Data Operations for the American Spine Registry

A collaboration between AANS and AAOS to improve quality and outcomes in spine care
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American Spine Registry

AANS/AAOS Shared Quality Vision

- component of a larger quality vision for spine
- provide data to inform AANS & AAOS guidelines and test performance measures
- provide feedback to providers to 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
**Spine Data Is Complicated**

- Variability in Diagnosis and Diagnostic Coding
- Variability in Procedure Selection and Coding
- Multi-stage Procedures
- Multiple Surgeons in a Single Procedure
- Complex Implant Constructs
Spine Data Is Complicated

Critical role of Patient Reported Outcomes

✓ Office-based Patient Interface
✓ Not typically EMR-linked
✓ Multiple Collection Strategies
✓ Multiple Clinic Locations
Spine Data Is Complicated

Importance of Longitudinal Data

✓ 1-year for clinical improvement
✓ 2-year f/u standard for fusion?
✓ Adjacent Level Risk
American Spine Registry

The ASR platform offers the potential to meet these challenges

- Automated Data Feed
- Medicare Integration
- Multiple PROMs Solutions
American Spine Registry

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
American Spine Registry

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
### American Spine Registry Diagnosis Inclusion Criteria

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spondylosis</td>
<td>M47.xx</td>
</tr>
<tr>
<td>Spondylolisthesis</td>
<td>M43.0 - M43.09</td>
</tr>
<tr>
<td>Spinal Stenosis</td>
<td>M40.0 - M48.00</td>
</tr>
<tr>
<td>Degenerative Disc Disease</td>
<td>M50.xx</td>
</tr>
<tr>
<td>Myelopathy</td>
<td>G99.2</td>
</tr>
<tr>
<td>Radiculopathy</td>
<td>M54.1 - M54.8</td>
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<tr>
<td>Kyphosis</td>
<td>M40.xx</td>
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</tbody>
</table>

### American Spine Registry Procedural Inclusion Criteria

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Coding</th>
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<tbody>
<tr>
<td>Odontoidectomy</td>
<td>22319, 22548</td>
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<tr>
<td>Discectomy</td>
<td>63077 - 63078</td>
</tr>
<tr>
<td>Laminctomy</td>
<td>63001-63017, 63020, 63045-63048</td>
</tr>
<tr>
<td>Laminoplasty</td>
<td>63050-63051</td>
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<tr>
<td>Corpectomy</td>
<td>63081, 63082</td>
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<tr>
<td>Foraminotomy</td>
<td>63047-63052</td>
</tr>
<tr>
<td>Fusion</td>
<td>22532-22534, 22548, 22551-22552, 22555-22556, 22558, 22585, 22590-22595, 22600-22614, 22630-22631, 22800-22804, 22808-22812</td>
</tr>
<tr>
<td>Arthroplasty</td>
<td>22855, 22857</td>
</tr>
<tr>
<td>Removal of Instrumentation</td>
<td>22850, 22852, 22855</td>
</tr>
</tbody>
</table>

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**ASR Enrollment Criteria**

**All Eligible Cases Included**

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**Diagram**

1. Your Site
2. Your Surgeons
3. Patient with diagnosis in Table 1
4. Patient scheduled for procedure in Table 2
5. Include
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
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

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

<table>
<thead>
<tr>
<th>Primary Symptoms (Check ALL that apply)</th>
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<tbody>
<tr>
<td>Back Pain □</td>
</tr>
<tr>
<td>Leg Pain □ Right □ Left □ Both</td>
</tr>
<tr>
<td>Neurogenic Claudication □</td>
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</table>

<table>
<thead>
<tr>
<th>Neural Compression (Check ALL that apply)</th>
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</thead>
<tbody>
<tr>
<td>None □</td>
</tr>
<tr>
<td>Central □</td>
</tr>
<tr>
<td>Recurrent compression □</td>
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</table>

<table>
<thead>
<tr>
<th>Structural Pathology (Check ALL that apply)</th>
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<tbody>
<tr>
<td>None □</td>
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<tr>
<td>Disc Herniation □</td>
</tr>
<tr>
<td>Stenosis □</td>
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<tr>
<td>Disc space collapse □</td>
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</table>

<table>
<thead>
<tr>
<th>Approach</th>
<th>Anterior/Oblique □</th>
<th>Transpsoas □</th>
<th>Posterior □</th>
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<tbody>
<tr>
<td>Minimally Invasive</td>
<td>Tubular □</td>
<td>Endoscopic □</td>
<td>Mini-Open □</td>
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<table>
<thead>
<tr>
<th>Supplemental Technique</th>
<th>Microscope □</th>
<th>Navigated □</th>
<th>Robotic □</th>
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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>
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<tbody>
<tr>
<td>L1</td>
<td>Corpectomy □</td>
<td>Screw □</td>
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<td>Revision Decompression □</td>
</tr>
<tr>
<td></td>
<td>Foraminotomy □</td>
<td>Cage □</td>
<td>PLF □</td>
<td>Revision Instrumentation □</td>
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<tr>
<td></td>
<td>Laminectomy □</td>
<td>Plate □</td>
<td>ALIF □</td>
<td>Revision Fusion □</td>
</tr>
<tr>
<td></td>
<td>Discectomy □</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>
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<td>Corpectomy □</td>
<td>Screw □</td>
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</tr>
<tr>
<td></td>
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<td>Other □, sp</td>
<td>LLIF □</td>
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<td>Facet/Lamina □</td>
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<td>PLF □</td>
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<td>PLF □</td>
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<td></td>
<td></td>
<td>Facet/Lamina □</td>
<td></td>
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<td>S1</td>
<td>Corpectomy □</td>
<td>Screw □</td>
<td></td>
<td>Revision Decompression □</td>
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</tbody>
</table>

| Pelvis | S2AI □ | Iliac Bolts □ | Revision Instrumentation □ | Revision Fusion □ |

