areas, from contributing to an ongoing impact assessment to developing content for a forthcoming online resource focused on Equitable Consent Frameworks to co-leading statewide listening sessions with diverse communities.

Interagency Cooperation

Throughout 2023, CIAPM staff served several interagency efforts toward reducing health disparities and addressing top priorities of Governor Gavin Newsom's Administration, including:

1. California Health in All Policies Task Force (member)

   Identifies priority programs, policies, and strategies to improve the health of Californians while advancing the goals of improving air and water quality, protecting natural resources and agricultural lands, increasing the availability of affordable housing, im-

proving infrastructure systems, promoting public health, planning sustainable communities, and meeting climate change goals

2. OPR Tribal Affairs Working Group (member)

   An agency-wide cohort of programmatic staff with experience or interest in engaging tribal communities as leaders, partners, and grant candidates and recipients

Racial Equity Action Plan Development

In 2023, the Governor's Office of Land Use and Climate Innovation (formerly the Governor's Office of Planning and Research, OPR) engaged in the planning and development of actions to advance racial equity. The three action items for 2023-2024 include (1) creating a series of toolkits for researchers, research and health care funders, patients, and administrative/clinic staff to boost equitable consent practices, (2) increasing the engagement of racially diverse patient advocacy groups and interested parties across all CIAPM programming, and (3) collaborating with OPR leadership in refining recruitment practices to increase representation of geographic, ethnic, and racial diversity and historically marginalized populations in government office leadership.

Grounded by these goals, CIAPM contributed to the development of OPR's first-ever Racial Equity Action Plan. This plan outlines the following twelve equity outcomes that OPR will engage in to help address racial inequities in California:

1. Strengthen Tribal Partnerships and Acknowledge Indigenous Knowledge
2. Enhance Accessibility to Services for Vulnerable Communities
3. Cultivate a Diverse and Inclusive Workplace
4. Expand Opportunities for Diverse Contractors
5. Empower Communities in Policy Design
6. Promote Economic Empowerment
7. Apply a Racial Equity Lens to Policies
8. Support the Reversal of Racist Zoning Practices
9. Assess and Advance Racial Equity in Policy Design
10. Advance Environmental Justice Through Policy Guidance
11. Amplify Community Stories
12. Increase Participation of Underrepresented Groups in Clinical Research

The Racial Equity Action Plan highlights concrete actionable steps to achieving meaningful change for each of the twelve outcomes, working towards the Newsom Administration's vision for a California for All.

California Precision Medicine Advisory Council

The California Precision Medicine Advisory Council was launched in 2020 to advise on current and future programs of the initiative. The 11-member council is comprised of precision medicine experts from a broad range of backgrounds and sectors, including academia, government, industry, finance, patient advocacy, and clinical care. The council meets quarterly for discussions and updates on CIAPM's portfolio of programs and projects. Two working groups were active in 2023: Data Integration and Equitable Consent Frameworks.

During the July 2023 council meeting, advisors renewed leadership roles of Chair Dr. Clara Lajonchere and Vice Chair Dr. Keith Yamamoto by unanimous votes. Some of this year's topics covered new elements of the Depression Research Program and discussions about CIAPM's role in developing a nationwide health innovation network for the federal Advanced Projects Research Agency (ARPA-H).

Meeting agendas and summaries can be found in Appendix F and on https://www.opr.ca.gov/ciapm/activity/meetings.html

Data Integration Working Group

The eight members of the Advisory Working Group on Data Integration for Social Determinants of Health set out to explore opportunities to integrate social determinants of health into medical and health records and integrate social, behavior, biological, and discovery data. This working group engaged state officials who are leading statewide efforts to improve the use, confidentiality, storage, sharing, and interoperability of health and other data reflective of Californians' wellbeing.

On February 15, the Data Integration Working Group held its final public meeting, featuring Dr. Peter Oh as a guest expert. Dr. Oh represents the California Department of Public Health Office of Health Equity Section on Health Equity Research and Statistics Unit. Following a presentation, Dr. Oh engaged attendees in a rich conversation on social determinants of health, as well as research and government data collection and analysis.

Equitable Consent Working Group

The Equitable Consent Working Group concluded its three-year effort with a near-final draft of a web resource to be debuted in 2024. The collection of information includes guidelines and best practices for increasing underrepresented minorities' participation in research and will be posted on the CIAPM website as part of the Representative Research Collaborative effort.

A LOOK AHEAD

Even after a whirlwind year of building connections within and well beyond state borders, implementing evidence-based approaches to research design, engaging with the Legislature, growing the number of internship and fellowship opportunities, and serving as a national model for equity-centered research and collaboration, CIAPM still has big plans for 2024. Three additional staff will join the team, rounding out much-needed expertise in science communications, health disparities, administration, and more. A Memorandum of Understanding is in draft form to finalize a partnership with the NIH's *All of Us* Research Program. The new Depression Research Program will launch with a fresh cohort of state-funded research teams, and CIAPM staff will conduct a formal evaluation to assess the impact and quality of the Cancer Disparities Research Program, which concluded in late 2023.

Reducing Health Disparities Through Research Representation

In 2024, CIAPM staff will continue to develop the Representative Research Collaborative, through an interagency and cross-sector network of public departments, community-based organizations, universities, and health care providers to boost representation in biomedical research, so health treatments, diagnostics, and prevention strategies serve all Californians.

Depression Research Program

Following successful development and deployment of a Request for Proposals, CIAPM will focus on the next stages of selecting and launching at least three new state-funded research projects on the prevention, diagnosis, and treatment of depression across the state in 2024.

Evaluating the Cancer Disparities Program

With the conclusion of 2023 and the Cancer Disparities Research Program, CIAPM staff will conduct a formal evaluations process of these projects in 2024.

APPENDICES

Appendix A. New Publications, Presentations, and Press Coverage of Currently Funded Projects

Adverse Childhood Experiences (ACEs) Research Projects

Scalable Measurement and Clinical Deployment of Mitochondrial Biomarkers of Toxic Stress

Lead Principal investigator: Dr. Pat Levitt, Children's Hospital Los Angeles (CHLA)

Publications

1. Gateau, K., Schlueter, L., Pierce, L. J., Thompson, B., Gharib, A., Durazo-Arvizu, R. A., Nelson, C. A., & Levitt, P. (2023). Exploratory study evaluating the relationships between perinatal adversity, oxidative stress, and infant neurodevelopment across the first year of life. PLOS global public health, 3(12), e0001984. https://doi.org/10.1371/journal.pgph.0001984

A Multi-Component Intervention to Strengthen Families and Build Youth Resilience

Lead Principal Investigator: Dr. Ariane Marie-Mitchell, Loma Linda University (LLU)

Publications

1. Patel NS, Watkins H, Marie-Mitchell A. "Predictive Validity of the Whole Child Assessment in a Generally Healthy Pediatric Cohort." Journal of Primary Care & Community Health, 14: 1-7, 2023.

Conference Presentations

1. Marie-Mitchell, A. "Improving Outcomes for Children with ACEs." Invited Speaker, UCLA-UCSF ACEs Aware Family Resilience Network (UCAAN) Journal Club (online), March 2023.
2. Marie-Mitchell, A. "Whole Child Care at Well-Child Visits" Grand Rounds, Pediatrics Department, Loma Linda University Medical Center (Loma Linda, CA), April 2023.

Public Outreach and Education Materials

1. FIRST introductory 4-hour curriculum for pediatric providers
2. FIRST introductory 3-hour curriculum for CHWs (mentors)
3. FIRST content integrated into seven lessons of the NF curriculum
4. Educational handouts for families available to print or include in medical record, English & Spanish

    a. Understanding ACEs & Resilience

    b. Stress Management, STOP tool

    c. Healthy Relationships

Networks and Collaborations

1. NASEM Forum for Children's Well-Being Healthy Parenting Collaborative, 1/2022-current
2. Epic Equitable Care Brain Trust, 4/2022- current
3. ACEs Aware Evaluation and Evidence Advisory Roundtable for UCLA-UCSF ACEs Aware Family Resilience Network (UCAAN), 2/2023-current

Web and Digital Assets

1. Webpage: Information related to the Whole Child Assessment, https://lluch.org/health-professionals/whole-child
2. Database: Clinical database with QI chart reviews to evaluate process measures related to the intervention, including ACEs reporting, provider documentation, provider referrals, CHW documentation, and health care utilization. Reviews include consideration of potential disparities by race/ethnicity, language or insurance status
3. Database: Research database with data collected at the research visits plus medical record reviews.
4. Algorithm: Whole Family Care clinical algorithm to determine level of community support based upon family risk factors (including ACEs, SDOHs and developmental delays)

The SYSTEMAATIC Project: Systems-based, Multidisciplinary Assessment of Adversity and Toxic Stress for Individualized Care

Lead Principal Investigator: Dr. Sayantani (Tina) Sindher, Stanford University

Publications

1. Gilgoff, R., Mengelkoch, S, Elbers, J., Kotz, K., Radin, A., Pasumarthi, I., Murthy, R., Sindher, S., Burke Harris, N., Slavich, G.E. The Stress Phenotyping Framework: A Multidisciplinary Biobehavioral Approach for Assessing and Therapeutically Targeting Maladaptive Stress Physiology. Stress. In Press. DOI: 10.1080/10253890.2024.2327333.
2. Martinez A, Ye M, Hessler D, de la Rosa R, Benson M, Gilgoff R, Koita K, Bucci M, Harris NB, Long D, Thakur N. Adverse Childhood Experiences and Related Events are Associated with Asthma Symptoms in Children. Acad Pediatr. Published online January 19, 2024. doi:10.1016/j.acap.2024.01.010.
3. McBain, R.K., Levin, J.S., Matthews, S., Qureshi, N., Long, D., Schickedanz, A.B., Gilgoff, R., Kotz, K., Slavich, G.M. and Eberhart, N.K..The effect of adverse childhood experience training, screening, and response in primary care: a systematic review. eClinicalMedicine, 65. 2023. Gilgoff R, Schwartz T, Owen M, Bhushan D, Burke Harris N. Opportunities to Treat Toxic Stress. Pediatrics. 2023 Jan 1;151(1):e2021055591. PubMed PMID: 36450652
4. Gilgoff, R., Kotz, K., Schwartz, T., Beasley, D., Martin, C., Babcock E., Chapman, A., Conn, R., Madzura V., Bradley, C., Norr, A. M. (2023). Stress Busters: Clinical Strategies for Preventing and Mitigating Toxic Stress [MOOC]. UCLA UCSF ACEs Aware Family-Resilience Network (UCAAN). https://www.acesaware.org/managestress

Web and Digital Assets

1. Toxic Stress [MOOC]. https://www.acesaware.org/managestress;
2. UCLA UCSF ACEs Aware Family-Resilience Network (UCAAN). https://training.acesaware.org/aa/detail?id=2115

Using Precision Medicine to Tackle Impacts of Adverse and Unpredictable Experiences on Children's Neurodevelopment: The SoCal Kids Study

Lead Principal Investigator: Dr. Tallie Z. Baram, UC Irvine

Publications

1. Pre-Print: Within-subject changes in methylome profile identify individual signatures of ear-

ly-life adversity, predicting neuropsychiatric outcome. Annabel K. Short, Ryan Weber, Noriko Kamei, Christina Wilcox Thai, Hina Arora, Ali Mortazavi, Hal S. Stern, Laura Glynn, Tallie Z. Baram. BioRxiv. https://doi.org/10.1101/2023.12.16.571594.

2. Glynn LM, Liu SR, Lucas CT & Davis EP. Leveraging the science of early life predictability to inform policies promoting child health. Under review.

Conference Presentations and Invited Talks

1. Baram TZ International Society of Developmental Psychobiology (ISDP), Utrecht, NL. Symposium: Modeling and Significance of Dynamic parent-child interactions across species, Speaker, July 2023
2. "Dynamic Patterns of Parental Signals shape brain maturation: enduring effects of unpredictable parental behaviors in children, and mechanistic insights from animals.", July 2023
3. Baram TZ International Society for Evolution, Medicine, & Public Health (ISEMPH) Annual Conference, "Why Mothers Matter: from evolution to principles of brain maturation, August 2023.
4. Baram TZ European Behavioural Pharmacology Society (EBPS), Symposium Speaker, "Novel stress-sensitive brain projections mediate the impact of early-life adversity on adult reward behaviors", Mannheim Germany, August 2023.
5. Baram TZ European Brain and Behavior Society conference (EBBS), Opening Keynote Speaker, "Shaping adult motivated behaviors by early-life experiences: novel mechanisms", Amsterdam, August 2023.
6. Baram TZ 2023 15th Annual Pioneers in Endocrinology Workshop, Rutgers University, "The Brain's Unique Endocrine System in Early-life Stress", Speaker, October 2023.
7. Baram TZ 2023 American College of Neuropsychopharmacology (ACNP) annual meeting, Symposium, "Emerging Roles for the Paraventricular Thalamus (PVT) Circuit in the Origins of Mental Illness: A Cross-Species, Trans-Disciplinary Discussion," Chair, Tampa, December 2023.
8. Lindert, N.G., Vargas, V.M., Cohen, S., Liu, S.R., Stern, H.S., Baram, T.Z., Golden, C.V., Weiss, M.A., Ehwerhemuepha, L., & Glynn, L.M. (November 2023). An update on screening for unpredictability in childhood in CHOC primary care clinics. Children's Hospital of Orange County's Research Day, Orange, CA.
9. Vargas, V.M., SoCal Kids Study Community Advisory Board, Lucas, C.T., Liu, S.R., Lindert, N.G., Cohen, S., & Glynn, L.M. (November 2023). SoCal Kids Study: Amplifying diverse perspectives and expertise in research through community engagement. Children's Hospital of Orange County's Research Day, Orange, CA.
10. Cohen, S., Vargas, V.M., Lindert, N.G., Liu, S.R., Stern, H.S., Baram, T.Z., Golden, C.V., Weiss, M.A., Ehwerhemuepha, L., & Glynn, L.M. (November 2023). Screening for toxic stress exposures in CHOC primary care clinics. Children's Hospital of Orange County's Research Day, Orange, California.

