

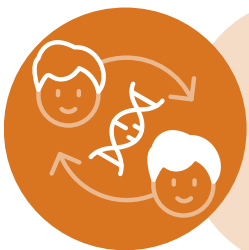


California Initiative to Advance Precision Medicine

Precision medicine is an approach that uses data, such as genetics, biomarkers, medical history, environment, and social factors for personalized and tailored prevention, diagnosis, and treatment of disease. To achieve this, precision medicine deploys advanced technologies like genomic sequencing, artificial intelligence, and mobile health tools to collect data for individualized interventions.

CIAPM's Inaugural Research Program

In 2015, the California Initiative to Advance Precision Medicine (CIAPM) was launched to leverage California's diverse research ecosystem to demonstrate the potential of this innovative approach to improve equitable health outcomes. Approximately ~\$11 million was allocated to support the first eight demonstration projects between 2015 and 2018, which addressed a wide breadth of diseases and technologies, summarized below.



University of California, Santa Cruz. Lead Investigator: David Haussler, M.D. 2015-2018, \$1.7 Million. California Kids Cancer Comparison

Why: 30% of children diagnosed with cancers in California lack effective therapeutic options.

Impact: Found new targets for personalized childhood cancer therapeutics and treatment using computer-aided analysis of novel tumor genomic markers (RNA) in 100% of children with untreatable tumors.

University of California, San Francisco. Lead Investigator: Charles Chiu, M.D., Ph.D. 2015-2018, \$1.7 Million. Precision Diagnosis of Acute Infectious Disease

Why: To provide faster and more precise diagnosis and treatment of brain infections and lower the costs associated with rare and unidentifiable bacterial and neurological infections.

Impact: Improvement of acute infectious disease diagnosis time from 72 hours to 8 hours through the development and clinical application of a minimally invasive metagenomic next generation sequencing (mNGS) test; later implemented to aid the discovery of the first omicron-variant of COVID in California.



University of California, San Francisco. Lead Investigator: Pratik Mukherjee, M.D., Ph.D. 2017-2018, \$1.2 Million. Artificial Intelligence for Imaging of Brain Emergencies

Why: Delayed diagnosis time is associated with irreversible brain damage and can be improved by deploying artificial intelligence in emergency response imaging.

Impact: An FDA medical device development tool using automated image analysis for emergency-detection of traumatic brain injury, led to accurately diagnosis of intracranial bleeding in 99% of brain scans using over 100,000 brain images.

Cedars-Sinai Medical Center. Lead Investigators: Brennan Spiegel, M.D., Noel Bairey-Merz, M.D., Jennifer van Eyk, Ph.D. 2017-2018, \$1.4 Million. Early Prediction of Major Adverse Cardiovascular Events Using Remote Monitoring

Why: Cardiovascular disease is the leading cause of death in men and women in California, occurring more often in younger women and racial/ethnic minorities, leading to oversight of early signs, inconsistent healthcare, and resulting in detrimental disease progression.

Impact: Major Adverse Cardiac Events (MACES) were predicted in patients with ischemic heart disease through the development of wearable sensors for remote, real-time monitoring of physical, biochemical and psychical measurements, alerting patients when urgent need to see a doctor is warranted.





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Children's Hospital Oakland Research Institute. Lead Investigator: David Martin, M.D. 2017–2018, \$1.2 Million. Full Genome Analysis to Guide Precision Medicine

Why: Many children with rare or unexplained genetic disorders do not receive a diagnosis, limiting opportunities for effective treatment.

Impact: Researchers used Full Genome Analysis (FGA) to identify previously unknown genetic causes of disease in approximately 40% of pediatric participants, helping guide future treatment decisions and demonstrating the value of providing no-cost genetic screens in largely underserved and low-insurance coverage populations.

University of California, Davis. Lead Investigator: Nicholas Anderson, Ph.D. 2017–2018, \$1.2 Million. Personal Mobile and Contextual Precision Health

Why: Chronic disease management is often limited by a lack of real-time information about patients' health, behaviors, and social factors between clinical visits.

Impact: The project developed a mobile health application integrated with Electronic Health Records (EHRs) that enabled patients and providers to share and monitor health data in real time. The scalable precision health approach demonstrated improvement in chronic disease management in both rural and urban communities.



University of California, Irvine. Lead Investigator: Sheldon Greenfield, Ph.D. 2017–2018, \$1.4 Million. Early Prostate Cancer: Predicting Treatment Response

Why: Treatment outcomes for prostate cancer vary widely, and existing approaches do not fully account for the clinical, genetic, and social factors that influence patient outcomes.

Impact: Researchers developed a personalized risk-prediction model that combined clinical information, genomic data, and social factors to better predict treatment response. The project identified disparities in outcomes and supported tailored surveillance and risk-based treatment strategies for diverse patients.

Sutter Health. Lead Investigator: JB Jones, Ph.D., MBA. 2017–2018, \$1.2 Million. Precision Medicine for Multiple Sclerosis (MS): Making It Work

Why: People living with multiple sclerosis (MS) require ongoing, individualized care, but providers often lack tools that integrate clinical information, patient experiences, and treatment decisions.

Impact: The project developed neuroSHARE, a platform that integrated clinical data, patient-reported outcomes, and Electronic Health Record (EHR) information to support personalized MS care. Patients became more engaged in tracking and sharing symptoms, improving communication and shared decision-making with providers.



Program Impact in California



In its first three years, CIAPM funded 8 research projects, involving 88 partners across healthcare, nonprofit, and academia, generated 106 scientific publications in renowned journals, 125 presentations at national and international conferences, and obtained over \$53 million in additional non-state funding.



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