<table>
<thead>
<tr>
<th>Graft Material</th>
<th>Iliac Crest □</th>
<th>Local autograft □</th>
<th>Structural Allograft □</th>
<th>BMP □</th>
<th>Bone Marrow Aspirate □</th>
<th>DBM □</th>
<th>Other □, specify</th>
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<table>
<thead>
<tr>
<th>Neumonitoring</th>
<th>None □</th>
<th>EMG □</th>
<th>MEP □</th>
<th>SSEP □</th>
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</table>

<table>
<thead>
<tr>
<th>Complications</th>
<th>None □</th>
<th>Durotomy □</th>
<th>Implant-related □</th>
<th>Neurologic □</th>
<th>Other □, specify</th>
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</thead>
</table>
Simplify Data Collection

- ASR has partnered with over 45 technology vendors to facilitate the data submission process
- Re-use data that already exists in medical record, practice management and PRO systems
- Direct data submission and management can be handled by a technology provider with sites able to fix rejected files
Existing Registry Platform Participation

Over 1,390 participating sites contracted and 11,090+ registered surgeons across all 50 states. Linked PRO data from sites with over 93,708 completed assessments.

941+ sites have submitted representing 9,232+ surgeons and 1,777,625 procedures. Capturing over 30% of all US TJA volume annually.

ASR
Key IT Build Variables

Existing Elements

➢ Existing AAOS registry platform data feed
➢ Primary EMR platform (coding resources)
➢ Secondary data feeds (billing data)
➢ Adaptation to local EMR modifications
Key IT Build Variables

Optional Elements

- Integration of PROMs data
- Internal Retention of PROMs data
- Integration of Smart-form data
**Norton Healthcare ASR Data Strategy**

**Modern Data Warehouse Architecture**

- **Data Sources**
  - Structured Data
    - Epic
    - Lawson ERP
    - LTM
    - Press Ganey
    - Lab
    - Claim

  - Unstructured Data
    - Image
    - Physician notes
    - Devices
    - Sensor
    - Social media

- **Enterprise Data Warehouse Management**
  - Enterprise Data Governance (Informatica Axon, EDC, DPM)
  - Data Ingestion – Batch & Real-Time
    - Data repositories
    - Master data
    - Data marts
    - (Microsoft SQL Server)

- **Data Lake**
  - Elastic storage and compute
  - Automatic analysis
  - User analytics sandbox
  - (Cloudera CDP)

- **Business Intelligence and Data Science**
  - Business Intelligence (TBD)
  - Advanced Analytics
    - Machine learning
    - Prediction
    - Classification
    - (Dataiku DSS)

- **System Management**
  - Configuration management
  - Resource analysis & allocation
  - Deployment management
  - Backup & disaster recovery

- **Information request and delivery**
  - Dashboard
  - Report
  - Data interface
  - Market place
  - Search & discovery
Surgical Approach: EPIC Clarity

ASA Class: EPIC Clarity

Anesthesia Type: EPIC Clarity

OR data source: EPIC (procedure times)

Implant data source: EPIC Clarity
manufacturer, component name, category, lot #

Horizon Patient Management data source:
cost accounting database, populated by EPIC
patient population based on ICD-10 principal procedure code
(if secondary procedure code also qualifies, may be >1 data row)
admit/discharge dates, procedure/diagnosis codes, demographics,
surgeon, POA status

Smoking Status: EPIC Clarity

eMail source: EPIC Clarity

Data audit includes: invalid heights, weights
admit/procedure/discharge dates and times not in proper order

Process timing: monthly files are uploaded shortly after the beginning of a month
Norton Healthcare ASR Data Strategy

ASR PROMs file processing and uploading process

**Lumbar procedures with any current month ODI survey(s), plus any prior months’ ODI surveys not yet used for "best"* survey determination**

- **Lumbar procedure patients with any current month ODI survey**
- **"TBD" file for previous month (see in red below)**

**Lumbar PROCEDURE data:**
all Lumbar PROCEDURE files uploaded to registry to date,
First 30 columns of PROMs file are same as for prior PROCEDURE file
Elements retained from the PROCEDURE files including
Procedure/Date/etc.

**Process timing:** monthly PROMs file is uploaded on or about the 15th of the month
(e.g., PROMs file with Jan ODI surveys (plus stragglers) is uploaded about Mar 15th, Feb about April 15th, etc.)
IT Build Solutions

- Options for data accrual – Billing vs. EMR
- Available code in SAS vs. SQL code
- EMR customization regardless of template
Estimated IT Build Resources

Senior Clinical Information Analyst / Data Architect

- Primary AAOS platform build – 240 hrs
- ASR procedure build – 26 hrs
- ASR PROMs file build – 86 hrs
Estimated IT Build Resources

IT build including validity work and internal data retention

Senior Clinical Information Analyst / Data Architect

- Monthly Procedural data upload – 2 hrs
- Monthly PROMs upload – 2 hrs
- Data feed infrastructure maintenance – 2 hrs
Questions?

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www.americanspineregistry.org

Improving spine care through data.
Contact the American Spine Registry

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Custom Analytics: Analytics@AmericanSpineRegistry.org

Phone: (847) 292-0530

Business Hours: Monday through Friday, 8 a.m. to 4 p.m. Central Time
Webinar Recordings

- Recordings and slide decks from past webinars can be found on this page of the AAOS website.

- If you would like to view a recording of a webinar held before October 2020, please visit learn.aaos.org.
Thank You
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www.americanspineregistry.org

Improving spine care through data.