Public Outreach and Education

1. Liu, S.R. (September 2023). Incorporating racial & ethnic DEI in Conte Center & CIAPM study research. UCI Conte Center Monthly Meeting, Irvine, California.
2. Baram TZ, Glynn LM, Golden C & Weiss M (2023). Addressing impacts of adverse childhood experiences through a collaborative precision medicine approach. Invited Grand Rounds for Children's Hospital of Orange County.

Identifying Social, Molecular, & Immunological Processes for Mitigating Toxic Stress & Enhancing Personalized Resilience

Lead Investigator: Dr. George Slavich, UC Los Angeles

Press Coverage

1. UCLA Health, "Trauma, severe stress in childhood linked to criminal legal involvement in next generation," https://www.uclahealth.org/news/release/trauma-severe-stress-childhood-linked-criminal-legal
2. UCLA Health, "Study shows how birth control pills affect women's psychological and biological responses to stress," https://www.uclahealth.org/news/release/study-shows-how-birth-control-pills-affect-womens
3. Aw, J. (2023). Spotlight on the emerging field of immunopsychiatry. Psychiatry Advisor. Interview with Drs. Daniel P. Moriarity, Alexander L. Chu, and Annelise Madison. https://www.psychiatryadvisor.com/general-medicine/spotlight-emerging-field-immunopsychiatry
4. Armstrong, K. (2023). Friend and foe: How inflammation fights disease and fuels depression. Observer. https://www.psychologicalscience.org/observer/friend-and-foe. Interview with Drs. Robert Dantzer and Daniel P. Moriarity.

Publications

1. Slavich, G. M., Mengelkoch, S., & Cole, S. W. (2023). Human social genomics: Concepts, mechanisms, and implications for health. Lifestyle Medicine, 4, e75. doi: 10.1002/lim2.75
2. Slavich, G. M., Roos, L. G., Mengelkoch, S., Webb, C. A., Shattuck, E. C., Moriarity, D. P., & Alley, J. C. (2023). Social Safety Theory: Conceptual foundation, underlying mechanisms, and future directions. Health Psychology Review, 17, 5-59. doi: 10.1080/17437199.2023.2171900
3. Moriarity, D. P., & Slavich, G. M. (2023). The future is dynamic: A call for intensive longitudinal data in immunopsychiatry. Brain, Behavior, and Immunity, 112, 118-124. doi: 10.1016/j.bbi.2023.06.002
4. Roos, L. G., & Slavich, G. M. (2023). Wearable technologies for health research: Opportunities, limitations, and practical and conceptual considerations. Brain, Behavior, and Immunity, 113, 444-452. doi: 10.1016/j.bbi.2023.08.008

5. Moriarity, D. P., Slavich, G. M., Alloy, L. B., & Olino, T. M. (2023). Hierarchical inflammatory phenotypes of depression: A novel approach across five independent samples and 27,730 adults. Biological Psychiatry, 93, 253-259. doi: 10.1016/j.biopsych.2022.08.017
6. Palamarchuk, I. S., Slavich, G. M., Vaillancourt, T., & Rajji, T. K. (2023). Stress-related cellular pathophysiology as a crosstalk risk factor for neurocognitive and psychiatric disorders. BMC Neuroscience, 24, 65. doi: 10.1186/s12868-023-00831-2
7. Ojha, A., Teresi, G. I., Slavich, G. M., Gotlib, I. H., & Ho, T. C. (2023). Social threat, fronto-cingulate-limbic morphometry, and symptom course in depressed adolescents: A longitudinal investigation. Psychological Medicine, 53, 5203-5217. doi: 10.1017/S0033291722002239
8. Burani, K., Brush, C. J., Spahr, C., Slavich, G. M., Meyer, A., & Hajcak, G. (2023). Corporal punishment is uniquely associated with a greater neural response to errors and blunted neural response to rewards in adolescence. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, 8, 210-218. doi: 10.1016/j.bpsc.2022.09.004
9. Allison, G. O., Kamath, R. A., Carrillo, V., Alqueza, K. L., Pagliaccio, D., Slavich, G. M., Shankman, S. A., & Auerbach, R. P. (2023). Self-referential processing in remitted depression: An event-related potential study. Biological Psychiatry Global Open Science, 3, 119-129. doi: 10.1016/j.bpsgos.2021.12.005
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44. Alley, J. C., Moriarity, D. P., Figueroa, M. B., & Slavich, G. M. (in press). Characterizing the hierarchical depression phenotype in sexually diverse individuals. Journal of Psychiatric Research.
45. Mengelkoch, S., & Slavich, G. M. (in press). Sex differences in stress susceptibility as a key mechanism underlying depression risk. Current Psychiatry Reports. doi: 10.1007/s11920-024-01490-8
46. Moriarity, D. P., & Slavich, G. M. (in press). Toward a dynamic immunopsychiatry. Brain, Behavior, and Immunity.
47. Gilgoff, R., Mengelkoch, S., Elbers, J., Kotz, K., Radin, A., Pasumarthi, I., Murthy, R., Sindher S., Burke Harris, N., & Slavich, G. M. (in press). The Stress Phenotyping Framework: A multidisciplinary biobehavioral approach for assessing and therapeutically targeting maladaptive stress physiology. Stress. doi: 10.1080/10253890.2024.2327333
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50. Telles, R., Zimmerman, B., Thaker, P. H., Slavich, G. M., Ramirez, E. S., Zia, S., Goodheart, M. J., Cole, S. W., Sood, A. K., & Lutgendorf, S. K. (in press). Rural-urban disparities in psychosocial functioning in epithelial ovarian cancer patients. Gynecologic Oncology.
51. Ahn, S., Kim, S., Zhang, H., Dobalian, A., & Slavich, G. M. (in press). Lifetime adversity predicts depression, anxiety, and cognitive impairment in a nationally representative sample of older adults in the United States. Journal of Clinical Psychology. doi: 10.1002/jclp.23642
52. Lutgendorf, S. K., Telles, R. M., Whitney, B., Thaker, P. H., Slavich, G. M., Goodheart, M. J., Penedo, F. J., Noble, A. E., Cole, S. W., Sood, A. K., & Corn, B. W. (in press). The biology of hope: Inflammatory and neuroendocrine profiles in ovarian cancer patients. Brain, Behavior, and Immunity. doi: 10.1016/j.bbi.2023.12.014
53. Miller, A. B., Jenness, J., Elton, A., Pelletier-Baldelli, A., Patel, K., Bonar, A., Martin, S., Dichter, G., Giletta, M., Slavich, G. M., Rudolph, K., Hastings, P., Nock, M., Prinstein, M. J., & Sheridan, M. (in press). Neural markers of emotion reactivity and regulation before and after a targeted social rejection: Differences among girls with and without suicidal ideation and behavior histories. Biological Psychiatry. doi: 10.1016/j.biopsych.2023.10.015
54. Rodriguez-Thompson, A. M., Miller, A. B., Wade, M., Meyer, K. N., Machlin, L., Bonar, A., Patel, K. P., Giletta, M., Hastings, P. D., Nock, M. K., Rudolph, K., Slavich, G. M., Prinstein, M. J., & Sheridan, M. A. (in press). Neural correlates of p-factor in adolescence: Cognitive control with and without enhanced affective demands. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging. doi: 10.1016/j.bpsc.2023.03.012

55. Lee, C., Whooley, M., Yang, Q., & Moriarity, D.P. (in press). How is inflammation biology truly associated with depression in patients with stable coronary heart disease?: Insights from the Heart and Soul Study. Brain, Behavior, & Immunity—Health.
56. Mac Giollabhui, N., Kautz, M., Moriarity, D.P., Chat, I.K.Y., Murray, S., Ellman, L., & Alloy, L.B. (in press). Chronic inflammation is associated with worsening working memory performance: Preliminary evidence from a diverse, longitudinal cohort of adolescents and young adults. Psychoneuroendocrinology. Accepted Registered Reports

Invited Talks and Symposia

1. Moriarity, D.P. (2023). Invited Speaker. It Takes Two to Tango: The Interplay Between Applied and Methodological Research in Building a Replicable and Clinically Impactful Immunopsychiatry. University of Arkansas Psychoneuroimmunology Colloquia. Fayetteville, Arkansas.
2. Moriarity, D.P. (2023). Invited Speaker. It Takes Two to Tango: The Interplay Between Applied and Methodological Research in Building a Replicable and Clinically Impactful Immunopsychiatry. UC Davis Quantitative Psychology Brown Bag. Davis, California.
3. Slavich, G. M. (2023). Social safety: A key organizing principle of human biology, health, and behavior. Department of Psychology, Stanford University
4. Slavich, G. M. (2023). Addressing health disparities in marginalized populations by assessing and managing stress. Department of Medicine, Stanford University
5. Slavich, G. M. (2023). The science of ACEs and toxic stress screening, response, and prevention. 2023 Pediatric Academic Societies Meeting, Washington, D.C.
6. Slavich, G. M. (2023). From molecules to medical practice: Translating the science of stress into better health and resilience. 2023 Pediatric Academic Societies Meeting, Washington, D.C.
7. Slavich, G. M. (2023). Current concepts and approaches in stress and health research. University of California, Los Angeles
8. Slavich, G. M. (2023). Impact of stress on the adolescent brain and body & best practices to enhance resilience. Resilience in Schools Sumit, Orange, CA
9. Slavich, G. M. (2023). Reducing health disparities by targeting stress-related processes: A multi-omics driven precision medicine-based approach. Department of Medicine, University of California, San Francisco Psychobiology of stress and health. Department of Psychiatry and Biobehavioral Sciences, University of California, Los Angeles
10. Slavich, G. M. (2023). The socially sensitive immune system: Implications for human health and disease. Department of Genetics, Stanford University
11. Slavich, G. M. (2023). Designing high-risk, high-reward interdisciplinary projects to maximize scientific and social impact. 20th annual meeting of Society in Science, Zurich, Switzerland
12. Slavich, G. M. (2023). How social experiences remodel the human immune system impact health. Stanford Mental Healthcare Innovations Summit, Stanford, CA
13. Slavich, G. M. (2023). Evidence-based strategies for normalizing stress and maximizing wellbe-

ing. Stanford Mental Healthcare Innovations Summit, Stanford, CA

14. Slavich, G. M. (2023). Organizer, UCLA-UCSF ACEs Aware Family Resilience Network (UCAAN) Evaluation and Evidence Advisory (EAR) Roundtable #1 on ACEs Screening, Los Angeles, CA
15. Slavich, G. M. (2023). Organizer, UCLA-UCSF ACEs Aware Family Resilience Network (UCAAN) Evaluation and Evidence Advisory (EAR) Roundtable #2 on Evidence-Based Clinical Responses to ACEs, Los Angeles, CA
16. Slavich, G. M. (2023). Integrating Social and Biomedical Sciences to Address Critical Public Health Problems. 19th annual meeting of Society in Science, Zurich, Switzerland
17. Slavich, G. M. (2023). Evidence-Based Stress Busters. Stanford Mental Healthcare Innovations Summit, Stanford, CA
18. Moriarity, D.P., Watts, A., Levin-Aspenson, H.F., Wright, A., & Clark, L. (2023). Building bridges between methodology, measurement, and applied research: A panel discussion on advocating for and teaching quantitative methodology & measurement.

