American Spine Registry: Delivering Value Through Data

A Year in Review

info@americanspineregistry.org
www.americanspineregistry.org
Our Speakers Today

• Todd J. Albert, MD, FAAOS
  ASR Executive Committee Member
• Steven D. Glassman, MD, FAAOS
  ASR Executive Committee Co-Chair
Disclosures: Todd J. Albert, MD, FAAOS

- American Orthopaedic Association: Board or committee member
- Augmedics: Stock or stock Options
- Back Story, LLC: Board or committee member
- Biomet: IP royalties
- Bonovo Orthopedics, Inc.: Stock or stock Options
- CytoDyn Inc.: Stock or stock Options
- DePuy, A Johnson & Johnson Company: IP royalties
- In ViVo Therapeutics: Stock or stock Options
- Innovative Surgical Designs, Inc.: Stock or stock Options
- Journal of Bone and Joint Surgery - American: Editorial or governing board
- JP Medical Publishers: Publishing royalties, financial or material support
- Morphogenesis: Stock or stock Options
- Nuvasive: Paid consultant
- Orthopedics Today: Editorial or governing board
- Paradigm Spine: Stock or stock Options
- Physician Recommended Nutriceuticals: Stock or stock Options
- Precision Orthopedics: Stock or stock Options
- Pulse Equity: Stock or stock Options
- Saunders/Mosby-Elsevier: Publishing royalties, financial or material support
- Scoliosis Research Society: Board or committee member
- Spine: Editorial or governing board
- Spine Deformity Journal: Editorial or governing board
- Spine Universe: Board or committee member
- Spinicity: Stock or stock Options
- Springer: Publishing royalties, financial or material support
- Strathspey Crown: Stock or stock Options
- Surg.IO LLC: Stock or stock Options
- Thieme: Publishing royalties, financial or material support
Disclosures: Steven D. Glassman, MD, FAAOS

- American Spine Registry: Board or committee member
- Cerapedics: Research support
- Empirical Spine: Research support
- Integra: Research support
- Intellirod: Research support
- International Spine Study Group: Research support
- Medtronic: IP royalties; Paid consultant; Research support
- Nuvasive: Research support
- Pfizer: Research support
- Scoliosis Research Society: Board or committee member
- Springer: Editorial or governing board
- No financial conflicts of interest relevant to this presentation
Great Variability in Conditions and Treatment

• ‘Spine’ is lumped together as a single entity

• Great heterogeneity in
  o Pathology
  o Patient health status
  o Treatment options
  o Surgical technique

• How to measure quality?
  o Initial efforts antibiotic prophylaxis, surgical site confirmation, infection rates.....
Upper Lumbar Disc Herniation
L5-S1 Disc Herniation
1 Level Lumbar Stenosis
L4-S1 Fusion for Degenerative Disc Disease
1 Level Degenerative Spondylolisthesis
Degenerative Spondylolisthesis
1 Level Anterior Cervical Discectomy and Fusion
A Partnership Based on the Need for Spine Data

- Degenerative spine disease is one of the most prevalent and costly disease states worldwide
  - LBP is the most common cause of work-related disability in the U.S.
  - In the U.S. alone, the total direct costs for spine care exceed $100 billion annually

- Utilization of common spine procedures has increased 150-600% over the last decade
  - Lumbar spinal fusion surgeries, which range from $60,000 to $110,000 per procedure, have significantly increased in frequency

- Various estimates suggest that between 10 and 25% of spine care (diagnostic and therapeutic) is unnecessary and/or ineffective
A Need for Spine Data

CMS: We need data that reflects spine care in standard clinical practice.

October 2007
A Need for Spine Data

• Increased use of PROs

• Improved study quality (SPORT)

• Quality Outcomes Database (QOD)
A Need for Spine Data

QOD Contribution

Registry Effort Goals

- Registry platform available across Neurosurgery (Ortho)
- Standardized collection of PROs
- Improved diagnostic delineation
- Facilitate national registry-driven quality improvement programs
- Support novel scientific research
The Core Strategy

Registry Effort Goals

- Collect unique clinical information demonstrating real-world practice
- Enable performance measurement by physicians for physicians
- Facilitate national registry-driven quality improvement programs
- Support novel scientific research
A Need for Spine Data

