Patient Reported Outcomes: How They Are Changing the Care We Provide to Our Patients

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Disclosure:

VP PROMIS Health Organization (PHO)
“Providers that organize themselves to improve outcomes and become more efficient in doing so will be rewarded with patients, professional satisfaction, and financial success. They will prosper even if fee-for-service reimbursement lingers for years, because better outcomes will attract more patients and greater efficiency will reduce copayments and improve financial margins.”

Data is Power
Validation of GAITRite and PROMIS as high-throughput physical function outcome measures following ACL reconstruction.

Papuga MQ¹, Beck CA, Kates SL, Schwarz EM, Maloney MD.
If you want to know how your patients are doing..... Just ask them
Validated Outcomes In Clinical Experience

UR VOICE PLATFORM

Every Patient, Every Clinic, Every Visit

Patient Reported Outcomes
Must Have’s

• Validated Instrument
• Quick
• “Not on the backs of the Clinician”
• Not costly
• Generalizable and Flexible
• Viewed in electronic record
• Searchable
Patient Reported Outcome Measurement Information System

- 11-year, $100 million effort by NIH
- Domain specific not disease specific
- Standardized across domains
  - 1-100 with 50=mean score for US population
  - t-score (10pts = 1 standard deviation)
- Follow patients throughout Health Care System
- Produces validated data quickly “Smart Testing”
  - Computer Adapted Technology
  - Item Response Theory
Physical Functioning Item Bank

Are you able to get in and out of bed?
Are you able to stand without losing your balance for 1 minute?
Are you able to walk from one room to another?
Are you able to walk a block on flat ground?
Are you able to run or jog for two miles?
Are you able to run five miles?
Screening for Depression in Adults
US Preventive Services Task Force Recommendation Statement

Albert L. Siu, MD, MSPH; and the US Preventive Services Task Force (USPSTF)
Mental Health Has a Stronger Association with Patient-Reported Shoulder Pain and Function Than Tear Size in Patients with Full-Thickness Rotator Cuff Tears

James D. Wylie, MD, MHS, Thomas Suter, MD, Michael Q. Potter, MD, Erin K. Granger, MPH, and Robert Z. Tashjian, MD

Investigation performed at the Department of Orthopaedics, University of Utah, Salt Lake City, Utah
Does Patient-Generated Data Help?

Creating, managing and reporting data has the potential to empower patients, engage and activate them.

Patients who read their notes, collect personal health data, and maintain a record become more aware of their conditions and behaviors => felt more in control of their care and showed increased participation their treatment recommendations.

Leverage Patient experience in shared decision making.
Patient Engagement (CG-CAHPS)

Know important info medical history

- 06839 & 12859
- Other Ortho providers

<table>
<thead>
<tr>
<th>Date Range</th>
<th>06839 &amp; 12859</th>
<th>Other Ortho providers</th>
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<tbody>
<tr>
<td>10/1/14-3/31/15</td>
<td>82.7%</td>
<td>89.3%</td>
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<tr>
<td>4/1/15-9/30/15</td>
<td>76.9%</td>
<td>77.5%</td>
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UR VOICE: Validated Outcomes In Clinical Experience
Putting it all together

Predictive Modeling

Example: Factors influencing the need for rehab stay after TJA (PROMIS PF scores, co-morbidities, pharma, prior surgery etc.)
How Do We Use The Data?
1st Visit
Achilles tendonitis
Referral to PT

Improved with PT
Home PT Program

Individual Patient Level
Return to work earlier? F/u not needed? PROMIS by app? Home PT save copay
Complication?
619 ACL Surgeries Performed by 6 Providers (cross sectional analysis)

Pain 95% CI

T-Score vs Days from Surgery

<table>
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<tr>
<th>Patients at Each Time Point</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>N5</th>
<th>N6</th>
<th>N7</th>
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<tbody>
<tr>
<td>Function</td>
<td>341</td>
<td>440</td>
<td>84</td>
<td>495</td>
<td>722</td>
<td>312</td>
<td>335</td>
</tr>
<tr>
<td>Pain</td>
<td>339</td>
<td>433</td>
<td>82</td>
<td>490</td>
<td>716</td>
<td>311</td>
<td>333</td>
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<tr>
<td>Depression</td>
<td>336</td>
<td>426</td>
<td>78</td>
<td>480</td>
<td>704</td>
<td>304</td>
<td>329</td>
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</table>

Thanks to Owen Papuga PhD and Sports Division

Group Data for common procedures
Similar Outcomes... Similar Costs?