Conference Presentations and Talks

1. Schüssler-Fiorenza Rose, S. M., & Slavich, G. M. (2023). Prevalence of adverse childhood experience exposure by disability status: A population-based study. Paper presented at the 2023 annual meeting of the Association of Academic Physiatrists, Anaheim, CA.
2. Rivera, K. M., Infante, A., Spahr, C. M., Slavich, G. M., & Doom, J. R. (2023). Associations between psychosocial stress, positive childhood experiences, and cardiovascular risk among adolescents. Paper presented at the 2023 biannual meeting of the Society for Research in Child Development, Salt Lake City, Utah.
3. Clapham, R. B., Ye, Z., Somerville, L., Miller, A. B., Giletta, M., Hastings, P. D., Slavich, G. M., Nock, M. K., Prinstein, M. J., & Rudolph, K. D. (2023). Risk and protective effects of need for approval on self-injurious thoughts and behaviors in girls. Poster presented at the 2023 biannual meeting of the Society for Research in Child Development, Salt Lake City, Utah.
4. La Charite, J., Schlichte L., Biely, C., Dudovitz, R., Leifheit, K., Russ, S., Sastry, N., Slavich, G. M., Tolliver, D., Yama, C., Barnert, E., & Schickedanz, A. (2023).The impact of parental adverse and positive childhood experiences on their adult child's arrest history before age 26: A nationally representative longitudinal study. Paper presented at the 2023 Annual Meeting of the Pediatric Academic Societies, Washington, DC.
5. Mashash M., Usacheva, M., Surachman, A., Hamlat, E., Slavich, G. M., Laraia, B., Epel, E. S., & Mayer, S. E. (2023). Dimensions of early life adversity and metabolic health in Black and White women. Poster presented at the 2023 biannual meeting of the Society for Research in Child Development, Salt Lake City, Utah.
6. Gruhn, M., Miller, A., Giletta, M., Hastings, P., Nock, M., Rudolph, K., Slavich, G. M., & Prinstein, M. (2023). Threat and deprivation uniquely moderate the associations between neural and physiological indices of emotion reactivity. Paper presented at the 2023 biannual meeting of

the Society for Research in Child Development, Salt Lake City, Utah.

7. Lutgendorf, S. K., Thaker, P. H., Goodheart, M. J., Arevalo, J. M. G., Chowdhury, M. A., Noble, A. E., Dahmoush, L., Penedo, F., Sood, A. K., Slavich, G. M., & Cole, S. W. (2023). Hopefulness and hopelessness are differentially associated with inflammatory profiles in ovarian cancer patients. Paper presented at the 80th Annual Meeting of the American Psychosomatic Society, San Juan, Puerto Rico.
8. Kim, L. Y., Roos, L. G., Sichko, S., Bui, T. Q., Olvera-Alvarez, H. A., & Slavich, G. M. (2023). Exploring stress mindset in relation to depressive symptoms, mood, and inflammatory reactivity in adolescent girls. Paper presented at the 80th Annual Meeting of the American Psychosomatic Society, San Juan, Puerto Rico.
9. Roos, L., Alley, J., Rajčáni, J., Meier, M., Packheiser, J., Berretz, G., & Slavich, G. M. (2023). A systematic review of diversity in cortisol stress reactivity research. Paper presented at the 80th Annual Meeting of the American Psychosomatic Society, San Juan, Puerto Rico.
10. Carolus, A. E., Bonar, A. S., Alvarez, G. M., Bryant Miller, A., Gruhn, M., Robertson, M. M., Rodgriuez-Thompson, A., Martin, S., Patel, K. K., Giletta, M., Hastings, P. D., Nock, M. K., Slavich, G. M., Rudolph, K. D., Prinstein, M. J., Lindquist, K. A., & Sheridan, M. (2023). Exposure to threat adversity and amygdala-prefrontal connectivity during emotion regulation: Exploring the role of emotional clarity. Poster presented at the 2023 annual meeting of the Society for Affective Science, Long Beach, CA.
11. Kim, S., Bai, J., Zhang, W., Choi, D., & Slavich, G. M. (2023). Impact of racial discrimination and lifetime stressor exposure on anxiety and depression among Chinese and Korean Americans during the COVID-19 pandemic. Paper presented at the 37th annual meeting of the Southern Nursing Research Society, Orlando, FL.
12. Mashash, M., Usacheva, M., Hamlat E., Zhang, J., Lin, J., Zannas, A., Slavich, G. M., Laraia, B., Epel, E.S., & Mayer, S. E. (March). Dimensions of early life adversity and telomere length in Black and White women. Paper talk presented at the 2023 Annual Meeting of the Israel Society of Biological Psychiatry, Kfar Blum, Israel.
13. Kelly, C., Trumpff, C., Gray, Z., Wang, S., Sloan, R., Shapiro, P. A., Hirano, M., Slavich, G. M., Assuras, S., & Picard, M. (2023). Early life adverse experiences and adulthood memory performance among individuals with impaired cellular mitochondrial energetics. Paper presented at the 80th annual meeting of the American Psychosomatic Society, San Juan, Puerto Rico.
14. Pelletier-Baldelli, A., Sheridan, M. A., Rudolph, M. D., Martin, S., Srabani, E., Patel, K. K., Bonar, A. S., Giletta, M., Hastings, P. D., Nock, M. K., Slavich, G. M., Rudolph, K. D., Prinstein, M. J., & Bryant Miller, A. (2023). Neurodevelopmental processes supporting peer evaluation: Associations between brain network connectivity and pubertal timing, pubertal status, hormones, and age. Paper presented at the 2023 annual meeting of the Society of Biological Psychiatry, San Diego, CA.
15. Nagpal, A., Barone, J., Slavich, G. M., & Eisenlohr-Moul, T. (2023). Does lifetime stressor expo-

sure predict greater affective reactivity to the menstrual cycle? Longitudinal evidence in a large transdiagnostic sample of patients with affective disorders. 2023 annual meeting of the Society of Biological Psychiatry, San Diego, CA.

16. Kim, L. Y., Moriarity D. P., & Slavich, G. M. (2023). Longitudinal trajectories of internalizing symptoms during the transition to college: The importance of adverse childhood experiences. Poster presented at the 2023 annual meeting of the Association for Psychological Science, Washington D.C.
17. Hemond, C. C., Deshpande, M., Berrios-Morales, I., Slavich, G. M., & Cole, S. W. (2023). An unblinded observational study of mindfulness-based stress reduction in MS: MRI and biological inflammatory correlates of patient-reported outcomes. Paper presented at the 2023 annual meeting of the Consortium of Multiple Sclerosis Centers, Aurora, CO.
18. Engels-Domínguez, N., Riphagen, J. M., Van Egroo, M., Spahr, C., Slavich, G. M., & Jacobs, H. I. L. (2023). Preliminary validation of the Stress and Adversity Inventory for Adults (Adult STRAIN) in Dutch and its associations with in-vivo locus coeruleus integrity. Paper presented at the 2023 Alzheimer's Association International Conference, Amsterdam, The Netherlands.
19. Mashash, M., Usacheva, M., Surachman, A., Hamlat E., A., Slavich, G. M., Laraia, B., Epel, E. S., & Mayer, S. E. (2023). Dimensions of early life adversity and metabolic health in Black and White women. Paper presented at the 53rd annual meeting of the International Society of Psychoneuroendocrinology, London, England.
20. Kim, S., Higgins, M., Hertzberg, V., Brennan, P., Slavich, G. M., Xiong, L., Kelly, U., & Dunlop, A. (2023). Black-White differences in chronic stressor exposures to classify preterm birth are revealed by multivariate adaptive regression splines models. Paper presented at the 2023 annual meeting of the Asian American Pacific Islanders Nurses Association, Los Angeles, CA.
21. Nitschke, J. P., Mikus, N., Slavich, G. M., & Lamm, C. (2023). The association between lifetime stress exposure and social trust learning. Paper presented at the 2023 World Association for Stress-Related Anxiety Disorders Congress, Zürich, Switzerland.
22. Knauft, K. M., Jiang, Y., Shields, G. S., Slavich, G. M., & Zilioli, S. (2023). Associations between lifetime stressor severity and diurnal cortisol in older African American adults. Paper presented at the 53rd annual meeting of the International Society of Psychoneuroendocrinology, London, England.
23. Kim, S., Higgins, M., Brennan, P. A., Slavich, G. M., Hertzberg, V., Xiong, L., Kelly, U., & Dunlop, A. (2023). Race-specific multivariate adaptive regression splines models of chronic stressor exposures predict preterm birth among Black and White women. Paper presented at the 2023 Asian American/Pacific Islanders Nurses Association Conference, Los Angeles, CA, United States.
24. Haeffner, C. E., Higgins, E., Laubacher, C. M., Gresham, L. K., Nord, E., Barnes, A. L., Abercrombie, H. C., Rosenkranz, M. A., Davidson, R. J., Slavich, G. M., & Schaefer, S. M. (2023). Associations among lifetime stressor exposure, stress-related brain structures, and the acute stress re-

sponse. Paper presented at the 2023 annual meeting of the Society for Psychophysiological Research, New Orleans, LA.

25. Navarro, E., Miller, A., Martin, S., Hastings, P. D., Nock, M. K., Slavich, G. M., Somerville, L., Rudolph, K. D., Prinstein, M. J., & Sheridan, M. (2023). Examining associations between suicidal ideation and cognitive reappraisal among adolescent females. Paper presented at the 2023 annual meeting of the Flux Society, Santa Rosa, CA.
26. Bonar, A. S., Carolus, A. E., Alvarez, G. M., Bryant Miller, A., Gruhn, M., Robertson, M. M., Rodgriuez-Thompson, A., Martin, S., Patel, K. K., Giletta, M., Hastings, P. D., Nock, M. K., Slavich, G. M., Rudolph, K. D., Prinstein, M. J., Lindquist, K. A., & Sheridan, M. (2023). Examining the effects of childhood threat exposure and emotional clarity on amygdala-prefrontal connectivity in youth. Paper presented at the 2023 annual meeting of the Flux Society, Santa Rosa, CA.
27. Constantino-Pettit, A., Slavich, G. M., Lean, R., Warner, B., Luby, J. L., Smyser, C. D., Barch, D. M., & Rogers, C. E. (2023). Impact of maternal early life adversity and emotion dysregulation on infant neurodevelopment. Paper presented at the second annual meeting of the Fetal, Infant, and Toddler Neuroimaging Group, Santa Rosa, CA.
28. Panier, L. Y. X., Allison, G. O., Slavich, G. M., & Weinberg, A. (2023). Maternal overprotection interacts with stressor exposure to predict anxiety during the transition to university. Poster presented at the 2023 annual meeting of the Society for Research in Psychopathology, St. Louis, MO.
29. Rivera, K. M., Infante, A., Spahr, C. M., Slavich, G. M., & Doom, J. R. (2023). Associations between lifetime stress exposure, positive childhood experiences, and cardiovascular risk among adolescents. Poster presented at the 13th biennial meeting of the Society for the Study of Human Development, Philadelphia, PA.
30. Haeffner, C. E., Higgins, E. T., Laubacher, C. M., Gresham, L. K., Nord, E. C., Barnes, A. L., Abercrombie, H. C., Rosenkranz, M. A., Davidson, R. J., Slavich, G. M., & Schaefer, S. M. (2023). Associations among lifetime stressor exposure, amygdala and hippocampal volume, and the acute stress response. Poster presented at the 2023 annual meeting of the Society for Neuroscience Conference, Washington, DC.
31. Ahn, S., Xian, H., Scherrer, J., Mahmood, A., Kim, S., Ahn, E., Beck, M., & Slavich, G. M. (2023). Sleep problems mediate the association between childhood adversity and late-life cognitive functioning. Paper presented at the annual meeting of the Gerontological Society of America, Tampa, FL.
32. Palamarchuk, I. S., Slavich, G. M., Vaillancourt, T., & Rajji, T. K. (2023). Linking depression and dementia: Cellular metaparadigm of stress. Poster presented at the TDRA Workshop: Neuromodulation for Neurocognitive Disorders, Toronto Dementia Research Alliance, Temerty Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada.
33. Mengelkoch, S., Slavich, G., & Hill, S.E. (August 2023). Distressed About the Stress Response: Hormonal Contraceptive Use and Women's Inflammatory Response to Psychosocial Stress. Talk

accepted to the annual meeting of International Society for Evolution, Medicine, and Public Health (ISEMPH). Irvine, California.

34. Mengelkoch, S., Slavich, G., & Hill, S.E. (June 2023). Distressed About the Stress Response: Hormonal Contraceptive Use and Women's Inflammatory Response to Psychosocial Stress. Talk accepted to the annual meeting of Human Behavior and Evolution Society Conference (HBES). Palm Springs, California.
35. Mengelkoch, S., Slavich, G., & Hill, S.E. (2023). Distressed About the Stress Response: Hormonal Contraceptive Use and Women's Inflammatory Response to Psychosocial Stress. Talk accepted to the annual meeting of the Northeastern Evolutionary Psychology Society (NEEPS). New Paltz, New York.
36. Mengelkoch, S., Slavich, G., & Hill, S.E. (2023). Distressed About the Stress Response: Hormonal Contraceptive Use and Women's Inflammatory Response to Psychosocial Stress. Talk accepted to the annual meeting of the American Psychosomatic Society (APS). San Juan, Puerto Rico.
37. Mishra, A., & Mengelkoch, S. (2023) Work hard, Play hard: Within woman shifts in grit across the ovulatory cycle. Poster accepted at the annual meeting of the Northeastern Evolutionary Psychology Society (NEEPS). New Paltz, New York.
38. Sinha, K., & Mengelkoch, S. (2023) Does Domestic Violence Decrease as Women Age? Understanding the Patterns of Domestic Violence in India. Talk accepted at the annual meeting of the Northeastern Evolutionary Psychology Society (NEEPS). New Paltz, New York.
39. Kim, L., Slavich, G.M., & Moriarity, D.P. (2023). The trajectory of internalizing symptoms predicted by adverse childhood experiences and perceived stigma of mental illness. Poster presented at the 35th Association for Psychological Science Annual Convention.