• Potential for AANS/AAOS collaboration

• Spine Surgery: 50% Ortho/50% Neuro

• Complimentary resources
A Need for Spine Data
A Shared Quality Vision

Registries

- component of a larger quality vision for spine care
- provide data to inform AANS & AAOS guidelines and test performance measures
- provide feedback to providers to continuously improve their practice and healthcare outcomes
- allow AANS & AAOS to define what quality means in a value-based system
- reduce the reporting burdens on physicians
- help inform gaps in knowledge or areas for further education

“If you can’t measure it, you can’t improve it” ~ Drucker
Collaborative Approach to Quality Spine Care

- ASR is a win-win for surgeons and stakeholders across spine
  - QOD sites benefit from lower cost and increased functionality
  - AJRR sites join a spine registry informed by QOD historical expertise
  - Ease of access for sites not participating in any registry
- All Sites benefit from multiple data re-use opportunities
- Participation allowed at several contribution levels (Standard & Vanguard)
- **ASR provides a pathway to more consistent high-quality spine care**
ASR Governance & Development

AANS Board of Directors

American Spine Registry (ASR) Executive Committee

AAOS Board of Directors

ASR Data Operations Committee

ASR Data Use Committee

Spine Tumor Module (in development)

Cervical Degenerative Spine Module

Lumbar Degenerative Spine Module

Future ASR Module

Launched January 2020
Accepts data from ICD10 implementation - present

Launched January 2020
Accepts data from ICD10 implementation - present

*Over 200 sites already participating since Jan 2020 launch*
ASR Surgeon Leadership

ASR Executive Committee (EC)

Neuro
- **Anthony Asher, MD, AANS Co-Chair**
  Carolina Neurosurgery & Spine Associates
- **Kevin Foley, MD**
  Semmes Murphey Clinic
- **Jack Knightly, MD**
  Atlantic Neurosurgical Specialists
- **Chris Shaffrey, MD**
  Duke University

Ortho
- **Steven Glassman, MD, AAOS Co-Chair**
  Norton Leatherman Spine Center
- **Todd Albert, MD**
  Hospital for Special Surgery
- **Darrel Brodke, MD**
  University of Utah
- **David Polly Jr., MD**
  University of Minnesota

*EC provides leadership across the development and implementation of ASR, oversees committees formed, and ensures surgeon representation from AANS and AAOS*
Data Operations Committee (DOC)*
*DOC Oversees the development of the data specification and data dictionary, monitors data quality and provides strategic oversight on data element updates

Neuro
- Mo Bydon, MD, AANS Co-Chair
  Mayo Clinic
- Erica Bisson, MD, MPH
  University of Utah
- Paul Park, MD
  University of Michigan
- John Ratliff, MD
  Stanford University
- Michael Steinmetz, MD
  Cleveland Clinic
- Luis Tumialan, MD
  Barrow Brain & Spine

Ortho
- Clint Devin, MD, AAOS Co-Chair
  UCHealth – Yampa Valley Medical Center
- Leah Carreon, MD
  Norton Leatherman Spine Center
- Elizabeth Norheim, MD
  Kaiser Permanente
- Zeeshan Sardar, MD
  Columbia University
- Wellington Hsu, MD
  Northwestern University
- Andrew Pugely, MD
  University of Iowa

Data Use Committee (DUC)*
*DUC oversees the data access policies, reviews submitted hypotheses, informs the platform dashboards and reports, and provides strategic oversight on data dissemination

Neuro
- Praveen Mummaneni, MD, AANS Co-Chair
  University of California San Francisco
- Dom Coric, MD
  Carolina Neurosurgery & Spine Associates
- Eric Potts, MD
  Goodman Campbell Brain and Spine
- Mike Wang, MD
  University of Miami, TJC Expert Panel
- Kai-Ming Fu, MD
  Weill Cornell Medicine

Ortho
- Doug Burton, MD, AAOS Co-Chair
  University of Kansas Medical Center
- Sheeraz Qureshi, MD
  Hospital for Special Surgery
- Raj Sethi, MD
  Virginia Mason Medical Center
- Alpesh Patel, MD
  Northwestern Medicine
- S. Tim Yoon, MD
  Emory University
Key Opinion Leader Taskforce* & ASR Surgeon Champion(s)

Neuro
- John Wilson, MD
  Wake Forest, TJC Expert Panel
- Adam Kanter, MD
  University of Pittsburgh
- Michael Groff, MD
  Brigham & Women’s Hospital
- Joseph Cheng, MD
  University of Cincinnati
- Justin Smith, MD
  University of Virginia
- Oren Gottfried, MD
  Duke University

