2022 Summer Research Internship Project Summaries

Below is a list of projects available for the 2022 Summer Research Internship Program at Gillette Children's Specialty Healthcare. The program will start with orientation in June and end with a poster symposium in August.

Carefully review the available projects. Pay special attention to the minimum requirements, which are outlined for each project. Tailor your statement of interest to highlight which projects are of most interest to you and how you are qualified to make a meaningful contribution. As part of the online application process, you will need to rank your project preferences. Efforts will be made to accommodate your choices.

1. Nighttime and full-time bracing for adolescent idiopathic scoliosis: Which outcomes matter most to patients and families?

Research area: *Spine* | **Mentors:** *Walter Truong, MD and Sara Morgan, PhD* | **Number of students:** *1 student*

Requirements: *Intern can be an undergraduate or graduate student*

Description: Idiopathic scoliosis is an abnormal sideways curvature of the spine with no known cause. Without treatment, at-risk scoliosis curves can get larger and may require spine surgery. To reduce the risk of curve progression and surgery, adolescents with idiopathic scoliosis are often prescribed a back brace that is designed either for full-time use (18-23 hours/day) or nighttime use (8-10 hours/day). Research studies are needed to compare treatment outcomes between patients who wear full-time and nighttime braces. While curve progression and prevention of surgery are important treatment outcomes that may differentiate these bracing types, it is also critical to understand patient-centered outcomes (such as mental or social outcomes) that reflect a patient's experiences and perceptions during brace treatment.

This study aims to use qualitative methods to identify patient-centered outcomes that doctors should consider when prescribing full-time and nighttime scoliosis braces. Intern tasks for this project will include engagement in focus groups and interviews with patients and families, review of relevant literature, analyzing transcripts of patient and family discussions, and distilling qualitative data with guidance from the research team to identify outcomes that matter most to patients and families. The long-term goal of this project is to help inform outcome measures and methods to be used in a future clinical trial that compares full-time and nighttime bracing in adolescents with idiopathic scoliosis. The results will also be summarized for publication and presentation.

2. Physical therapy outcomes using scoliosis specific exercise method

Research area: *Rehabilitation Therapies* | **Mentors:** *Michelle Engberg, DPT and Candice Johnson, OTD, OTR/L* | **Number of students:** *1 student*

Requirements: *Intern can be an undergraduate or graduate student; preferred experience in research, coursework in statistics, and/or familiarity with REDCap and Microsoft Excel*

Description: The Rehabilitation Therapies department, Orthopedic department, and Research department have collaborated to design a registry of outcome measure data to study the efficacy of scoliosis specific exercise as a conservative form of treatment for idiopathic scoliosis. The intern's primary project would be to pull change scores for the Trunk Aesthetic Clinical Evaluation (TRACE), subcategory and total scores of the Scoliosis Research Society 22-item questionnaire (SRS-22), and number of treatment sessions in a plan of care from the registry. These data points would be compared to the test's minimal clinically important difference (MCID) to determine if a patient deteriorated, stayed the same or improved over the course of treatment, and on average how many treatment sessions were participated in from each category. This information would help therapist better design therapy plans, assist patients and families with decision-making in regard to committing to therapy participation, and inform referring providers for short term results of therapy participation. Additional projects or areas of work will be assigned as appropriate based on time and need in the summer of 2022.

3. Identifying key characteristics of bowel and bladder continent catheterizable conduit (CCC) revision among patients of the National Spina Bifida Patient Registry (NSBPR)

Research area: *Health Services Research - Outcomes* **| Mentor:** *Rhonda Cady, PhD, RN* **| Number of students:** *1 student*

Requirements: *Intern can be an undergraduate with demonstrated biostatistics experience or current graduate student in a biostatistics program*

Description: Neurogenic bladder and bowel commonly occur in individuals with spina bifida. A continent, catheterizable conduit (CCC) is a surgically created enteric tunnel between the bowel or bladder and the skin. The goal of CCC procedures is management of neurogenic conditions to promote continence. However, complications can occur and include stomal incontinence, stomal stenosis, stomal prolapse, CCC stricture, and false passage. Prior studies indicate a correlation between weight and surgical outcomes and that obesity directly correlates with the development of stomal stenosis in patients who have undergone CCC procedures.

The National Spina Bifida Patient Registry (NSBPR) is a collaboration of over 20 sites that care for children and/or adults with spina bifida. The demographic, intervention and outcome data collected by each site is aggregated and used to improve the quality of spina bifida care. Using the large NSBPR dataset, we will examine the frequency and distribution of revision rates of bladder and bowel CCC procedures and identify key characteristics of patients who undergo revisions. Potential statistical methods include t-test, chi-square, ANOVA and survival analysis.

4. Exploratory investigation of retrospective hospital acquired conditions (HACs) data to identify common themes, associations, patterns and clusters

Research area: *Health Services Research - Care Delivery* **| Mentor:** *Rhonda Cady, PhD, RN* **| Number of students:** *1 student*

Requirements: *Intern can be an undergraduate or graduate student; preferred coursework or experience in qualitative data analysis, epidemiology, programming, data mining, and/or statistical analysis*

Description: Hospital acquired conditions, commonly referred to as HACs, are conditions that develop during a hospital admission, can cause harm to patients, and are often preventable. Commonly defined HACs include catheter-associated urinary tract infection, central line-associated blood stream infections, surgical site infections, pressure ulcers, falls and ventilator-associated events. In this study, we will use qualitative analysis strategies, data-mining techniques and descriptive statistics to explore previously collected data on HAC occurrences over the past 8-10 years. The goal of this exploratory investigation is to identify associations between patient characteristics and occurrence and non-occurrence of HACs. This information will be used to develop future research and process improvement protocols.

5. Virtual reality as a pain and anxiety management strategy for patients with and without developmental disabilities

Research area: *Pain & Comfort* **| Mentor:** *Chantel Barney, PhD* **| Number of students:** *1 student*

Requirements: *Intern can be an undergraduate or graduate student*

Description: Virtual reality (VR) is a new technology being used at Gillette to improve patient experience during medical events. VR provides a very engaging form of distraction that may reduce pain and anxiety for some patients. We are measuring the effect of VR in various medical contexts using randomized controlled trials of VR compared to standard of care. Intern tasks will include collecting data, assisting with project implementation, and developing educational materials for clinic staff. The long-term goal is to better understand how useful VR is for reducing pain, anxiety, and medication use for patients at Gillette.