Follow-up Grants Supporting CIAPM-related Work

1. Under Review: R01HG013827; Slavich (PI); 7/1/24 – 6/30/28; $3,134,229.00; NIH/NHGRI
   Addressing Early Adversity-Associated Health Inequities Using a Multi-omics Precision Medicine-Based Approach
   This study aims to characterize the computational, cognitive, and motivational mechanisms underlying how individuals construct the perceived cost of exercising self-control. Principal Investigator: George Slavich
2. Active/Funded: UCLA Chancellor's Award for Postdoctoral Research ($7,500) to Daniel P. Moriarity.
3. Active/Funded: APS Teaching Fund ($4,995) for development of CIAPM stress & resilience online course to Daniel P. Moriarity.

Advancing a Precision Population Health Approach to ACEs to Reduce Health Disparities (HEALthy4You)

Lead Investigator: Dr. Gary S. Firestein, UC San Diego

Publications

1. Terrana, A., Viglione, C., Rhee, K., Rabin, B., Godino, J., Aarons, G. A., Chapman, J., Melendrez, B., Holguin, M., Osorio, L., Gidwani, P., Juarez Nunez, C., Firestein, G., Hekler, E. (2023). The core functions and forms paradigm throughout EPIS: designing and implementing an evidence-based practice with function fidelity. Frontiers in Health Services, 3. https://doi.org/10.3389/frhs.2023.1281690

The Collaborative Approach to Examining Adversity and Building Resilience (CARE) Program

Lead Principal Investigator: Dr. Neeta Thakur, UC San Francisco

Publications

1. de la Rosa, R., Zablotny, D., Ye, M., Bush, N. R., Hessler, D., Koita, K., Bucci, M., Long, D., & Thakur, N. (2023). Biological Burden of Adverse Childhood Experiences in Children. Psychosomatic medicine, 85(2), 108–117. https://doi.org/10.1097/PSY.0000000000001167
2. Ye M, Hessler D, Ford D, et al. Pediatric ACEs and related life event screener (PEARLS) latent domains and child health in a safety-net primary care practice. BMC Pediatr. 2023;23(1):367. Published 2023 Jul 17. doi:10.1186/s12887-023-04163-2

Cancer Disparities Research Projects

Reducing Cancer Disparities Through Innovative Community-Academic Partnerships

Lead Principal Investigators: Dr. Manali Patel, Stanford University

Publications

1. Wood, Emily H., Leach, Maria, Villicana, Gerardo., Rosas, Lisa G., Duron, Ysabel, O'Brien, Dale G., Koontz, Zachary, & Patel, Manali I. (2023). A Community-Engaged Process for Adapting a Prov-

en Community Health Worker Model to Integrate Precision Cancer Care Delivery for Low-income Latinx Adults with Cancer. Health Promotion Practice.

2. Rodriguez G., Kumar D., Patel M.I. "I have constant fear." A national qualitative study on the impact of COVID-19 on cancer care and potential solutions to improve the cancer care experience during the pandemic, Journal of Clinical Oncology Practice, May 2023.
3. Wood, E. H., Rodriguez, G. M., Villicana, G., Lopez Guzman, L., Reynaga, J., Medrano, H. S., ... & Patel, M. I. (2023). The effect of a multilevel community health worker–led intervention on patient knowledge of precision medicine: A randomized clinical trial. ASCO Quality
4. Hanna, M. T., Wood, E. H., Medrano, H. S., Perez, C., Noyola, A., Villicana, G., ... & Patel, M. I. (2023). ALCANCE Food for Health Equity: Community-driven development of a food insecurity intervention for patients with cancer.
5. Kamran, R., Wood, E. H., Perez, C., Medrano, H. S., Villicana, G., Lopez Guzman, L., ... & Patel, M. I. (2023). Advancing equity in cancer care through community-academic partnerships: Results from the addressing Latinx cancer care equity—Program for long-term united skills building (ALCANCE-PLUS).

Conference Presentations and Invited Talks

1. Patel, M.I. "Conquering the Digital Divide – Strategies and Approaches that Can Achieve Equity," Center for Digital Health Advisory Board Meeting, Stanford, CA, January 20, 2023.
2. Patel, M.I. "Equity in the Delivery of Precision Cancer Care Through Community-Academic Partnerships," invited speaker at the Precision Medicine World Conference, Santa Clara, CA, January 24, 2023.
3. Patel, M.I. "Lessons learned in the conduct of multilevel community-based research to improve value-based cancer care delivery," invited speaker at the UNC Chapel Hill Lineberger Comprehensive Cancer Center Cancer Outcomes Research Program, Chapel Hill, North Carolina, February 7, 2023
4. Patel, M.I., Wood E.H. "Wildfires and Health," invited speaker with Emily Wood at the ACTIVATE23 AgSafe Annual Conference, Monterey, California, February 9, 2023.
5. Patel, M.I. "Barriers and Facilitators in the Conduct of Multilevel Community-based research," Stanford-Surgery Policy Improvement Research and Education Center," Stanford University, February 13, 2023.
6. Patel, M.I. "Cancer Health Equity," School of Medicine Cancer Biology Course, Stanford University, February 21, 2023
7. Patel, M.I. "Lung Cancer – Policies to Reduce Burden," Stanford University School of Medicine Community Health and Prevention Research (CHPR) 250 Course, Stanford University, February 23, 2023
8. Patel, M.I. Invited to present as the recipient of the Iris Fischer Memorial Lectureship

Yale Cancer Center Grand Rounds, New Haven, New Jersey, March 28, 2023.

9. Patel, M.I. "Community Based Organizations and Fireside Chats" invited speaker and panelist at the 2023 Bristol Myers Squibb Foundation Grantee Summit, Austin, Texas, April 19, 2023.
10. Patel, M.I. "Symptom Management" invited speaker at the 2023 Global Breast Cancer Conference, Seoul Korea, April 27, 2023.
11. Patel, M.I. "Novel therapeutics and cancer disparities" speaker and panelist at the 2023 Summit on Cancer Health Disparities, Seattle, Washington, April 29, 2023.
12. Patel, M.I. "Advocating for policies and practices to advance cancer health equity," invited speaker and panelist and named Advocacy Champion - President's Circle at the American Society of Clinical Oncology Advocacy Summit, Washington DC, May 1, 2023.
13. Patel, M.I. "It's not the biology--Advancing Cancer Health Equity," Stanford University Cancer Biology 242 Course, Stanford University May 10, 2023
14. Kamran, R., Wood, E. H., Perez, C., Medrano, H. S., Villicana, G., Lopez Guzman, L., ... & Patel, M. I. Advancing equity in cancer care through community-academic partnerships: Results from the addressing Latinx cancer care equity—Program for longterm united skills building (ALCANCE-PLUS). American Society of Clinical Oncology Quality Care Symposium 2023, Boston, MA, October 27, 2023.
15. Patel, M.I., Wood, E.H., Agrawal, M., Kamran, R., Rodriguez, G.M., ...& Galvez, D.R. "Partnerships to Advance Cancer Care (PACC): Advancing cancer care delivery from Trenches to Benches to Bedsides and Wrenches." Oncology/Hematology/BMT Research Retreat at Asilomar Conference Center, Monterey, CA, September, 2023.
16. Wood, E. H., Rodriguez, G. M., Villicana, G., Lopez Guzman, L., Reynaga, J., Medrano, H. S., ... & Patel, M. I. The effect of a multilevel community health worker–led intervention on patient knowledge of precision medicine: A randomized clinical trial. Oncology/Hematology/BMT Research Retreat at Asilomar Conference Center, Monterey, CA, September, 2023.
17. Hanna, M. T., Wood, E. H., Medrano, H. S., Perez, C., Noyola, A., Villicana, G., ... & Patel, M. I. ALCANCE Food for Health Equity: Community-driven development of a food insecurity intervention for patients with cancer. Oncology/Hematology/BMT Research Retreat at Asilomar Conference Center, Monterey, CA, September, 2023.
18. Wood, E. H., Rodriguez, G. M., Villicana, G., Lopez Guzman, L., Reynaga, J., Medrano, H. S., ... & Patel, M. I. The effect of a multilevel community health worker–led intervention on patient knowledge of precision medicine: A randomized clinical trial. 2023 ASCO Quality Care Symposium, Boston, MA, October 27, 2023.
19. Hanna, M. T., Wood, E. H., Medrano, H. S., Perez, C., Noyola, A., Villicana, G., ... & Patel, M. I. ALCANCE Food for Health Equity: Community-driven development of a food insecurity intervention for patients with cancer. 2023 ASCO Quality Care Symposium, Boston, MA, October 27, 2023.

20. Wood, E. H., Rodriguez, G. M., Villicana, G., Lopez Guzman, L., Reynaga, J., Medrano, H. S., ... & Patel, M. I. The effect of a multilevel community health worker–led intervention on patient knowledge of precision medicine: A randomized clinical trial. 2023 American Public Health Association Conference, November 13, 2023.

Public Outreach and Education

- September 2023 Community Advisory Board

Integrated Machine-Learning Platform to Inform Precision Therapy in Triple-Negative Breast Cancer Patients

Lead Principal Investigators: Dr. Pablo Tamayo & Dr. William Kim, UC San Diego

Press Coverage

1. Fikes, Bradley. 2019. "UCSD gets $3 million to fight triple-negative breast cancer." San Diego Union Tribune, February 15. Fikes, Bradley. 2019.
2. "UCSD gets $3 million to fight triple-negative breast cancer." Baltimore Sun, February 15.

Publications

1. Mavura Y, Song H, Xie J, Tamayo P, Mohammed A, Lawal AT, Bello A, Ibrahim S, Faruk M, Huang FW. Transcriptomic profiling and genomic rearrangement landscape of Nigerian prostate cancer. Prostate. 2023 Apr;83(5):395-402. doi: 10.1002/pros.24471. Epub 2023 Jan 4. PMID: 36598071.
2. Sun Y, Revach OY, Anderson S, Kessler EA, Wolfe CH, Jenney A, Mills CE, Robitschek EJ, Davis TGR, Kim S, Fu A, Ma X, Gwee J, Tiwari P, Du PP, Sindurakar P, Tian J, Mehta A, Schneider AM, Yizhak K, Sade-Feldman M, LaSalle T, Sharova T, Xie H, Liu S, Michaud WA, Saad-Beretta R, Yates KB, Iracheta-Vellve A, Spetz JKE, Qin X, Sarosiek KA, Zhang G, Kim JW, Su MY, Cicerchia AM, Rasmussen MQ, Klempner SJ, Juric D, Pai SI, Miller DM, Giobbie-Hurder A, Chen JH, Pelka K, Frederick DT, Stinson S, Ivanova E, Aref AR, Paweletz CP, Barbie DA, Sen DR, Fisher DE, Corcoran RB, Hacohen N, Sorger PK, Flaherty KT, Boland GM, Manguso RT, Jenkins RW. Targeting TBK1 to overcome resistance to cancer immunotherapy. Nature. 2023 Jan 12. PMID: 36634707.
3. Ford K, Munson BP, Fong SH, Panwala R, Chu WK, Rainaldi J, Plongthongkum N, Arunachalam V, Kostrowicki J, Meluzzi D, Kreisberg JF, Jensen-Pergakes K, VanArsdale T, Paul T, Tamayo P, Zhang K, Bienkowska J, Mali P, Ideker T. Multimodal perturbation analyses of cyclin-dependent kinases reveal a network of synthetic lethalities associated with cell-cycle regulation and transcriptional regulation. Sci Rep. 2023 May 11;13(1):7678. doi: 10.1038/s41598-023-33329-2. PMID: 37169829; PMCID: PMC10175263.

