2025 Summer Research Internship Project Summaries

1) Analysis of Outcome Adherence and Effectiveness of Rehabilitation Therapies in Improving Patient Performance and Satisfaction as Measured by the COPM Change Score

Research Area: **Rehabilitation Therapies** | Mentor(s): **Emily Lockman, OT and Candice Johnson, OT**

Requirements: Undergraduate or graduate student; preferred experience with Microsoft Excel and coursework/experience in research related work

Description: Typically, in rehabilitation therapy models, patients are seen for episodes of care (bursts of therapy that can vary in frequency and duration) but have a finite number of sessions with a clear beginning and end. Outcomes are necessary to measure progress and the overall effect of care provided. It is especially important to understand what motivates the patient and understand if therapy is supporting the patient in meeting their specific goals. Gillette Rehabilitation Therapies department initiated the use of the Canadian Occupational Performance Measure (COPM) in 2018 with initial efforts to track completion at beginning and end of the plan of care. Previously, tracking this measure was difficult. Now, the COPM has been built into the Electronic Medical Record (EMR) and data can be readily pulled and analyzed. This project will work to uncover current adherence to this practice change, strategize on improvement as needed, and analyze the current data to determine if patients are making clinically meaningful changes in their performance and satisfaction with identified areas of importance. Intern tasks will include data analysis, chart review, therapy session observations as appropriate, dissemination. Additional projects and areas of work will be assigned as appropriate

Visit here to learn more COPM: COPM | Canadian Occupational Performance Measure

2) Gaining Better Understanding of Hip Disease and Disorders

Research Area: Orthopedics | Mentor(s): Susan Novotny, PhD and Jennifer Laine, MD

Requirements: Undergraduate or graduate student.

Description: There are two proposed topics for this summer's research: Legg-Calvé-Perthes disease and Hip dysplasia. An intern may help with one or both projects, depending on interest and data availability.

Legg-Calvé-Perthes disease is a rare childhood hip disorder that results in idiopathic bone death. It affects 1 in 740 boys and 1 in 3500 girls between ages 0-14, common enough to be a significant public health problem. Children present at a variety of ages, in varying stages of disease, and with a wide spectrum of disease severity. A possible Perthes project may involve qualitative interviews of Perthes patients to assess pain during and after disease.

Hip dysplasia is one of the most common pediatric orthopedic conditions, affecting up to 8 in 1000 babies and is defined as abnormal development of the acetabulum. This describes a spectrum of severity ranging from subtle dysplasia (shallow hip socket) to a fully dislocated hip. Hip dysplasia is one of the leading causes for development of hip osteoarthritis, often requiring total hip arthroplasty to improve quality of life. If not addressed, hip pain and dysfunction secondary to dysplasia can occur even in the second decade of life. Projects focused on hip dysplasia involve understanding the utility of hip surgery in walking-age children, as well as looking at the intersection of hip dysplasia and impingement in the setting of cerebral palsy.

Both projects will involve retrospective analysis of patient data. Intern tasks may include screening patients for inclusion into data sets, basic statistical analyses, potential patient interviews, and abstract writing.

3) Using the National Spina Bifida Patient Registry (NSBPR) outcome data to identify and understand pediatrics to adult Health Care Transition (HCT) readiness and Quality of Life in Spina Bifida population will be investigated through quantitative analysis and focus group analysis

Research Area: Health Services | Mentor(s): Rhonda Cady, PhD

Requirements: Undergraduate or graduate student with coursework or experience in descriptive and inferential statistical analysis; preferred coursework or experience in qualitative data analysis.

Description: The intern will work on multiple projects within the Health Services Research program, both utilizing outcome data collected for the National Spina Bifida Patient Registry.

The first project will evaluate how the Transition Readiness Assessment Questionnaire for SB (TRAQ-SB) is used by providers in the pediatric and adult SB Coordinated Clinics. Within healthcare systems, aging into adulthood requires moving from a pediatric to an adult health care system. This change is called health care transition (HCT) and is an ongoing process of helping young adults and when appropriate, their caregivers (e.g., parent, sibling, partner), plan and prepare for the transfer and integration into adult, patient-focused care models. In Minnesota, only 29% of youth with medical complexity receive transition preparation from their health care providers, underscoring widespread HCT gaps. For a patient to be successful at HCT, the patient needs to understand taking medications in a timely manner, making and keeping appointments, communicating their healthcare needs, etc. Looking at the TRAQ form is only one piece of data that will be a part of the chart review. The study team wants to investigate the clinician's note to see if anything related to the TRAQ is documented, actions taken by providers, and ideally how can this information advance HCT for youth with SB. A secondary objective of this study is investigating associations between health care transition readiness and clinical characteristics of youth with SB.

The second project will be a quantitative data analysis of the Quality of Life in the SB population at Gillette to identify common themes, associations, patterns and clusters. This data is gathered from Gillette patients participating in the NSBPR. QoL is gathered from three different age groups: 8 – 12 years old, 13 – 17 years old, and 18 and over. The goal of this quantitative data analysis is to better understand how factors (demographics, clinical care, and outcomes) collected by the NSBPR may be associated with quality of life in individuals with spina bifida.

Intern tasks for both projects will include data gathering from the NSBPR and medical record, data entry and descriptive and basic inferential statistics. Depending on experience, interns may participate in focus group sessions and/or analysis.

4) Lost to Follow-Up: Finding Patients Who Were Lost After Gait Surgery

Research Area: **Gait and Motion Analysis** | Mentor(s): **Andrew G. Georgiadis, MD** |

Requirements: Intern can be undergraduate or graduate student; preferred experience or interest in research related work.

Description: The database at the James R. Gage Center for Gait and Motion Analysis includes tens of thousands of patients, most of whom have a diagnosis of cerebral palsy. It is routine for children to undergo comprehensive instrumented gait analysis before lower extremity treatment, to aid in surgical decision-making.

Only about 60% of children return for postoperative assessment after their gait surgery. This means that clinical outcomes studies, statistical modeling, and machine learning algorithms used for patient specific outcomes predictions are based on an incomplete and potentially biased post-treatment data set. Our aim is to improve our prediction models by finding the patients who had a gait assessment, then underwent lower extremity surgery, but never returned for follow-up. The fate of these patients (viz. what procedures they underwent) is unknown to us.

By carefully recapitulating the surgical procedures that patients have undergone for their gait, our laboratory can make more accurate machine learning predictions about surgical candidacy and patient-specific outcomes prediction.

The research intern will work directly with an orthopaedic surgeon and research staff using an existing custom software to locate the records of patients who have not returned to our laboratory and "fill in the gaps" of their treatment into our database.