Ortho
- Jacob Buchowski, MD
  Wash U in St. Louis, TJC Expert Panel
- Rick Sasso, MD
  University of Indiana, TJC Expert Panel
- Paul Rubery, MD
  University of Rochester
- Scott Boden, MD
  Emory University
- Thomas Mroz, MD
  Cleveland Clinic
- Jason Savage, MD
  Cleveland Clinic
- Jeffrey Wang, MD
  USC
- Eric Truumees, MD
  UT Austin
- Kris Radcliff, MD
  Rothman Institute
- Frank Phillips, MD
  Rush University

*KOL represents spine surgeon leaders from across the country to inform and provide guidance on ASR development and implementation
Young Physician Committee

• Young Physician Committee (YPC) is directed at surgeons in early practice
• Educational materials and opportunities in registry science
• Equal representation of ortho and neuro
• Erica Bisson, MD and Wellington Hsu, MD as Co-Chairs
ASR Initial Module Framework

American Spine Registry

Cervical Spine

- Standard
- Vanguard

Lumbar Spine

- Standard
- Vanguard

*Vanguard sites: smartform for procedural / diagnostic detail 1 yr. rather than 3 mo. PROM follow-up
ASR Clinical Data Elements

Two Modules Available: Cervical & Lumbar

Demographics

Patient
- Name (Last, First)
- Date of Birth
- Social Security Number
- Diagnosis (ICD-10)*
- Gender
- Race/Ethnicity
- Comorbidities (ICD-10)
- COVID-19 as prior diagnosis
- Height + Weight/Body Mass Index

Site of Service
- Name and Address (TIN/NPI)

Surgeon
- Name (NPI)

Procedure
- Type (ICD-10, CPT)*
- Date of Surgery
- Spinal Approach
- **Implants and Grafts (manufacturer/lot#, UDI)**
- Length of Stay
- American Society of Anesthesiologists Score
- Anticoagulation

Post-Operative/Complications
- Operative and Post-operative Complications
- Secondary Surgical Procedures

*Vanguard sites utilize an operative form for additional procedural & diagnosis detail
ASR PRO Data Elements

Patient-reported Outcomes*

Recommended
• PROMIS-10 Global or VR-12
• PROMIS Physical Function or Oswestry Disability Index (ODI)
  2.1/Neck Disability Index (NDI)
• Numeric Rating Scale (NRS)

Additional Options Accepted
• PROMIS CAT, PROMIS-29
• PROMIS Emotional Distress – Depression
• PROMIS Emotional Distress – Anxiety
• PROMIS Pain Interference
• EQ-5D

*Vanguard sites pursue longer PROMs post-operative follow-up (min 1 year) compared to standard sites (min 90 days)

*Sites can utilize their existing PROMs collection mechanism or utilize ASR’s no cost PROM tool
### ASR Operative Forms

- Optional operative forms used to capture information found in the brief op notes in discrete form.
- Completed by the circulating nurse or surgeon during closure to populate op note and registry needs.
- Being updated to populate as a smartform that contributes data to multiple areas.
- Data will inform coding, valuation and advocacy in spine care by providing more detail than currently captured via CPT / ICD coding.

#### Primary Symptoms (Check ALL that apply)
- Back Pain
- Leg Pain: Right, Left, Both
- Neurogenic Claudication
- Cauda equina
- Motor weakness: Right, Left, Both

#### Neural Compression (Check ALL that apply)
- Foraminal: Right, Left, Both
- Central: Lateral recess: Right, Left, Both
- Recurrent compression: Far Lateral: Right, Left, Both
- Spondylolisthesis/Instability
- Kyphosis / Flatback
- Fracture
- Tumor