4. Rohila D, Park IH, Pham TV, Jones R, Tapia E, Liu KX, Tamayo P, Yu A, Sharabi AB, Joshi S. Targeting macrophage Syk enhances responses to immune checkpoint blockade and radiotherapy in high-risk neuroblastoma. Front Immunol. 2023 Jun 7;14:1148317. doi: 10.3389/fimmu.2023.1148317. PMID: 37350973; PMCID: PMC10283071.
5. Rohila D, Park IH, Pham TV, Weitz J, Hurtado de Mendoza T, Madheswaran S, Ishfaq M, Beaman C, Tapia E, Sun S, Patel J, Tamayo P, Lowy AM, Joshi S. Syk Inhibition Reprograms Tumor-Associated Macrophages and Overcomes Gemcitabine-Induced Immunosuppression in Pancreatic Ductal Adenocarcinoma. Cancer Res. 2023 Aug 15;83(16):2675-2689. doi: 10.1158/0008-5472.CAN-22-3645. PMID: 37306759; PMCID: PMC10416758.
6. Pre-Print: Faraji F, Ramirez SI, Clubb LM, Sato K, Quiroz PYA, Galloway WMG, Mikulski Z, Hoang TS, Medetgul-Ernar K, Marangoni P, Jones KB, Officer A, Molinolo AA, Kim K, Sakaguchi K, Califano JA, Smith Q, Klein OD, Tamayo P, Gutkind JS. Direct reprogramming of oral epithelial progenitor cells to cancer stem cells at single cell resolution in vivo. bioRxiv. 2023 Jul 26:2023.07.24.550427. doi: 10.1101/2023.07.24.550427. PMID: 37546810; PMCID: PMC10402053.
7. Steen E, Basilaia M, Kim W, Getz T, Gustafson J, Zage PE. Targeting the RET tyrosine kinase in neuroblastoma: A review and application of a novel selective drug design strategy. Biochem Pharmacol. 2023 Aug 16;115751. doi: 10.1016/j.bcp.2023.115751.
8. Panuganti BA, Carico C, Jeyarajan H, Flagg M, Tamayo P. Transcriptional subtypes of glottic cancer characterized by differential activation of canonical oncogenic programming. Head Neck. 2023 Nov;45(11):2851-2861. doi: 10.1002/hed.27514. Epub 2023 Sep 8. PMID: 37682073.
9. Burghi V, Paradis JS, Officer A, Adame Garcia S, Wu X, Matthees ES, Barsi-Rhyne B, Ramms DJ, Clubb L, Acosta M, Tamayo P, Bouvier M, Inoue A, von Zastrow M, Hoffmann C, Gutkind JS. Gαs is dispensable for β-arrestin coupling but dictates GRK selectivity and is predominant for gene expression regulation by β2-adrenergic receptor. J Biol Chem. 2023 Sep 27:105293. doi: 10.1016/j.jbc.2023.105293. Epub ahead of print. PMID: 37774973.
10. Chaudhary P, Xu X, Wang G, Hoj JP, Rampersad R, Asselin-Labat ML, Ting S, Kim W, Tamayo P, Pendergast AM, Onaitis M. Activation of KrasG12D in subset of alveolar Type II cells enhances cellular plasticity in lung adenocarcinoma. Cancer Res Commun. 2023 Nov 24. doi: 10.1158/2767-9764.CRC-22-0408. PMID: 37882674.
11. Ma JY, Ting S, Tam B, Pham T, Reich M, Mesirov J, Tamayo P, Kim W. Deciphering the Functional Roles of Individual Cancer Alleles Across Comprehensive Cancer Genomic Studies. bioRxiv. 2023 Nov 16:2023.11.14.567106. doi: 10.1101/2023.11.14.567106. PMID: 38014215

Conference Presentations and Invited Talks

1. Kim, W. Behind the Science: A Cancer Research Forum from Moores Cancer Center. May 25th (2023). UCSD MCC Community Outreach Engagement. Online
2. P. Tamayo, A tumor state model and prototype AI system to predict individual patient re-

sponse to cancer therapies (Nov 3rd 2023). Designing Hope: Engineering Solutions to Cancer, Atkinson Hall UCSD

Improving Precision Medicine for Breast Cancer in Latinas: A Multi-Tiered Approach

Lead Principal Investigators: Dr. Elad Ziv, UC San Francisco

Publications

1. Yuan C Ding*, Hanbing Song*, Aaron Adamson*, Daniel Schmolze, Donglei Hu, Scott Huntsman, Linda Steele, Carmina Patrick, Shu Tao,Natalie Hernandez, Charleen D Adams, Laura Fejerman, Kevin L. Gardner, Anna María Nápoles, Eliseo J. Pérez-Stable, Jeffrey N. Weitzel, Henrik. Bengtsson, Franklin W. Huang, Susan L. Neuhausen+, Elad Ziv+ Profile of the somatic mutational landscape in breast tumors from Hispanic/Latina women, Cancer Research; 2023 Aug 1; 83(15):2600-2613. PMID: 37145128; PMCID: PMC10390863.
   * Joint first authors; + Joint senior authors
2. Fabian Perez, Miriam Hernandez, Alejandra Martinez, Patricia Castaneda, Raquel Ponce, Maria Gonzalez, Cindia Martinez, Angelica Perez, Juanita Elizabeth Quino, Eric Robles Garibay, Valentina A. Zavala, Xiaosong Huang, Susan L Neuhausen, Elad Ziv, Luis CarvajalCarmona, Ysabel Duron, Laura Fejerman. Promotores' perspectives on the virtual adaptation of a hereditary breast cancer education program. J Genet Counseling; 2023 Dec;32(6):1226-1231, PMID: 37747056.
3. **Pre-Print**: Nierenberg JL, Adamson AW, Hu D, Huntsman S, Patrick C, Li M, Steele L, Tong B, Shieh Y, Fejerman L, Gruber SB, Haiman CA, John EM, Kushi LH, Torres-Mejia G, Ricker C, Weitzel JN, Ziv E*, Neuhausen SL*. Whole exome sequencing and replication for breast cancer among Hispanic/Latino women identifies FANCM as a susceptibility gene for estrogen-receptor negative breast cancer. medRxiv. 2023 Jan 28. PMID: 36747679; PMCID: PMC9901069.
   * Joint senior and co-corresponding authors

Appendix B. Summaries of Previously Funded Projects; New Publications, Presentations, Press, and Patents from Past CIAPM Projects

Summaries of previously funded CIAPM projects are listed below. CIAPM also recognizes that research results cannot always be collected during the term of funding and therefore stays connected with researchers for five years following the conclusion of CIAPM grants. Below the summaries are publications, presentations, press coverage, and patents in 2023 related to each team's CIAPM-funded project.

Precision Diagnosis of Acute Infectious Diseases

Lead Principal Investigator: Dr. Charles Chiu

Host Institution: UC San Francisco

Project Period: September 1, 2015 – December 31, 2018

Partners: Abbott Laboratories, Inc.; American Tissue Culture Collection; California Department of Public Health; Children's Hospital Colorado / University of Colorado; Children's Hospital Los Angeles; Children's National Medical Center at Washington D.C.; DNAnexus, Inc.; Google, Inc.; Illumina, Inc.; Oxford Nanopore Technologies, Inc.; Quest Diagnostics, Inc.; St. Jude Children's Research Hospital; Synapse, Inc.; U.S. Food and Drug Administration; UC Berkeley; UC Davis; UCLA; UC San Diego; University of Maryland; Zuckerberg San Francisco General Hospital and Trauma Center

Rare bacterial infections are challenging to diagnose, often resulting in patients with suspected infections receiving generalized therapies like antibiotics instead of tailored treatments. This non-specific approach not only escalates healthcare expenditures but also heightens the risks associated with antibacterial resistance and potential fatalities.

To enhance the accuracy of diagnosing and treating brain infections, the Precision Diagnosis of Acute Infectious Disease (PDAID) team at UCSF devised a genomic test, referred to as metagenomic sequencing. This approach involved the search for microbial DNA in patient samples, such as cerebrospinal fluid or blood. By genetically profiling these patient samples, the team was able to pinpoint

the presence of bacterial and microbial DNA, confirming whether bacteria were the cause of the infection.

The application of the metagenomic test to patients with brain infections unveiled 14 previously unidentified infections among the enrolled individuals. Furthermore, the team illustrated the cost-saving potential of this precision medicine approach through a case involving a 14-year-old boy who had endured months of inconclusive tests before receiving a diagnosis. The new test expediently identified the source of his infection, offering the potential to alleviate suffering and reduce medical expenses by avoiding the need for hospitalizations and unproductive diagnostic tests. Overall, this research represents an excellent precision medicine strategy with the capacity for broader application across various diseases.

Notable Accomplishments

- Created clinical-grade software
- Validated the experimental metagenomics test within a clinical laboratory setting for the purpose of diagnosing the origins of brain inflammation
- Confirmed the applicability of the test within a clinical laboratory context for diagnosing infections through blood plasma
- Began clinical studies of critically ill hospitalized patients to compare conventional and metagenomic-based approaches
- Instituted and routinely convened a clinical microbial sequencing board, a diverse group that meets to discuss complex patient cases
- Initiated efforts to make the test affordable and widely available

New Publications in 2023

1. Loy CJ, Sotomayor-Gonzalez A, Servellita V, et al. Nucleic acid biomarkers of immune response and cell and tissue damage in children with COVID-19 and MIS-C. Cell Rep Med. 2023;4(6):101034. doi:10.1016/j.xcrm.2023.101034
2. Servellita V, Sotomayor Gonzalez A, Lamson DM, et al. Adeno-associated virus type 2 in US children with acute severe hepatitis. Nature. 2023;617(7961):574-580. doi:10.1038/s41586-023-05949-1
3. Walters WA, Granados AC, Ley C, et al. Longitudinal comparison of the developing gut virome in infants and their mothers. Cell Host Microbe. 2023;31(2):187-198.e3. doi:10.1016/j.chom.2023.01.003

California Kids Cancer Comparison

Lead Principal Investigator: Dr. David Haussler

Host Institution: UC Santa Cruz

Project Period: September 1, 2015 – December 31, 2018

Partners: Alex's Lemonade Stand Foundation; Amazon Services, Inc.; Microsoft Azure, Inc.; Children's Hospital Orange County; Children's Mercy Hospital in Kansas City; DNAnexus, Inc.; Jacob's Heart; Key for a Cure; Kids v Cancer; Live for Others Foundation; NuMedii, Inc.; Pacific Pediatric Neuro-Oncology Consortium; Philanthropist George Kraw; Sanford University of South Dakota Medical Center; Seven Bridges Genomics, Inc.; Stanford University Hospital; St. Baldrick's Foundation; Team Finn; Team G Foundation; UC San Francisco; University of British Columbia Cancer Agency; University of Michigan; University of Pittsburg; Unravel Pediatric Cancer

While there has been notable progress and innovations in the treatment of cancers in adults, the approaches for pediatric cancer has seen minimal evolution over the last 50 years. Consequently, cancer continues to be the leading cause of death due to disease among children. In California, 1,700 children are diagnosed with cancer each year, 500 of which fail to respond to available treatments or do not have access to standard therapies for their condition.

Given that DNA testing and analysis offer valuable insights for less than 10% of pediatric cancer patients, the California Kids Cancer Comparison (CKCC) aimed to construct a more comprehensive genetic profile of each tumor through RNA sequencing. Unlike DNA, RNA reveals the functioning of the tumor and identifies the genes and pathways potentially fueling cancer growth. CKCC's objective was to enhance pediatric cancer care by using RNA to profile patient tumors, identifying targets for therapeutic intervention and treatment.

CKCC's RNA-based approach provided the researchers with new information in all the pediatric cancer cases, surpassing their goal of new information in 20% of pediatric cases. Additionally, the team established a registry of the tumor RNA profiles, which physicians can use when diagnosing and treating pediatric cancer patients. Overall, CKCC's RNA approach discovered new treatment options when DNA-based diagnoses did not provide useful treatment information. The results of this project can be scaled to a wider spectrum of pediatric and adult cancers, leaving a broader impact.

Notable Accomplishments

- Formed a network comprising hospitals and research organizations
- Used data to propose new treatment options
- Communicated discoveries to molecular tumor panels
- Used computational techniques to develop an extensive catalog of tumor data.
- Involved patients in clinical decision-making and the research process
- Instituted an initial-phase patient registry study to validate the data's practicality

Personal Mobile and Contextual Precision Health

Lead Principal Investigator: Dr. Nicholas Anderson

Host Institution: UC Davis

Project Period: January 1, 2017 – December 31, 2018

Partners: Overlap Health, Inc.; UC Berkeley; UC San Francisco

Managing chronic illnesses like hypertension and depression can be challenging when patients are away from medical facilities and lack constant contact with their healthcare providers. However, patients continuously collect personal data on their mobile devices, offering an opportunity for both patients and clinicians to track disease progression. Despite the potential value of this data for health records and patient care, many mobile applications do not facilitate healthcare providers' access to this information or integration with electronic health records (EHRs).

The research team at UC Davis developed a mobile health application compliant with HIPAA. This application was designed to transmit alerts and gather, oversee, and report patient-generated data while seamlessly integrating it with the patient's EHR. This integration allowed both the clinical care team and the patient to interact with and access their health data in real-time.

This project created, implemented, and evaluated a comprehensive system capable of connecting two major hospital record systems with a private mobile health industry partner. The research team demonstrated the capability to link EHR data with applications that track daily lifestyle-generated data, offering a model for integrated precision medicine care both inside and outside the clinic.

