## Date of submission

4/29/2023

## An initial descriptive Project Title

Maximizing Missouri Orthopedic Institute's Outcomes: An Evidence-Based Data Science Analysis

## A general Project Topic Description with any known background/history of the topic and desired outcomes.

The project aims to analyze patient data from the Missouri Orthopaedic Institute (MOI) to create a predictive, explanatory, or descriptive model that can help predict patient outcomes following orthopedic surgery. Potential topics include progression to Post-traumatic Osteoarthritis (PTOA) after specific fractures, return to work (RTW) and return to sports (RTS) after certain surgeries, and adherence after ortho trauma or limb preservation. The desired outcome is to identify patterns and factors that contribute to successful patient recovery, allowing for more effective treatment strategies and better patient care.

## Brief description of the potential alternative Analytical Perspective(s) useful to achieving the desired project outcomes.

Potential Analytical perspectives include:

* Descriptive analysis of patients and their various outcomes: this would provide information to patients and physicians about what outcomes of a procedure might look like. Probability of developing PTOA, returning to work, etc. This would also provide information necessary for developing a predictive or explanatory model.
* Explanatory analysis using patient data to determine potential outcomes: this would provide an end product of an explanatory model. Likely, a logistic regression or tree. This would provide physicians and patients with with a plan of action to maximize the likelihood of success.
* Predictive analysis using patient data to determine potential outcomes: this would take the explanatory work a step further and in the background calculate a patient’s outcome.

Both a descriptive, predictive, and explanatory approaches could be of use. This project will likely include a combination of these approaches to maximize usefulness to physicians and patients.

## Description of Data and Data Sources under consideration if known.

The data sources for this project could include Electronic Health Records (EHR), Patient IQ, Physical Therapy (PT) records, and clinical notes from the Missouri Orthopaedic Institute. These sources provide patient information (PT attendance, BMI, blood pressure, initial injury severity, etc.) and post-surgery outcomes (range of motion, pain, return to sports/life, etc.). In addition to the clinical data, we’d like to also explore available socioeconomic datasets such as household income range, highest education level reached, occupation, and zip code.

## Initial Data Story/Product and Intended Audience.

The initial data story aims to provide insights on the factors that contribute to successful patient outcomes following orthopedic surgery. This information can be used to develop predictive models that help healthcare providers make informed decisions about treatment strategies. The intended audience for this data story includes orthopedic surgeons, physical therapists, healthcare administrators, and other professionals involved in the care and treatment of orthopedic patients. Patients could also be an intended audience, where information may be passed to them through a physician to maximize their outcomes. The project will also be valuable for researchers and students in the fields of data science, healthcare, and orthopedics.

## Listing of Group Member Names and Pawprint/SSO identifiers, emphasis area, and why each member has selected to work on the project.

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| --- | --- | --- | --- |
| Name | Pawprint | Emphasis Area | Reason for selecting project |
| Josh Jaeger | Jwj8c8 | High Performance Computing | While my background is in engineering and utility data, I have experience in the medical field and have seen what data can do to improve patient outcomes. |
| Tyler Hall | Hallty | Biohealth | Background is in physiology and previous experience at MOI |
| Karen Bromert | bromertk | Biohealth | My background is in biology but I’m interested in the medical recovery process. |
| David Turvey | Dtfp3 | High Performance Computing | Worked at Cerner for 10 years assisting with interoperability of data. |

## Recommended Mentor if known or desired and why.

Unknown. However, we also have a contact through MOI who may be willing to occasionally provide guidance.