

Please see below ongoing projects in the Department of Pediatrics where medical students and residents may be able to participate. Please contact the PI directly if interested in learning more.

Clinical Studies

Title: Effect of Online Family Interventions on Glycemic Control in Children with Type One Diabetes

PI: Lindsey Albrecht, MD (laalbrecht@ucdavis.edu)

Description: This project is testing a series of online modules with families of newly diagnosed Type 1 Diabetes patients. Patient's A1C levels from clinic visits will need to be extracted from the charts for 2 years.

Title: Pilot Study of Connected Health Technology in Patients with Newly Diagnosed Type 1 Diabetes

PI: Stephanie Crossen, MD, MPH (scrossen@ucdavis.edu)

Description: This study will evaluate whether remote sharing of diabetes data – including measured blood glucose values as well as patient-reported carbohydrate counts and insulin doses – with the UC Davis Pediatric Diabetes team via connected health applications is feasible for pediatric patients with newly diagnosed type 1 diabetes. It will also evaluate whether the use of connected diabetes technology impacts patients/families' awareness, understanding, and use of their own diabetes data at 1 and 6 months after type 1 diabetes diagnosis.

Title: Improving Care for Breastfeeding Mothers of Infants Admitted to the UC Davis Children's Hospital

PI: Laura Kair, MD (lrkair@ucdavis.edu)

Description: Breastfeeding is important for optimal maternal and infant health. When infants become ill and are admitted to the hospital, they often are not feeding as well as they do when healthy. Their mothers may also need access to breast pump equipment, food, and drink for themselves, consultation with a lactation consultant, and other support to maintain lactation during this difficult time. Current inpatient workflows do not always include eliciting and addressing these needs, but they could.

Title: Using Telemedicine for Children with Special Healthcare Needs in Rural Communities

PI: Jim Marcin, MD (jpmarcin@ucdavis.edu)

Description: Many children with special healthcare needs have to travel long distances to obtain pediatric rehabilitative services. We are collecting data on the use of telemedicine to determine whether this is a feasible model to help such children and their families. There is an opportunity to help collect and analyze data to determine the impact that this model of care might have on children throughout the State of California.

Title: Studies address novel targeted therapies for pediatric cancers and the biology of cancer stem cells

PI: Noriko Satake, MD (nsatake@ucdavis.edu)

Description: Goals include to identify targetable genes/molecules in pediatric cancers and to develop novel cancer-targeted therapies. In addition, the objective is to understand the biology of "cancer stem cells – the root of cancer" with the ultimate goal of developing "cancer stem cell"-targeted therapies. Cancer (stem cell)-targeted therapies will have a significant positive impact on children with cancer, because they will be more effective than current treatments and be less harmful to normal cells in growing children.

Title: Implementing Clinical Guidelines to Prevent and Manage Chronic Conditions in Primary Care

PI: Ulfat Shaikh, MD, MPH (ushaikh@ucdavis.edu)

Description: Despite the existence of affordable and effective evidence-based interventions, our understanding of how best to deliver those interventions across a range of diverse and complex health systems is still limited. We study methods to promote the systematic uptake of research findings and other evidence-based practices into primary care, with the goal of improving the quality, safety, and effectiveness of health care services.

Title: A Cohort Study of Preterm Infants

PIs: Mark Underwood, MD (munderwood@ucdavis.edu) and Kara Kuhn-Riordon, MD (kmkuhn@ucdavis.edu)

Description: The intestinal microbiota of the preterm infants influences risk of necrotizing enterocolitis and sepsis. We are enrolling 300 very preterm infants over a 10-year period and collecting samples of feces, urine, saliva, plasma, and mother's milk over the course of the hospitalization in the NICU. Our intent is to determine

how clinical exposures influence the fecal microbiota and the urine and plasma metabolomes. We would welcome help in gathering and organizing clinical data for this cohort study.

Title: Patient and Family Centered I-PASS Mentored Implementation Project

PI: Jessica Witkowski, MD (jcwitkowski@ucdavis.edu)

Description: This project is a quality improvement/research hybrid project to improve the patient and family-centeredness of inpatient hospitalist team rounds. Increasing patient and family-centeredness of inpatient hospitalist team rounds will decrease errors and improve satisfaction.

Translational Studies

Title: Novel Techniques of Neonatal Resuscitation with an Intact Umbilical Cord

PI: Satyan Lakshminrusimha, MD

Description: Newborn infants with birth asphyxia are currently managed by immediately cutting the umbilical cord and transferring the baby to a warmer to provide positive pressure ventilation. We will explore new techniques of ventilating asphyxiated newborn lambs on the mother's abdomen with an intact umbilical cord.

Title: The impact of e-cigarette vaping during pregnancy on perinatal development of offspring

PI: Kent Pinkerton, PhD (kepinkerton@ucdavis.edu)

Description: Reflecting the highly addictive nature of nicotine, 10-12% of American women smoke during pregnancy. Maternal smoking during pregnancy alters normal lung development to produce lifelong decreases in offspring pulmonary function and increased risk of respiratory diseases. This strongly suggests that use of e-cigarettes during pregnancy will have significant detrimental effects on lung development and offspring lung disease; and worse, that nicotine addiction will drive pregnant e-cigarette users to continue use during pregnancy. A mouse model is used to characterize the effects of perinatal e-cigarette exposure on offspring pulmonary function and disease and the potential for intergenerational transmission.

Title: The effects of environmental air pollutants on maternal allergic asthma and its neurobiological consequences on offspring

Description: Autism Spectrum Disorders are behaviorally defined by deficits in communication, social reciprocity, and repetitive stereotypic behaviors. While genetic factors are likely contributors to these disorders, heritability estimates indicate strong environmental contributions. A mouse model of maternal allergic asthma will be used to test the hypotheses that exposure to ambient particulate matter and combustion particle emissions will exacerbate the immune response to cause neurodevelopmental disruptions and behavioral phenotypes relevant to autism spectrum disorders.

Title: Somatic Cell Genome Editing, Gene Therapy, and Regenerative Medicine Tailored to Age

PI: Alice Tarantal, PhD (atarantal@ucdavis.edu)

Description: Studies are focused on a range of congenital and acquired diseases and translational models, and incorporate the use of *in vivo* imaging (e.g., ultrasound, PET/CT, total-body PET).

Title: Viral Teratogens and Developmental Disorders: CMV and Zika Virus

Description: Investigations include viral trafficking during pregnancy, the role of the immune system in teratogenic outcomes, and the relationship of neural precursors to microglia during key developmental stages.

Title: Postnatal Growth Restriction and Lung Development

PIs: Mark Underwood, MD (munderwood@ucdavis.edu) and Steve Wedgwood, PhD (swedgwood@ucdavis.edu)

Description: In this rodent model, poor postnatal growth causes pulmonary hypertension and exacerbates hyperoxia induced bronchopulmonary dysplasia mimicking what we see in extremely preterm infants. We are exploring the developing nutrient-gut-lung axis in this model, including investigations of the role of the intestinal microbiota, TLR4 signaling, defensins, and nutrient supplementation. The ultimate goal is to understand how malnutrition causes lung disease and to discover interventions to improve growth and decrease lung disease in preterm infants. We would welcome help in analyzing banked tissue specimens (mostly Westerns and ELISAs).