<u>Notable Accomplishments</u>

- Exemplified how chronic diseases can be monitored using an integrated mobile phone application with EHRs

- Created a policy and privacy framework that connects data providers with clinical and personal data
- Analyzed the user experience associated with the application

Early Prostate Cancer: Predicting Treatment Response

Lead Principal Investigator: Dr. Sheldon Greenfield

Host Institution: UC Irvine

Project Period: January 1, 2017 – December 31, 2018

Partners: Ambry Genetics Corporation; Cedars-Sinai Medical Center; GenomeDx Biosciences, Inc.; Vanderbilt University; Veterans Affairs Los Angeles; UCLA Medical Center

Prostate cancer, the most prevalent cancer among men in the United States, relies on a limited set of tests for diagnosis and treatment decisions, which do not effectively predict how the tumor will respond to treatment. Disparities in prostate cancer outcomes have been associated with varying levels of healthcare access, chronic stress, socioeconomic status, and environmental factors. Despite this knowledge, these factors have not been considered in the profiling of prostate cancer or the customization of patient treatments.

UC Irvine's research team addressed this healthcare gap by introducing an individualized risk profile to tailor care and mitigate disparities in prostate cancer outcomes. The Comparative Effectiveness Analysis of Surgery and Radiation (CEASAR Study) aimed to explore whether the severity of prostate cancer and a patient's personal circumstances could predict health outcomes following therapeutic radiation or surgery.

The models developed during this study are expected to evolve, providing valuable insights into treatment effectiveness and cancer recurrence in patients. As these models are refined, the research team plans to share their findings with healthcare professionals in southern California, starting with urologists and radiation oncologists at the five partner institutions. Their goal is to implement this model to enhance patient care.

Notable Accomplishments

- Established a consortium of clinicians, researchers, and industry collaborators for the study

- Formed a Citizen Science Committee to provide patient perspectives
- Created a federated registry that allows for data searches that inform patient outcomes, all while enforcing the privacy of patient data
- Examined the connection between genetic risk, patient characteristics, and treatment, revealing that African American and Latino men typically show a heightened genetic predisposition to prostate cancer

Precision Medicine for Multiple Sclerosis: Making It Work

Lead Principal Investigator: Dr. JB Jones

Host Institution: Sutter Health

Project Period: March 1, 2017 – December 31, 2018

Partners: National Multiple Sclerosis Society; Palo Alto Medical Foundation; Plan Language Health, Inc.; Roche/Genentech, Inc.; Sutter's Jordan Research and Education Institute; Sutter Philanthropy; UC San Francisco

Multiple sclerosis (MS) is a chronic disorder of the nervous system affecting the brain and spinal cord. It arises when the body's immune system erroneously targets healthy cells, leading to neurodegeneration. Although symptoms typically manifest between the ages of 20 to 40, the progression of the disease varies among individuals and remains challenging to predict or effectively treat.

To address the knowledge gap concerning MS progression, a collaborative research team from Sutter Health and UCSF developed an interactive tool known as neuroSHARE. This application was conceived to facilitate access to clinical and patient-reported data, forecast disease management strategies aimed at slowing progression and alleviating symptoms, and promote collaborative decision-making between patients and physicians. The neuroSHARE design streamlines the process, incorporating the latest MS research as a resource for patients while also interpreting patient data to ensure their unique concerns are addressed during subsequent medical appointments.

As a result of this study, neuroSHARE was successfully implemented in various real-world neurology practice settings. The concept behind this application, which established a precision medicine link between the patient's bedside and the doctor's office, has the potential for versatile application across a range of medical conditions. Tools like neuroSHARE highlight the significance of bringing data into the conversation between clinicians and patients, particularly within the framework of elec-

tronic health records.

Notable Accomplishments

- Developed an effective data management tool
- Progressed towards the reduction of health disparities
- Used partnerships to encourage clinical and commercial use, with potential to scale toward other diseases/conditions

Full Genome Analysis to Guide Precision Medicine

Lead Principal Investigator: Dr. David Martin

Host Institution: Children's Hospital Oakland Research Institute

Project Period: March 1, 2017 – December 31, 2018

Partners: GenomeOne, Inc.; Human Longevity, Inc.; Illumina, Inc.; UC Berkeley; UC San Francisco; UCSF Benioff Children's Hospital Oakland

While significant advancements have been made in genetic testing over the past decade, the majority of tests conducted in medical practices and hospitals are tailored to a limited set of common genetic disorders, rather than comprehensively analyzing the patient's entire genetic makeup, known as the genome. Furthermore, genetic tests often inadequately represent communities of color, resulting in underdiagnosis of potential genetic disorders among individuals in these demographics.

Researchers at the Children's Hospital Oakland Research Institute pioneered a method called Full Genome Analysis (FGA), aimed at sequencing the complete genome of children who may have genetic disorders. They tested 45 pediatric cases, primarily from underserved backgrounds, successfully identifying the probable genetic cause of the disorder in 40% of these cases.

This research showed that FGA can enable clinicians to assess disease risk and potential therapies early in their pediatric patient treatment. Additionally, it contributed to the identification of genetic diseases that may otherwise go unnoticed within communities of color, improving the list of genetic disorders that clinicians consider when diagnosing patients

Notable Accomplishments

- Successfully pinpointed the probable genetic cause of the condition in 40% of the pediatric

patients in the study
- Demonstrated the ability of Full Genome Analysis in clinical care of pediatric patients, potentially establishing a new standard of care for undiagnosed illnesses
- Added genomic data from underrepresented communities to the catalog of disease information that clinicians consider

Artificial Intelligence for Imaging of Brain Emergencies

Lead Principal Investigator: Dr. Pratik Mukherjee

Host Institution: UC San Francisco

Project Period: February 1, 2017 – December 31, 2018

Partners: Brain Trauma Foundation; Community Regional Medical Center in Fresno; Stanford University; TBI Endpoints Development Project; Transforming Research and Clinical Knowledge in Traumatic Brain Injury Consortium; UC Berkeley; Zuckerberg San Francisco General Hospital and Trauma Center

Irreversible damage to the brain can occur within minutes following a brain injury. However, the ability to diagnose such injuries relies on the expertise of skilled radiologists who assess brain scans, thereby limiting the promptness of treatment available to patients during this critical timeframe.

Researchers at UCSF and UC Berkeley pioneered a cutting-edge technology designed to automate the analysis of Computed Tomography (CT) brain scans. This approach harnessed image recognition software and Artificial Intelligence (AI) to detect brain injuries. Following extensive training on a dataset comprising over 100,000 CT scans, the technology achieved an accuracy rate of over 99% in identifying brain injuries, which is on par with the performance of board-certified radiologists.

The team created a cloud-based, automated image analysis system that can identify intracranial bleeding with over 99% accuracy, matching the proficiency of a board-certified radiologist. After receiving FDA approval, the technology can be deployed in regions that lack radiologists, including rural, remote areas, and underserved regions in developing countries.

Notable Accomplishments

- Showcased the potential of AI-driven automated image analysis for neurological injuries, applicable in routine clinical practice, research studies, and pharmaceutical trials
- Designed a computer-vision AI solution to detect and measure biomarkers associated with

brain injuries

- Examined numerous patient images, achieving a diagnosis accuracy exceeding 99%
- Enhanced the AI tool for cloud-based, multi-scanner use, with the goal of securing FDA approval for its use

New Publications in 2023

1. Mark IT, Wren-Jarvis J, Xiao J, et al. Neurite orientation dispersion and density imaging of white matter microstructure in sensory processing dysfunction with versus without comorbid ADHD. Front Neurosci. 2023;17:1136424. Published 2023 Jul 10. doi:10.3389/fnins.2023.1136424
2. Kryza-Lacombe M, Santiago R, Hwang A, et al. Resting-State Connectivity Changes After Goal-Oriented Attentional Self-Regulation Training in Veterans With Mild Traumatic Brain Injury: Preliminary Findings from a Randomized Controlled Trial. Neurotrauma Rep. 2023;4(1):420-432. Published 2023 Jun 29. doi:10.1089/neur.2022.0074
3. Parekh SA, Wren-Jarvis J, Lazerwitz M, et al. Hemispheric lateralization of white matter microstructure in children and its potential role in sensory processing dysfunction. Front Neurosci. 2023;17:1088052. Published 2023 Apr 17. doi:10.3389/fnins.2023.1088052

Early Prediction of Major Adverse Cardiovascular Event Surrogates

Lead Principal Investigator: Dr. Brennan Spiegel

Host Institution: Cedars-Sinai Medical Center

Project Period: January 1, 2017 – December 31, 2018

Partners: Agilent, Inc.; AliveCor, Inc.; Beckman Coulter, Inc.; DocuSign, Inc.; Fitabase, Inc.; Fitbit, Inc.; HealthLoop, Inc.; Neoteryx, Inc.; SCIEX, Inc.; Tasso, Inc.; Thermo Fisher Scientific, Inc.; UCLA

Cardiovascular disease stands as the primary cause of death in both men and women throughout California, with a higher incidence among younger women and racial/ethnic minorities. The initial indicators of disease often go unnoticed, and the absence of regular healthcare can lead to detrimental disease advancement.

The research team based at Cedars-Sinai Medical Center conducted a study to investigate the feasibility of identifying cardiovascular risks at an early stage, thereby enabling effective treatment or prevention. They collected physical, biochemical, and psychosocial data to predict Major Adverse Cardiac Events (MACEs). Over a twelve-month period, the team remotely monitored a group of 200

patients diagnosed with ischemic heart disease using wearable biosensors. These tracked various metrics, including their physical activity, sleep patterns, heart rate, stress levels, self-reported mental health, and finger-prick blood samples. The comprehensive dataset was then analyzed to ascertain whether monitoring these parameters could aid in predicting MACEs among the patients.

The remote monitoring system showcased the capacity for tracking patients beyond the confines of a medical facility, while potentially helping to predict and prevent MACEs. To illustrate, a 64-year-old male participant noticed chest pain and an abnormal cardiac reading on his wearable biosensor. In response, the program advised him to seek emergency room care, preventing a more severe cardiac episode. The team has published their successful findings and intends to continue publishing additional results after further analysis of over 500 potential biomarkers from the patients' blood samples.

Notable Accomplishments

- Established that collecting blood samples remotely at a patient's residence yields high-quality samples for clinical examination, comparable to, if not superior to, samples obtained in a clinical setting
- Demonstrated a 72% patient adherence rate throughout the study, affirming the feasibility and consistency of patient engagement within this research framework
- Found a correlation between reduced physical activity and sleep patterns and an elevated likelihood of developing anxiety and depression among participants
- Identified an association of physical activity and overall well-being with improved cardiac health and a reduced risk of MACEs

Appendix C. Select Invited Talks and CIAPM Representation at 2023 External Events

January 25-27 – Precision Medicine World Conference, Dr. McCall, Dr. Muir, Ms. Barberis

February 8 – Biomarker and Companion Diagnostics Conference in San Diego, Keynote presentation entitled, "Authentic Community Engagement in State-Sponsored Precision Medicine Research," Dr. Muir

June 12 – Bay Area Economic Council Science and Innovation Consortium Board of Directors Quarterly Meeting, Dr. McCall

June 20 – California Legislative Informational Hearing, Assembly Select Committee on Biotechnology, Dr. McCall

August 24 – National Alliance of Mental Illness California Annual Conference, Drs. Reiner and Pennington

November 7 – UC San Francisco, Algorithmic Justice in Precision Medicine, Ms. Barberis, Drs. McCall, Reiner, and Spezzano

November 16 – Biocom California Celebration of Life Gala, Government Official of the Year Award Ceremony, Dr. McCall

November 29 – Stanford Mental Healthcare Innovation Summit, Dr. Reiner

December 4 –Icahn School of Medicine at Mount Sinai, Dr. McCall

December 13 – SRI International Seminar Series, Dr. McCall

Appendix D. Press Release for the Depression Research Program's Request for Proposals

California Announces Funding for Innovative Research to Prevent, Diagnose, and Treat Depression

Published: 09/22/2023

Contact: David Reiner, 916-323-9164, david.reiner@opr.ca.gov

Sacramento, CA — California has announced a request for proposals for innovative research on the prevention, diagnosis, and treatment of depression through the California Initiative to Advance Precision Medicine (CIAPM) within the Governor's Office of Planning and Research. The funding will support precision medicine research studies in California to improve outcomes for patients with or at risk for depression, particularly as a path to reduce health inequities. CIAPM will award $9 million total across three to five independent research teams ($1.8 to $3 million per team) over a three-year project term.

"Precision medicine can be best described as providing the right treatment for the right patient at the right time, essentially viewing the patient as a whole person," said CIAPM Science Officer Dr. David Reiner. "The research we intend to fund seeks to provide innovative approaches to implement

personalized, meaningful, and effective care for people with or at risk of depression."

California-based proposal teams must be co-led by at least one non-profit academic research institution and at least one non-profit community-based organization, patient advocacy group, community clinic, or public or tribal entity that provides support to people with or at risk for depression. To ensure community needs are at the center of the CIAPM research agenda, the state team implemented a Request for Information, delivered a public webinar, and held five listening sessions throughout California in partnership with the Mental Health Services Oversight and Accountability Commission.

