



Shriners Hospitals
for Children®

PROMISing Outcomes: Targeting Pediatric Obesity and Diabetes

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Shriners Team And Patients

Shriners Hospitals for Children is a network of 22 non-profit medical facilities across North America. Since 1924, SHC-Portland has treated a wide range of pediatric orthopedic conditions, from fractures to rare diseases and syndromes. Our Integrated Practice Unit of multi-disciplinary professionals provide a comprehensive approach through specialized evaluation and treatment along with rehabilitative services to restore each child physically, emotionally, and socially. Below is a list of common conditions treated at SHC-Portland.

Skeletal abnormalities – Osteogenesis imperfecta (OI), osteochondritis dissecans (OCD lesions), Blount disease, skeletal dysplasias, etc.

Neuromuscular conditions – Cerebral palsy, myelomeningocele (spina bifida), Muscular dystrophy, spinal muscular atrophy

Hand/Upper extremity deformity – Congenital abnormalities, macrodactyly, syndactyly, polydactyly, TAR syndrome, etc.

Hip abnormalities – Developmental dysplasia of the hip (DDH), Legg-Calve-Perthes disease, slipped capital femoral epiphysis (SCFE), femoral acetabular impingement (FAI)

Lower Extremity conditions – Clubfoot, genu valgum, Osgood- Schlatter's disease, limb-length inequality, macrodactyly, syndactyly, etc.

Spinal deformity and conditions – Kyphosis, lordosis, scoliosis (congenital, neuromuscular, syndromic, idiopathic), spondylolysis, spondylolisthesis

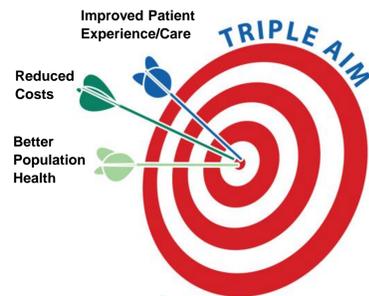
Sports injuries & fractures

Musculoskeletal infections

Introduction

Current data confirms that nearly 1 and 5 young people aged 6-19 in the United States has obesity. Direct medical costs of childhood obesity-related illness is a staggering \$14 billion, which includes risk of complications around: surgical site infections and implant failure, wound problems (hematomas and dehiscence), adverse respiratory events, and longer length of stay. Furthermore, children with obesity have significantly higher prevalence of comorbidities than children without obesity, which includes asthma, hypertension, sleep apnea, and Type 2 diabetes. Pediatric obesity has been posited to delay diagnosis or modify natural progression of various common pediatric orthopedic conditions such as Legg-Calve-Perthe disease, adolescent idiopathic scoliosis (AIS), slipped capital femoral epiphysis (SCFE), and Blount disease, which are commonly treated at Shriners Hospital for Children-Portland (SHC-P).

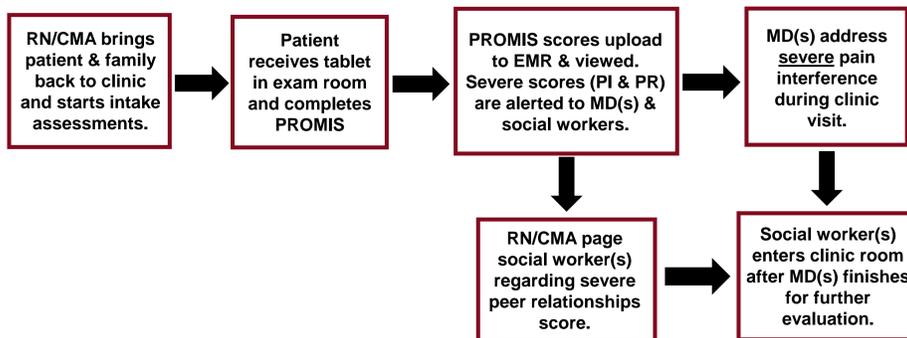
Employing patient-reported outcomes like PROMIS into practice is an essential step towards achieving best outcomes at the lowest cost, and utilizing data to launch vital improvements with SHC-P's integrated Practice Unit to maximize patient value.



Methods

SHC-Portland implemented PROMIS via computer tablets in December 2017 in the outpatient clinic after intake assessments as part of standard care. PROMIS scores are integrated into the EMR in real-time which facilitates their use for patient-centered care management and provides data for performance improvement opportunities.

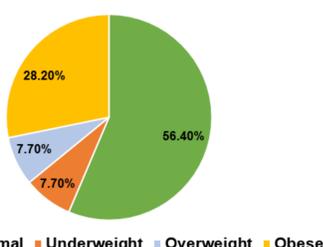
PROMIS Flowchart in Outpatient Clinic



PROMIS Pediatric Patient-reported & Parent Proxy (PP) Item Bank v2.0 Domains

Pain Interference (PI) – SHC Custom Short Form 8a
Mobility Short Form 8a
Upper Extremity Function (UEF) Short Form 8a
Peer Relationships (PR) Short Form 8a/7a (PP)

SHC-P's Readmissions Cohort BMI Percentile 2017-2019 (N=39)



About 36% of total readmissions from 2017-2019 came from overweight/obese patients. Reasons for readmissions were (N=14):

- ❖ 21.4% Infection
- ❖ 50% Wound Dehiscence
- ❖ 28.6% Implant problems, pain, etc.