Thanks to Owen Papuga PhD and Sports Division

Function

Days From Surgery
Variation in Surgical Techniques

Figure 1: A) Overall trends in PF demonstrate a return to baseline at 8-12wk follow-up based on reconstruction type demonstrate nearly significant slower improvement at 2, 4-6, 8-12, and >12 wk follow-up. *p < 0.05
PROMIS PF Foot and Ankle

• ROC curves
  – Preop PF predictive of MCID
  – Used 95% Specificity

PF score < 29.7 had an 83% probability of meeting MCID;

PF score >42 had a 94% probability of failing to meet MCID


Preoperative PROMIS Scores Predict Postoperative Success in Foot and Ankle Patients.

Ho B1, Houck JR2, Flemister AS1, Ketz J1, Oh I1, DiGiovanni BF1, Baumhauer JF3.
Physical Function – TKA
and THR and Spinal Fusion and Disc Excision and Spinal Injections and ....

- 118 TKA patients
- Ave. f/u 240 days
- PF > 44.5 had a 88.1% probability of failing to achieve MCID

MCID = 3.8

13.5 %
Bunion Surgery Recovery Curve

PROMIS Physical Function Score

T-score

Pre-op  1wk  3-4wk  6-12wk  >13wk**
Patient’s Like You....
Predictive Modeling

Example: Factors influencing the need for rehab stay after TJA (PROMIS PF scores, co-morbidities, pharma, prior surgery etc.)
Roadmap to Predictive Modeling:
Skilled Nursing Facility Admission Model
The URMC Total Joint Bundle

- Get Data
- Clean
- Exploratory Analysis
- Test Machine Learning Models
- Model: Web Endpoints for Clinical Use
SNF Placement Predictive Modeling

• GOAL: Use big data techniques to develop a machine learning model to pre-operatively predict which total joint patients will end up going to a SNF

• Benefits
  – Reduce number of patients that need to go to a SNF by pre-operatively identifying effective interventions
  – Better prepare mentally and physically patients for post-surgical outcomes
  – Allow SNFs and the hospital to allocate resources with more advanced notice
### Epic Analytics

#### Chance of SNF Admission

<table>
<thead>
<tr>
<th>Function</th>
<th>Pain</th>
<th>Mood</th>
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<tbody>
<tr>
<td>38</td>
<td>33</td>
<td>33</td>
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#### [Health Lab Bundles]

**MACHINE LEARNING**

- **Try the Widescreen View**
- There is a new bar that you can use for your next documentation with relevant cases and less steps.
- Learn More → Try it!

- **Epidemiologic Presentation Screen**
  - New Bundle
  - No data found

- **Visit Information**
  - Chief Complaint
    - Knee Pain
  - Other Relevant Diseases
    - Osteoarthritis

- **Care Everywhere Outside Records (New Click)**
  - This column is for care everywhere information
  - New, Related, Osteoarthritis, Surgery
  - None

- **Vital Signs**
  - New Set of Vital
    - Time: 10:12 AM
    - Weight: 156 kg, 129.2 lbs
    - Height: 5'11"
Barriers

• Other “Quality Measures” more important for compliance and reimbursement than PRO
• IT limitations at other institutions
• PRO available but might not be viewed or shared by provider with patient
  – Patients question need to fill out
• Importance of Data not understood by Provider
• Low Depression scores of concern to providers
PROMIS in Clinical Practice

• Advance Patient Care
• Engage the Patients
• Educate patients
• Share Decision Making with Patients
• Access cost related to outcomes
• Allocate patient care resources appropriately (P4P)
• Common Research outcomes across medicine
• Assess Population Health
• UNITE a Health Care System!