"Because disparate access to appropriate treatment for depression can create and exacerbate existing health issues and depression can manifest differently from person-to-person, it was important for CIAPM to hear community perspectives and design their funding with those voices in mind", said the Commission's Executive Director, Dr. Toby Ewing. "The listening sessions allowed CIAPM to center community perspectives in their research funding opportunity in a culturally responsive manner."

"This research funding opportunity complements existing state-wide efforts to improve mental health, such as the Master Plan for Kids' Mental Health, the Children and Youth Behavioral Health Initiative, and the Mental Health Services Act," said California Surgeon General Dr. Diana Ramos. "CIAPM's approach is to look towards the future and ask how innovative research can transform the current status quo of prevention, diagnosis, or treatment of depression and how that can be done while treating patients as individuals and partners in the research process."

Applicants must submit a non-binding and non-scored letter of intent by October 30, 2023, followed by a concept proposal due December 1, 2023. Please visit the CIAPM website for more details on submission eligibility and requirements.

https://opr.ca.gov/ciapm/activity/research/depression/rfp.html

About the California Initiative to Advance Precision Medicine

Housed within the Governor's Office of Planning and Research, CIAPM supports collaborative research and fosters partnerships between the state, researchers, patients, communities, and industry to drive health equity. CIAPM has awarded over $40 million for precision medicine research throughout California, advancing the science of Adverse Childhood Experiences, cancer, brain injuries, heart health, depression, genetic conditions, infectious diseases, and other conditions.

About the Governor's Office of Planning and Research

As the State of California's comprehensive planning and innovation agency, the Governor's Office of Planning and Research studies future research and planning needs, fosters goal-driven collaboration, and delivers guidance to state partners and local communities, with a focus on land use and community development, climate risk and resilience, research and innovation, and high road economic development.

Appendix E. Depression Selection Committee Member Biographies

Olusola Ajilore, MD, PhD

Professor, Selection Committee Chair

University of Illinois at Chicago

Dr. Ajilore is the Director of the Mood and Anxiety Disorders Program, Director of the Clinical Research Core in the Center for Clinical and Translational Science, Center for Depression and Resilience Professor of Psychiatry, Co-director of the Medical Scientist Training Program, and Associate Head for Faculty Development at the University of Illinois at Chicago. Dr. Ajilore uses a variety of technologies to study structural and functional brain connectivity in major depressive disorder, viewing the brain as a network. He graduated magna cum laude from Harvard University with a bachelor's degree in biology and completed his MD/PhD degrees at Stanford University. Prior to joining UIC, Dr. Ajilore was an Assistant Professor in the Department of Psychiatry at UCLA. Currently, as Director of the Connected Technologies (CoNeCT) Lab, he has numerous NIH funded grants focused on evaluating and treating depression in adults and geriatric patients using neuroimaging and computational science techniques to develop technology-based treatments. Dr. Ajilore also is a member of the National Advisory Mental Health Council for the National Institute of Mental Health.

Bruno Anthony, PhD

Professor

University of Colorado

Dr. Anthony is a Professor, Vice Chair for Psychology and Director of the Office of Psychological Science and Practice, Department of Psychiatry, University of Colorado School of Medicine and Chief of Psychology for the Pediatric Mental Health institute, Colorado Children's Hospital. His research focuses on how mental health disparities affect vulnerable populations and ways to improve the systems and practices to ultimately improve health outcomes. He received his bachelor's degree in biology from University of Pennsylvania and a PhD in psychology from Columbia University. His work also focuses on ways to empower youth and families in decision-making, including programs to help providers and families build effective partnerships to enhance outcomes. More recently, his work focus-

es on best practices to support primary care practices, schools and parents in enhancing children's mental health. Dr. Anthony has served as a member of NIH and PCORI study sections and serves as an ad hoc grant reviewer for the National Science Foundation, Veterans Administration, and the Administration for Children, Youth and Families.

Justin Baker, MD, PhD

Associate Professor

Harvard University

Dr. Baker is an Associate Professor of Psychiatry at Harvard Medical School. He is also Director of the Laboratory for Functional Neuroimaging and Bioinformatics and the Scientific Director of the McLean Institute for Technology in Psychiatry (ITP). Dr. Baker co-founded the ITP, a first-of-its-kind research and development center to foster tool development and novel applications of consumer technology in psychiatric research and care delivery. He received his undergraduate degree in neuroscience at Brown University and his MD/PhD from the Washington University in St. Louis in neurobiology. Dr. Baker uses bioinformatical approaches and functional imaging to understand what causes the behavioral differences in the brains of people with lifelong psychiatric conditions like schizophrenia. He and his lab use techniques such as latent construct modeling, machine learning, and dynamical systems analysis to develop translational approaches to help individuals.

Crystal Barksdale, PhD, MPH

Program Director

National Institute on Minority Health and Health Disparities (NIMHD)

Dr. Barksdale a licensed clinical psychologist and is a Program Director in the Division of Community Health and Population Science at the National Institute of Minority Health and Health and Disparities. She earned her bachelor's degree in psychology at the University of North Carolina at Chapel Hill and her master's degree in public health from Johns Hopkins Bloomberg School of Public Health. She received her doctorate in clinical psychology from George Washington University. She has used her expertise to evaluate and consult on children's mental health projects focused on depression and suicide, disparities in child-serving systems, and culturally and linguistically appropriate interventions for at-risk youth and their families. Dr. Barksdale's current work and research interests are focused on identifying, disseminating, and supporting community-based and community-engaged, multilev-

el interventions to eliminate health disparities, with a particular focus on the role of structural and social determinants of health.

Joyonna Gamble-George, MHA, PhD

Associate Research Scientist

Yale University

Dr. Gamble-George is an Associate Research Scientist in Public Health at the Yale University School of Public Health. With over a decade of experience discovering cures for the most common health diseases and disorders and across clinical, administrative, and research sectors of the healthcare field, Dr. Gamble-George is an internationally acclaimed scientist. She has traveled the globe sharing her research approaches to medicine with diverse audiences, including Nobel Prize Winners. She holds a Bachelor of Science in Biochemistry and Biology with Honors in Mathematics from Xavier University of Louisiana and a Master of Health Administration from the University of South Florida College of Public Health. During her doctoral studies at Vanderbilt University, she co-founded SciX, LLC, a bio-tech company searching for methods to combat brain disorders and other health issues.

Annie Fox, PhD

Associate Professor

Massachusetts General Hospital Institute of Health Professions

Dr. Fox is an Associate Professor of Healthcare Data Analytics in the School of Healthcare Leadership at the MGH Institute of Health Professionals. As a social psychologist, Dr. Fox is interested in the conceptualization, measurement, and consequences of mental illness stigma. She obtained a bachelor's in psychology from College of the Holy Cross, and her Masters and PhD in social psychology from the University of Connecticut. Her current research uses advanced statistical models to examine the longitudinal relationships between stigma and mental health in young adults in order to determine the optimal timing for stigma interventions and increase rates of treatment seeking. She also serves as a statistician in the Women's Health Sciences Division of the National Center for PTSD, where her research focuses on PTSD, trauma, and women's health.

Yolangel Hernandez Suarez, MD, MBA

Associate Professor

Florida International University

Dr. Hernandez Suarez is an Associate Professor in Obstetrics and Gynecology and the Executive Associate Dean for Students at FIU Herbert Wertheim College of Medicine. She is also a board-certified obstetrician and gynecologist. She earned her bachelor's degree at Swarthmore College and completed her MD at the Johns Hopkins University School of Medicine. She trained in Obstetrics and Gynecology at the University of Iowa Hospital and Clinics. She holds a Master of Business Administration with specialization in Health Administration and Policy from the University of Miami. With skills in both hospital administration and academic research, her primary goal is to build bridges among hospitals, academia and the community to create value for systems, patients and learners. Dr. Hernandez Suarez is the Founding Chair of the Miami-Dade Health Action Network, a 2008 National Public Hospital Fellow "Future Leader of Public Hospitals" and a board member of the National Hispanic Medical Association.

Darrell Hudson, PhD, MPH

Associate Professor

Washington University in St. Louis

Dr. Hudson holds a joint appointment with the Washington University Department of Psychiatry and is a Faculty Scholar with the Institute for Public Health. He was recently appointed named the Director of Center for the Study of Race, Ethnicity & Equity at Washington University. Dr. Hudson's career is dedicated to the elimination of racial/ethnic inequities in health. His research agenda centers on how social determinants of health, particularly racism, affect multiple health outcomes. He earned his bachelor's in psychology from Morehouse College. He completed his Master of Public Health in Health Behavior and Health Education and PhD in Health Behavior and Health Education from the University of Michigan School of Public Health. By studying the social epidemiology of depression among African Americans, his research has sought to determine how stress is socially patterned, and the coping strategies and resources that individuals develop and can access to cope with stress.

Patricia Kerig, PhD

Professor

University of Utah

Dr. Kerig is a Professor of Clinical Psychology at the University of Utah, where she directs the Risk to Resilience Laboratory. She earned her B.A. in Psychology from UC Irvine and Ph.D. in Clinical Psychology from UC Berkeley. Dr. Kerig is a developmental psychopathologist who studies the developmental processes that contribute to risk or resilience across the lifespan, particularly among youth exposed to trauma. Dr. Kerig also has an abiding interest in resilience and how it can be promoted through intervention. Her current research is focused on investigating the mechanisms accounting for the link between trauma and youth involvement in the justice system. Dr. Kerig also served on the Adverse Childhood Experiences Selection Committee for CIAPM.

Sahnah Lim, PhD, MPH, MIA

Assistant Professor

New York University

Dr. Lim is an Assistant Professor at the NYU Grossman School of Medicine. She is currently leading the Gender Equity scientific track and Mental Health scientific track at the Department of Population Health's Section for Health Equity and is a steering committee member of the Asian American Native Hawaiian Pacific Islander 'OHANA Center of Excellence on mental health and substance use. Her research focus research understands how multiple marginalization impacts mental and sexual health outcomes, drawing from intersectionality and syndemics frameworks to address gender-related health issues among hard-to-reach populations. Dr. Lim's research interests also include reproductive and sexual health, mental health, and substance use. Her work uses mixed methods and community-engaged research approaches to advance health equity of individuals from mixed-marginalized populations. Dr. Lim obtained her PhD from Johns Hopkins University and an MPH from Columbia University.

Ziad Nahas, MD, MSCR

Professor

University of Minnesota

Dr. Nahas is a Neuromodulation Researcher, Professor & Executive Vice Chair for Clinical Affairs at the Department of Psychiatry & Behavioral Sciences at the University of Minnesota. He received his Medical Degree from Saint Joseph University in Lebanon and then completed an internship in Psychiatry at L'Institut Paul Silvadon, a Lacanian day hospital, and Hopital Charles Foix, both in Paris, France before moving to Houston, Texas as a resident in Psychiatry at Baylor College of Medicine. Before the University of Minnesota, he was previously at the Medical University of South Carolina and American University of Beirut Medical Center, where he helped develop the department's clinical, educational, and research portfolio. Dr. Nahas' scientific interests lie in translational research of mood dysregulation and depressive disorders with unique expertise is in functional neuroimaging and brain stimulation across various modalities.

Katherine Sanchez, PhD, LCSW

Associate Investigator

Baylor Scott & White Res. Inst.

Dr. Sanchez is an Associate Investigator and Director of Diversity and Inclusiveness in Research for Baylor Scott & White Health's Research Institute (BSWRI) in Dallas, Texas. She is a clinician-researcher, with over 15 years of experience as a bilingual clinical social worker. Her research interests are in integrated health care, investigating effective interventions aimed at reducing disparities and improving uptake in evidence-based mental health treatments in primary care through socio-culturally, linguistically adapted models for the treatment of co-morbid mental and physical illness. Dr. Sanchez's research agenda has segued from a focus on small scale interventions in primary care to advance the science around reducing mental health disparities through efforts at the health delivery system level She also represents BSWRI on the governing board of the Health Care Systems Research Network, a network of 20 non-profit healthcare delivery systems.

Anne Saw, PhD

Associate Professor

DePaul University

Dr. Saw is an Associate Professor of Clinical-Community Psychology at DePaul University. Her lab aims to promote health equity through conducting community-engaged research and studying structural and sociocultural influences on coping and health behaviors and contribute to the development, evaluation, implementation, and dissemination of culturally responsive behavioral health interventions. Her research program is focused on reducing health and mental health disparities, particularly for Asian American immigrant and refugee communities. Dr. Saw completed her PhD in Clinical/Community Psychology at the University of Illinois at Urbana-Champaign. She completed a predoctoral internship at McLean Hospital/Harvard Medical School and postdoctoral fellowship at UC Davis Dr. Saw also served as a panelist at the Inaugural Asian American, Native Hawaiian, and Pacific Islander Mental Health Summit hosted by the Biden-Harris Administration in July 2023.

Arash Shaban-Nejad, PhD, MPH, MSc

Associate Professor

University of Tennessee Health Science Center.