#### Structural Pathology (Check ALL that apply)
- Pseudarthrosis
- Scoliosis
- Adjacent Segment
- Disc space collapse

#### Approach
- Anterior/Oblique
- Transpsoas
- Posterior
- Tubular
- Endoscopic
- Mini-Open
- Percutaneous screw

#### Minimally Invasive
- Navigated
- Robotic

#### Supplemental Technique
- Microscope

#### This is part of a multi-stage procedure

<table>
<thead>
<tr>
<th>Level</th>
<th>Decompression</th>
<th>Implants</th>
<th>Fusion</th>
<th>Revision Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>Laminectomy</td>
<td>Screw</td>
<td>PLF</td>
<td>Revision Decompression</td>
</tr>
<tr>
<td>L1-L2</td>
<td>Foraminotomy</td>
<td>Cage</td>
<td>TLIF</td>
<td>Revision Instrumentation</td>
</tr>
<tr>
<td></td>
<td>Laminectomy</td>
<td>Plate</td>
<td>ALIF</td>
<td>Revision Fusion</td>
</tr>
<tr>
<td></td>
<td>Discetomy</td>
<td>Other, sp</td>
<td>LLIF</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Facet/Lamina</td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>Foraminotomy</td>
<td>Screw</td>
<td>PLF</td>
<td>Revision Decompression</td>
</tr>
<tr>
<td>L2-L3</td>
<td>Foraminotomy</td>
<td>Cage</td>
<td>TLIF</td>
<td>Revision Instrumentation</td>
</tr>
<tr>
<td></td>
<td>Laminectomy</td>
<td>Plate</td>
<td>ALIF</td>
<td>Revision Fusion</td>
</tr>
<tr>
<td></td>
<td>Discetomy</td>
<td>Other, sp</td>
<td>LLIF</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Facet/Lamina</td>
<td></td>
</tr>
<tr>
<td>L3</td>
<td>Foraminotomy</td>
<td>Screw</td>
<td>PLF</td>
<td>Revision Decompression</td>
</tr>
<tr>
<td>L3-L4</td>
<td>Foraminotomy</td>
<td>Cage</td>
<td>TLIF</td>
<td>Revision Instrumentation</td>
</tr>
<tr>
<td></td>
<td>Laminectomy</td>
<td>Plate</td>
<td>ALIF</td>
<td>Revision Fusion</td>
</tr>
<tr>
<td></td>
<td>Discetomy</td>
<td>Other, sp</td>
<td>LLIF</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Facet/Lamina</td>
<td></td>
</tr>
<tr>
<td>L4</td>
<td>Foraminotomy</td>
<td>Screw</td>
<td>PLF</td>
<td>Revision Decompression</td>
</tr>
<tr>
<td>L4-L5</td>
<td>Foraminotomy</td>
<td>Cage</td>
<td>TLIF</td>
<td>Revision Instrumentation</td>
</tr>
<tr>
<td></td>
<td>Laminectomy</td>
<td>Plate</td>
<td>ALIF</td>
<td>Revision Fusion</td>
</tr>
<tr>
<td></td>
<td>Discetomy</td>
<td>Other, sp</td>
<td>LLIF</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Facet/Lamina</td>
<td></td>
</tr>
<tr>
<td>L5</td>
<td>Foraminotomy</td>
<td>Screw</td>
<td>PLF</td>
<td>Revision Decompression</td>
</tr>
<tr>
<td>L5-S1</td>
<td>Foraminotomy</td>
<td>Cage</td>
<td>TLIF</td>
<td>Revision Instrumentation</td>
</tr>
<tr>
<td></td>
<td>Laminectomy</td>
<td>Plate</td>
<td>ALIF</td>
<td>Revision Fusion</td>
</tr>
<tr>
<td></td>
<td>Discetomy</td>
<td>Other, sp</td>
<td>LLIF</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Facet/Lamina</td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>Foraminotomy</td>
<td>Screw</td>
<td></td>
<td>Revision Instrumentation</td>
</tr>
</tbody>
</table>

#### Pelvis
- S2AI
- Iliac Bolts

#### Graft Material
- Iliac Crest
- Cancellous Allograft
- Structural Allograft
- BMP
- Stem cells
- Bone Marrow Aspirate
- DBM
- Other, specify

#### Neuromonitoring
- EMG
- MEP
- SSEP

#### Complications
- Durotomy
- Implant-related
- Neurologic
- Other, specify
Integration of Medicare Data

- Access to **Medicare claims** inclusive of inpatient (148 data elements), outpatient (122 data elements) & National Death Index
- Linked by full identifiers for longitudinal tracking
- 2012-2019 Medicare data for all patients represented in Registry with quarterly updates
  - Medicare files ~ 1 year delayed
  - National Death Index ~ 2 years delayed
  - National Inpatient Sample (NIS) integrated as reference data for representative analyses
  - NPPES dataset incorporated for NPI validation
- Access to custom reports that compare their site to the national Annual Report analyses, show migration trends, etc.
RegistryInsights® Dashboards

