SickKids | Centre for Global Child Health

Sample List of Available C-GCH Projects

Developing Global Standards for Paediatric Ocular Image Acquisition, Segmentation, and Analysis
Supervisor: Dr. Helen Dimaras

Delayed diagnosis of paediatric eye disease remains a major global health challenge. This project builds on a funded initiative to establish a global paediatric ocular image biobank with an emphasis on standardizing image acquisition and segmentation protocols across diverse clinical settings. The fellow will lead the development and implementation of harmonized standards for image capture, annotation, and segmentation in collaboration with international partner sites (Ghana, Kenya). A key component will be co-developing training materials and workflows to support consistent, high-quality data collection across sites. The curated dataset will support downstream applications, including AI-driven diagnostic tools, while the fellow evaluates feasibility, data quality, and uptake of standardized protocols. This work integrates research with capacity building, generating scalable tools and training resources to improve diagnostic accuracy and enable global collaboration in paediatric ocular disease.

Genomic Characterization of Rare Paediatric Eye Tumours
Supervisor: Dr. Helen Dimaras

Rare paediatric eye tumours are under-characterized at the molecular level. This project will leverage rare specimens housed in the SickKids Kids Eye Biobank to perform whole genome sequencing aimed at identifying diagnostic markers and biological insights. The fellow will lead sequencing coordination, data analysis, and interpretation of genomic findings. Importantly, this project is designed as a training platform, equipping the fellow with practical skills in genomic workflows, variant interpretation, and translational research. Skills developed through this work will be directly transferable, supporting fellows who wish to establish or expand molecular diagnostic capacity in their home institutions. Educational components will include hands-on mentorship, structured training modules, and exposure to clinical genomics integration. This project combines discovery research with capacity building, using rare tumour resources to train the next generation of researchers in genomic medicine.

Metabolomic Profiling of Mitochondrial Dysfunction in the RESTORE Trial (F35 vs. F75)
Supervisor: Dr. Robert Bandsma

Severe malnutrition remains a leading driver of childhood mortality, and mortality risk in this population is closely tied to disturbances in energy metabolism. Within the CHAIN Network cohort, comparison of children who died during hospitalization to those discharged alive identified altered levels of metabolites involved in nutrient oxidation and mitochondrial function as key correlates of death. The RESTORE trial, a Phase III randomized comparison of reduced-calorie (F35) versus standard (F75) stabilization feeds in ~1200 acutely ill, severely malnourished children, offers a unique opportunity to test this mechanism prospectively in a large, well-characterized clinical cohort. We hypothesize that children who die or fail to stabilize during hospitalization exhibit a distinct metabolomic signature of impaired mitochondrial fatty-acid oxidation and reduced tricarboxylic acid (TCA) cycle flux, relative to those who recover, and that reduced-calorie feeding (F35) attenuates this signature compared with standard-calorie feeding (F75) by better matching caloric provision to true metabolic capacity during the acute catabolic phase of illness. The fellow will lead an analysis that will leverage the exploratory sub-cohort blood sampling already built into the RESTORE protocol (enrolment and day 3), for which amino acid, organic acid, acylcarnitine and TCA-cycle metabolite profiling by mass spectrometry is centrally planned. Metabolomic trajectories (day 0 to day 3) will be compared between treatment arms (F35 vs. F75) and between survivors and non-survivors, and will be correlated with 14-day mortality, time to stabilization, and refeeding-syndrome features using longitudinal and pathway-based statistical models. This sub-study will provide mechanistic insight into how reduced caloric intake affects the mitochondrial and energy-metabolic pathways

implicated in mortality among severely malnourished children. The work may also lead to the identification of a metabolic biomarker of treatment response and inform more precise, physiology-guided approaches to nutritional rehabilitation in this high-risk population.

Investigating infant carrying and swaddling practices and developing a public health campaign for the prevention of developmental dysplasia of the hip in Ethiopia
Supervisor: Dr. Richard Gardner

Developmental dysplasia of the hip (DDH) is a common condition in Ethiopia, which is characterized by abnormalities of the hip joint. While children typically present with the condition at 2 years of age or older, by this age, significant reconstructive surgery is often required. The need for surgery can be reduced through early identification of DDH and, potentially, through public health promotion measures that aim to raise awareness of swaddling and infant carrying practices that are associated with increased risk of DDH (e.g., hip swaddling), as well as practices that are thought to be protective for DDH (e.g., back carrying). In this work, we aim to improve our understanding of infant swaddling and carrying practices in both urban and rural areas of Ethiopia by employing qualitative research methods. Specifically, the successful fellow will investigate current infant carrying and swaddling practices; reasons for, and knowledge underlying these current practices; and where women and families typically receive information regarding childcare practices including family, friends, and social media. The fellow will describe their findings overall and by place of residence. The second stage of the project will involve developing and implementing, in partnership with the Ministry of Health in Ethiopia, a public health campaign to highlight safe infant carrying and swaddling practices.

Evaluating the Impact of International Clinical Trainee Programs at The Hospital for Sick Children
Supervisor: Dr. Robert Bandsma

For decades, The Hospital for Sick Children (SickKids) has welcomed international physicians into a variety of training programs, offering clinical exposure, advanced medical education, and a collaborative research environment. However, despite the presumed wide scope and global reach of these training programs, to date, there has been no comprehensive description of the magnitude and breadth of international physician trainee programs at SickKids, nor has there been an evaluation of the long-term outcomes and global impact of these training programs. Moreover, to the best of our knowledge, there is currently no centralized database or network of international physicians trained at SickKids. The successful fellow will employ a mixed-methods approach to: 1) describe the magnitude and scope of international physician clinical training programs at SickKids between 2015 and 2025; 2) evaluate the impact of the international physician clinical training programs over the same time period; and, 3) establish a network of alumni who have trained at SickKids as international physicians. This project will enable the production of a centralized database of SickKids' alumni of international clinical fellows and a detailed impact report. It will also lead to the development of strategic recommendations for enhancing future international training programs and provide feedback to existing clinical education partnerships at SickKids. In addition, this work will contribute to the global conversation on medical education equity and the role of high-income country institutions in global health systems strengthening.