Dr. Shaban-Nejad is an Associate Professor and Director of Population and Precision Health at the UTHSC-OAK-Ridge National Lab Center for Biomedical Informatics, and the Department of Pediatrics at the University of Tennessee Health Science Center. Dr. Shaban-Nejad received his MSc and Ph.D. in Computer Science from Concordia University and Master of Public Health from UC Berkeley and completed a postdoctoral fellowship at McGill University. Currently, his primary research interest spans population health intelligence, epidemiologic surveillance and big-data semantic analytics using tools and techniques from artificial intelligence, knowledge representation, and the semantic web. Dr. Shaban-Nejad is an associate editor of BMC Medical Informatics and Decision Making and a guest editor of Nature - Digital Medicine, Artificial Intelligence in Medicine, and IEEE Journal of Biomedical and Health Informatics journals. Dr. Shaban-Nejad previously served on the Adverse Childhood Experiences Selection Committee for CIAPM.

Susan Shortreed, PhD

Senior Biostatistics Investigator

Kaiser Permanente Washington Health Research Institute

Dr. Shortreed is a Biostatistics Investigator at Kaiser Permanente Washington Health Research Institute and Affiliate Professor in the Department of Biostatistics at the University of Washington. She uses statistics and machine learning methods to address health science problems, with a special emphasis on analyzing complex longitudinal data, such as electronic health records. She is leading a project to develop statistical methods for constructing personalized treatment strategies using data captured from electronic health records. She obtained her PhD in statistics from the University of Washington. Prior to her current role, she spent two years in the Department of Epidemiology and Preventive Medicine at Monash University in Melbourne, Australia, and another two years in the School of Computer Science at McGill University in Montreal, Canada. Dr. Shortreed collaborates scientists in a broad range of areas including alcohol use, cancer screening, and medication safety, and now works alongside researchers in mental and behavioral health.

Madhukar Trivedi, MD

Professor

University of Texas Southwestern

Dr. Trivedi is a Professor of Psychiatry, Chief of the Division of Mood Disorders, and the founding Director of the Center for Depression Research and Clinical Care at UT Southwestern Medical Center, where he holds the Betty Jo Hay Distinguished Chair in Mental Health and the Julie K. Herse Chair for Depression Research and Clinical Care. He earned his MS and MBBS (MD equivalent) in Baroda, India, completing his residencies in Psychiatry at University General Hospital, Baroda, India and Henry Ford Hospital. Certified by the American Board of Psychiatry and Neurology, Dr. Trivedi focuses on developing and validating biosignatures of depression as well as the pharmacological, psychosocial, and nonpharmacological treatments for depression. He has been a principal investigator on numerous translational projects and clinical trials and has one of the longest running longitudinal research studies on depression.

Jürgen Unützer, MD, MPH, MA

Professor

University of Washington

Dr. Unützer is a board-certified psychiatrist and a Professor of Psychiatry and Behavioral Sciences at the University of Washington. He completed his medical degree at the Vanderbilt University School of Medicine and his residency at the UCLA. His work focuses on innovative models of care that integrate mental health and general medical services and on translating research on evidence-based mental health care into effective clinical and public health practice. He has more than 300 scholarly publications and is the recipient of numerous federal and foundation grants and awards for his research to improve the health and mental health of populations through patient-centered integrated mental health services. Dr. Unützer works with various national and international organizations to improve behavioral health care for diverse populations, most notably having served as Senior Scientific Advisor to the World Health Organization and as an advisor to the President's New Freedom Commission on Mental Health.

Appendix F. Advisory Council Agendas and Meeting Minutes

The California Precision Medicine Advisory Council (CPMAC) held quarterly meetings in 2023 in March, early July, September, and December. The following pre-meeting materials were provided on our website:

- March 13 2023 CPMAC Agenda - https://opr.ca.gov/ciapm/docs/meetings/20230309-CIAPM_Advisory_Council_March_2023_Meeting.pdf
- July 12 2023 CPMAC Agenda - https://opr.ca.gov/ciapm/docs/meetings/20230803-July_12_2023_Agenda.pdf
- September 25 2023 CPMAC Agenda - https://opr.ca.gov/ciapm/docs/meetings/20230925-Sept_CIAPM_Council_Agenda.pdf
- December 18 2023 CPMAC Agenda - https://opr.ca.gov/ciapm/docs/meetings/20231214-Dec_CIAPM_Council_Agenda.pdf

The following meeting summaries were approved by the council after convening:

- March 2023 CPMAC Summary - https://opr.ca.gov/ciapm/docs/meetings/20230803-March_2023_Meeting_Summary.pdf
- July 2023 CPMAC Summary - https://opr.ca.gov/ciapm/docs/meetings/20240415-July_2023_CIAPM_Advisory_Council_Meeting_Summary.pdf
- September 2023 CPMAC Summary - https://opr.ca.gov/ciapm/docs/meetings/20240415-September_2023_CIAPM_Advisory_Council_Meeting_Summary.pdf
- December 2023 CPMAC Summary - https://opr.ca.gov/ciapm/docs/meetings/20240415-December_2023_CIAPM_Advisory_Council_Meeting_Summary.pdf

Appendix G. Select Health BRIIDGE Consortium Partner List

Institution	State of Primary Offices
A16Z	CA
Advancing Research Impacts in Society	MO
Alva10	MA
American Society for Biochemistry and Molecular Biology	DC
America's Frontier Fund	VA
AMK Technologies of Ohio, LLC	OH
ARCH Venture Partners	CA, IL, WA
Arizona Western College	AZ
Ark Clinical Research	CA
Association of American Medical Colleges	DC
AUI	MD, NM, VA, WV
Avellino	CA
Banner Health Innovation Group	AZ
Bay Area Council	CA
Bayer	CA
Biocom California	CA
BioHealth Innovation	MD
BioLabs	IL, CA, CT
BioMedSA	TX
BioscienceLA	CA
BioSTL	MO
Blended Impact	CA
CA Council on Science and Technology	CA
CA Governor's Office of Business and Economic Development	CA
CA Governor's Office of Planning and Research	CA
California Alliance of Child and Family Services	CA
California Council on Science and Technology	CA
California Department of Public Health	CA
California Institute for Regenerative Medicine (CIRM)	CA
California Life Sciences Association	CA
California Office of the Small Business Advocate (CalOSBA)	CA
CalTech	CA
Cancer Patients Alliance	CA
Case Western Reserve University	OH

Cedars-Sinai	CA
Center for Genomic Interpretation	UT
Center for Global Health Innovation	GA
CivicoLabs	CA
City of Kannapolis	NC
CONNECT	CA
Connecticut Academy of Science and Engineering	CT
Context Ventures	CA
Cortado Ventures	OK
County of Monterey Health Department	CA
California State University (CSU) Office of the Chancellor	CA
CZ Biohub	CA
Dartmouth College	NH
Elevance Health/Carelon	CA
Eli Lilly	MA, IN, NJ
Engineering Biology Research Consortium	CA
Front Porch	CA
General Catalyst	CA, NY, UK
Georgia Coalition	GA
Georgia Institute of Technology	GA
Georgia Tech Medtech Accelerator	GA
Gladstone Institutes	CA
Google Public Sector	CA, NV, IA, OR, UT
Greater Phoenix Economic Council	AZ
Greater St. Louis	MO
HealthBegins	CA
Health Equity Ventures	CA
Health Plus Studio	CA, OR
Health Velocity Capital	CA, TN
Helpsy Clinic	CA
Innovaccer	CA
Intuitive Ventures	CA
Irrational Labs	CA
James Pooley Professional Law Corporation	CA
Kaiser Permanente Northern California	CA
Laboratory of Dr. Stacy Lindau, the University of Chicago	IL
Laboratory of Karmella A. Haynes at Emory University and Georgia Institute of Technology	GA
Larta Institute	CA
Latino Cancer Institute	CA
Lawrence Berkeley National Laboratory	CA
Lawrence Livermore National Laboratory	CA

Los Alamos National Laboratory	NM
Marcos Ramos Benitez Laboratory, Ponce Health Sciences University	PR
MassiveBio	NY
Maverick Ventures	CA
McKinsey & Company	AZ, CA
McLaughlin Biosciences Institute	MT
Miracosta College	CA
MOST Policy Initiative	MO
New Hampshire IDeA Network of Biomedical Research Excellence (INBRE)	NH
New Mexico Economic Development Department	NM
NextGen Precision Health, University of Missouri	MO
Neuroscience 20	CA
NextMed Health	CA
North Bay Leadership Council	CA
North Carolina Research Campus	NC
OCHIN	OR
Octave Bioscience	CA
Office of the California Surgeon General	CA
Oregon Bioscience Association	OR
Personalized Medicine Coalition	DC
Plug and Play	AR, AZ, CA
Precision Medicine World Conference	CA, PA
PrideNet	CA
QB3	CA
Quaintise	AZ, CA
Rady Children's Institute for Genomic Medicine	CA
RAND Corporation	CA, VA, MA, PA
Redesign Health	CA, NY
Rensselaer Polytechnic Institute	NY
Research Institute Nationwide Children's Hospital	OH
(re)solve Health	CA
Rubix LS	CA, FL, GA, MD, NY
Rutgers University	NJ
San Diego State University	CA
San Jose State University	CA
Sanford Laboratories for Innovative Medicines	CA
Santa Cruz Health Information Organization	CA
Scintillon Institute of Research	CA
Scripps Research Institute	CA
Sigma Xi Scientific Research Honor Society	NC
Silicon Valley Leadership Group	CA
South Dakota State University	SD

Southern Research	AL
SRI International	CA
Stanford BioDesign	CA
Stanford Center for Undiagnosed Diseases	CA
Stanford School of Medicine	CA
Stanford University Center for Precision Mental Health and Wellness	CA
State Senator Bill Dodd	CA
Strategic Health AK	AK
SynBioBeta	CA
Texas A&M University	TX
Texas Medical Center (TMC)	TX
The 90/10 Institute	CA
The George Washington University	DC
The University of Chicago, Laboratory of Dr. Stacy Lindau	IL
The University of New Mexico	NM
Tulane Innovation Institute	LA
UC Berkeley	CA
UC Berkeley Innovative Genomics Institute	CA
UC Davis	CA
UC Irvine	CA
UC Los Angeles	CA
UC Merced	CA
UC Office of the President	CA
UC Riverside	CA
UC San Diego	CA
UC San Francisco	CA
UC Santa Barbara	CA
UC Santa Cruz	CA
UCSD Radiation Medicine and Applied Sciences	CA
UNCF	DC, PA
Universidad Ana G Méndez	PR
University City Science Center	PA
University of Hawai'i Office of Strategic Health Initiatives	HI
University of Iowa	IA
University of Kentucky	KY
University of Missouri School of Journalism Mississippi River Basin Ag & Water Desk	MO
University of Nebraska Medical Center	NE
University of Nevada Las Vegas	NV
University of Tennessee Health Science Center-Oak Ridge National Lab	TN
University of Utah	UT
University of Washington at St Louis (Wash U)	MO

University of Wisconsin School of Medicine and Public Health	WI
Valley Childrens Healthcare	CA
Venrock	CA, NY
Washington State Academy of Sciences	WA
Women in Bio Southern California Chapter	CA
World Brain Mapping Foundation, Society for Brain Mapping and Therapeutics, Brain Technology and Innovation Park	CA
WWAMI – University of Idaho	ID
Xcellerant Ventures	AZ
Yoo and Co Accelerator	AZ
Yuma Regional Medical Center	AZ

Appendix H. Key Personnel in 2023

Sam Assefa, OPR Director (September 2021-Present)

Julianne McCall, Co-Director & Director of CIAPM (February 2019-Present)

Shannon Muir, Co-Director of CIAPM (April 2019-April 2023)

David Reiner, Science Officer (April 2023-Present)

Saga Barberis, Intergovernmental Program Analyst (January 2023-Present)

Alexandra Colón-Rodríguez, CCST Science and Technology Policy Fellow (February 2022-January 2023)

Elyse Pennington, CCST Science & Technology Policy Fellow (June-October 2023)

Hanna Butler-Struben, Student Intern (November 2023-Present)

Joanna Guan, Student Intern (November 2023-Present)

Yuki Hebner, Policy Fellow (October 2022-Present)

Megan Neel, Student Intern (June 2022-March 2023)

Bridgette Smith, Policy Fellow (June 2022-April 2023)

Beck Tran, "Cal in Sac" Student Intern, (June-August 2023)

Max Wayne, Student Intern (December 2022-October 2023)

Lainie Miller, USC MPA Fellow (January – April 2023)

Emily Graham, USC MPA Fellow (January – April 2023)

Juanita L. Watson, USC MPA Fellow (January – April 2023)

Anne Talavera, USC MPA Fellow (January – April 2023)

Christopher Garrido, USC MPA Fellow (January – April 2023)

Priscilla Hung, USC MPA Fellow (January – April 2023)

Kayleigh Lloyd, USC MPA Fellow (January – April 2023)