On-demand practice specific dashboards

Compare your practice to national performance benchmarks

Unlimited surgeon accounts with access to system, site, and surgeon level dashboards
Clinical Management

**Surgeon Users**
- View their procedural, post-operative and PROM data
- National benchmarks for comparison measures
- Request custom reports
- Submit data for quality initiatives (e.g., ABOS MOC, QPP, BPCI-A)

**PROM Management**
- Pre-register patients for PROM protocols
- Select PROM assessments to be delivered via email
- Utilize platform in kiosk mode in clinic
- Monitor completion, linked PROMs, and patients reaching MCID
The Value of Data

**ASR is primarily a Quality Improvement effort**

- Sites access and **export their own data** via the portal
- ASR serves as a **backbone** for advanced research efforts
- Sites (other partners) request **ASR analysis** of their data
- Access is tiered based on **site contribution**
- ASR may undertake internal **Registry driven projects**
# Delivering Value for AANS & AAOS Spine Surgeons

<table>
<thead>
<tr>
<th>On-demand practice and surgeon specific dashboards</th>
<th>Comparison to national performance benchmarks</th>
<th>Monitor longitudinal patient outcomes (Medicare data)</th>
<th>Maintenance of Certification credit (ABOS and ABNS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualify for national distinction programs (Aetna, AAAHC, Blue Distinction, DNV, TJC)</td>
<td>CMS quality improvement programs (MIPS &amp; BPCI-A)</td>
<td>Improve the value of care delivered to patients</td>
<td></td>
</tr>
</tbody>
</table>

- **ASR**

**Details:**
- On-demand practice and surgeon specific dashboards
- Comparison to national performance benchmarks
- Monitor longitudinal patient outcomes (Medicare data)
- Maintenance of Certification credit (ABOS and ABNS)
- Qualify for national distinction programs (Aetna, AAAHC, Blue Distinction, DNV, TJC)
- CMS quality improvement programs (MIPS & BPCI-A)
- Improve the value of care delivered to patients
# ACSS Performance Measures

<table>
<thead>
<tr>
<th>Measure Name</th>
<th>Description</th>
<th>Denominator</th>
<th>Numerator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surgical Site Infection Rates</strong></td>
<td>Patients with a post-operative surgical site infection identified within 90 days after the primary procedure.</td>
<td>All primary cervical and lumbar degenerative spine cases submitted to ASR.</td>
<td>Spine cases with documented surgical site infection within 90 days of the primary procedure.</td>
</tr>
<tr>
<td><strong>New Neurological Deficits</strong></td>
<td>Patients with new neurological deficits present within 90 days after the primary procedure.</td>
<td>All primary cervical and lumbar degenerative spine cases submitted to ASR.</td>
<td>Spine cases with new unexpected neurologic deficit with focus motor strength that is a 3/5 or worse.</td>
</tr>
<tr>
<td><strong>Unplanned Return Visit to the OR</strong></td>
<td>Patients who had an unplanned return to the OR within 90 days of the primary procedure.</td>
<td>All primary cervical and lumbar degenerative spine cases submitted to ASR that are not multi-stage procedures.</td>
<td>Spine cases that are not multi-stage procedures, with unplanned return visits to the operating room.</td>
</tr>
</tbody>
</table>
ACSS Performance Measures, continued

<table>
<thead>
<tr>
<th>Measure Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-operative and Post-operative Patient Reported Outcomes (PROs)</strong></td>
<td>Proportion of patients submitted to ASR who completed the general health and spine specific functional status assessments: 90 days prior to surgery and 90 days post-operatively. ASR accepts the following assessments: <em>General Health Assessments: PROMIS-10, VR-12, PROMIS Physical Function, PROMIS-CAT, PROMIS-29, PROMIS Pain Interference, PROMIS Emotional Distress - Depression, PROMIS Emotional Distress - Anxiety, EQ-5D Spine Specific Functional Assessments: ODI, NDI, Numeric Rating Scale</em></td>
</tr>
</tbody>
</table>
ASR Progress

ASR is a work in progress:
Areas of Strong Early Achievement

- Engagement with Regulators and Payers
- Buy-in from major Health Systems
- Capability to collect granular data at scale
ASR Progress

ASR is a work in progress:
Challenges of Spine Registry Development

 Complexity of Spine Data at all levels

 Need for focused IT involvement to build data feed

 We don’t know what we don’t know
Thank You

Info@AmericanSpineRegistry.org
www.americanspineregistry.org

Improving spine care through data.