Performance/Quality Improvement

After 2 years of data collection, rates of Minimal Clinical Important Difference (MCID) were assessed for all patient-reported domains of surgical patients at 6 months-1 year post-op, and 1 year test-retest of conservative treatment patients. Multivariate linear regression models were produced to identify:

- ❖ Statistically significant and/or highly influential variables that are predictive in achieving MCID per patient-reported PROMIS domain in both surgical and conservative treatment groups.
- ❖ Quality/performance improvement opportunities to improve current or establish new processes around statistically significant variables with the goal of improving MCID rates over time.

Results

Most Influential Variables Predicting MCID Surgical Population N= 126

Domain Model p-value	Variable 1	Variable 2	Variable 3
Pain Interference (PI) MCID F= 20.252 (3,123) p< 0.001	Baseline Pain Interference p< 0.001	Baseline Peer Relationships p-value= 0.004	Baseline UEF p-value= 0.025
Mobility MCID F= 14.388 (3,122) p< 0.001	Baseline Mobility p-value< 0.001	Sex p-value= 0.004	BMI p-value= 0.032
Upper Extremity Function (UEF) MCID F= 32.484 (2,123) p< 0.001	Baseline UEF p-value< 0.001	Age p-value= 0.027	
Peer Relationships (PR) MCID F= 9.320 (2,123) p< 0.001	Baseline Peer Relationships p-value< 0.001	Baseline Pain Interference p-value= 0.093	

Conservative Treatment Population N= 160

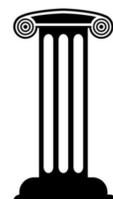
Domain Model p-value	Variable 1	Variable 2	Variable 3	Variable 4
Pain Interference (PI) MCID F= 14.895 (4,156) p<0.001	Baseline Pain Interference p< 0.001	Age p-value= 0.037	Baseline Peer Relationships p-value= 0.040	Sex p-value= 0.091
Mobility MCID (N=158) F= 7.221 (1,157) p=0.008	Baseline Pain Interference p= 0.008			
Upper Extremity Function (UEF) MCID F= 19.913 (3,156) p=0.009	Baseline UEF p-value< 0.001	Baseline Mobility p-value= 0.011	BMI p-value= 0.032	
Peer Relationships (PR) MCID F= 23.289 (3,156) p<0.001	Baseline Peer Relationships p-value< 0.001	BMI p-value< 0.001	Baseline UEF p-value= 0.025	

Results Take Aways

- ❖ Overweight-obese patients were less likely to meet a meaningful improvement (MCID) in mobility function 6 months-1 year post-operatively compared to patients with healthy/normal BMI.
- ❖ Additionally, overweight-obese patients who underwent conservative treatment were less likely to meet a meaningful improvement (MCID) in upper extremity function and social health compared to patients with healthy/normal BMI after 1 year.

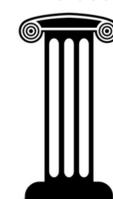
Actionable Changes

Early Detection



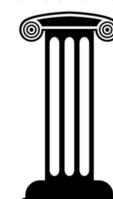
- ❖ Implemented diabetes risk-based screening as recommended by the American Diabetes Association at time of surgical booking or when concern is identified.

Preoperative Protocol



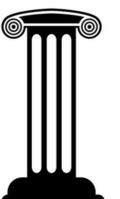
- ❖ Implemented a protocol addressing preoperative lab retesting to determine if HbA1c falls within an acceptable range or delay surgery.

Perioperative Standardization



- ❖ Standardized perioperative management of care of pre/diabetic patients to help mitigate adverse postoperative outcomes.

Care Expansion



- ❖ Evolving existing feeding clinic to a health and wellness clinic to encompass both our malnourished, medically fragile and obese patient population.

- ❖ As a musculoskeletal specialty hospital, treating obesity is not a principal focus, however we are adapting practice to improve detection of pre/diabetes preoperatively and reduce the prevalence of obesity among our patient population.
- ❖ Perioperative standardized care of diabetic patients involved: first scheduled case of the day, discontinue Metformin 1 day prior to surgery and perioperative blood glucose monitoring (preoperatively and every 4-6 hours postoperatively of the first 24-48 hours).
- ❖ Our findings solidified the need to hybridize the feeding clinic by expanding our care model to treat obese patients. This health and wellness clinic would include mental health professionals, physical therapists, recreational therapists, nutritionists, and nurse practitioners to deliver an effective multidisciplinary care approach.

Looking Forward

- ❖ **Improve Care** – Development of standardized treatment plans targeting obesity and diabetes in ways that are specifically tailored to the diagnoses commonly treated at SHC-P.
- ❖ **Improve value** – Patients of the health and wellness clinic will take a validated diagnosis-specific (obesity) HRQOL patient-reported tool every 6 months to merit the impact of new lifestyle changes.
- ❖ **Improve quality** – To further measure efficacy of both clinic and screening, readmissions data will be reassessed annually beginning in 2021 for improvement comparison against the 2017-2019 readmissions cohort. Decreased readmissions rates inevitably reduce healthcare related costs.
- ❖ **Improve health** – Childhood obesity is an epidemic in the US and SHC-P is committed to addressing, implementing, and standardizing practice to combat obesity and its afflicting comorbidities.