Neurosciences Landscape Update

NERVES Annual Meeting

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Sg2 Intelligence

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Operational Performance Is Improving, Yet Volume, Growth and Financial Trends Signal Pressure and Opportunity Lie Ahead

Historical Volumes

Q4 2022–Q3 2025

IP Volume **+13%**

Observation Volumes **+7%**

ED Volumes **+14%**

ALOS

Q4 2022–Q3 2025

IP ALOS **–6%**

Observation ALOS **–9%**

ED ALOS **–19%**

Growth

2025–2035

IP **+5%**

ED **+5%**

OP **+18%**

Acuity

IP Case Mix Index = 2.0

Financial

2.0% Median Operating Margin (Through November 2025)

Sources: Impact of Change®, 2025; HCUP National Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP) 2021. Agency for Healthcare Research and Quality, Rockville, MD; Proprietary Sg2 All-Payer Claims Data Set, 2023; The following 2023 CMS Limited Data Sets (LDS): Carrier, Denominator, Home Health Agency, Hospice, Outpatient, Skilled Nursing Facility; Claritas Pop-Facts®, 2025; Sg2 Analysis, 2025.

Looking Forward, Three Important Trends Will Shape the Future

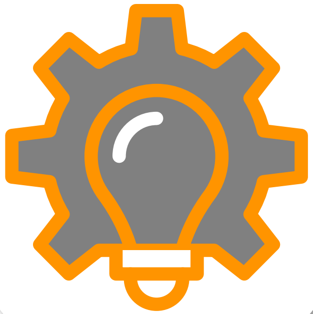
System Optimization

Service lines act as a system-wide strategic engine to enhance quality, unlock capacity and strengthen financial sustainability.

Economic Divergence

Economic and policy shifts are elevating the importance of data-driven planning and forecasting.

Clinical Innovation



Accelerating innovation is reshaping utilization patterns and redistributing care.

Neurosciences Leaders Face a Multitude of Competing Priorities and Pressures

What issues are top of mind for your institution in neurosciences/spine? (select up to 3)

Notes N= 95 Survey Responses; **Sources:** Survey from Sg2 Neurosciences Landscape 2025 Webinar, June 12, 2025

Refine offerings built around patients,

as innovation-driven evolution and operational realities elevate the need for integrated care.

Align models with organization-specific factors.

Institutional support, incentives and strategic alignment are crucial to success.

Integrate market and performance data to clarify readiness and execution strategies.

Clinical Innovation Continues to Drive Growth but Necessitates Effective Programs, Strategic Distribution of Services

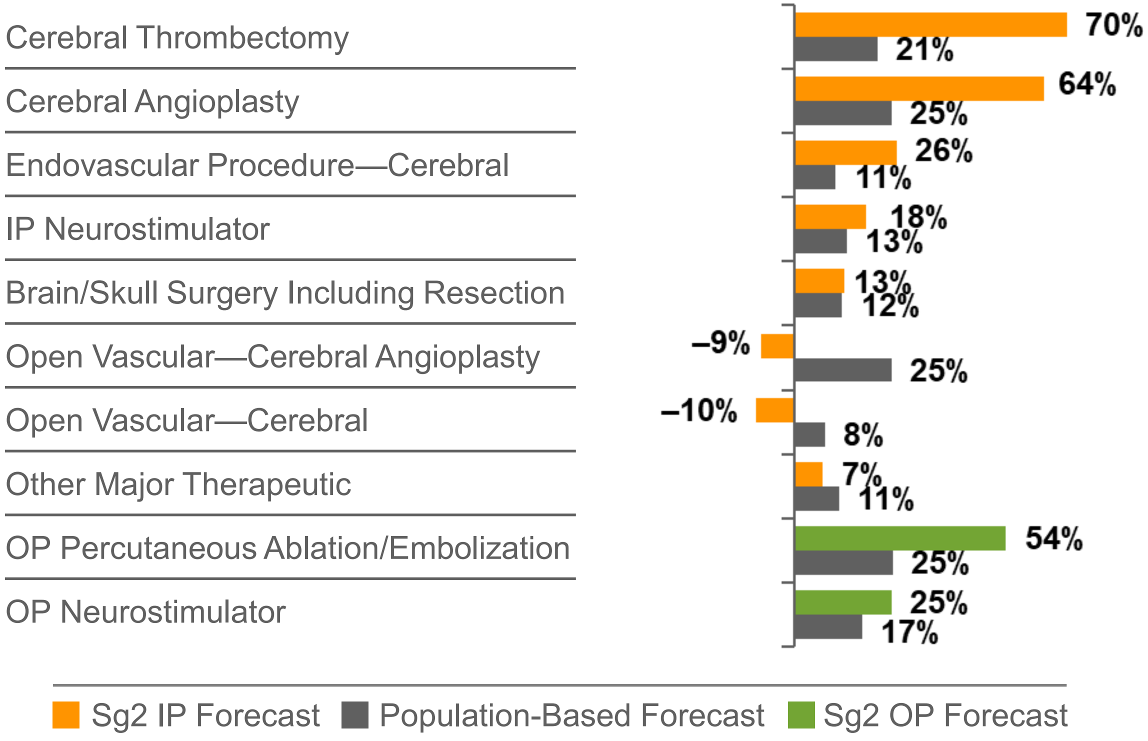
Examples

- Continued progress on thrombectomy access
- Emerging data supporting MIS for ICH
- Ongoing adoption of endovascular approaches (shift from open techniques; MMA embolization for SDH)
- Increasingly patient-specific neurostimulation techniques and broadening indications

Adoption Considerations

- Centralization vs Distribution (quality, cost, access perspectives)
- Resource requirements and cost
- Diverse access channels
- Comprehensive program context
- “Value” Demonstration and payor pressure (e.g., prior authorization)

Neurosciences Forecast
Select Procedures, US Market, 2025–2035



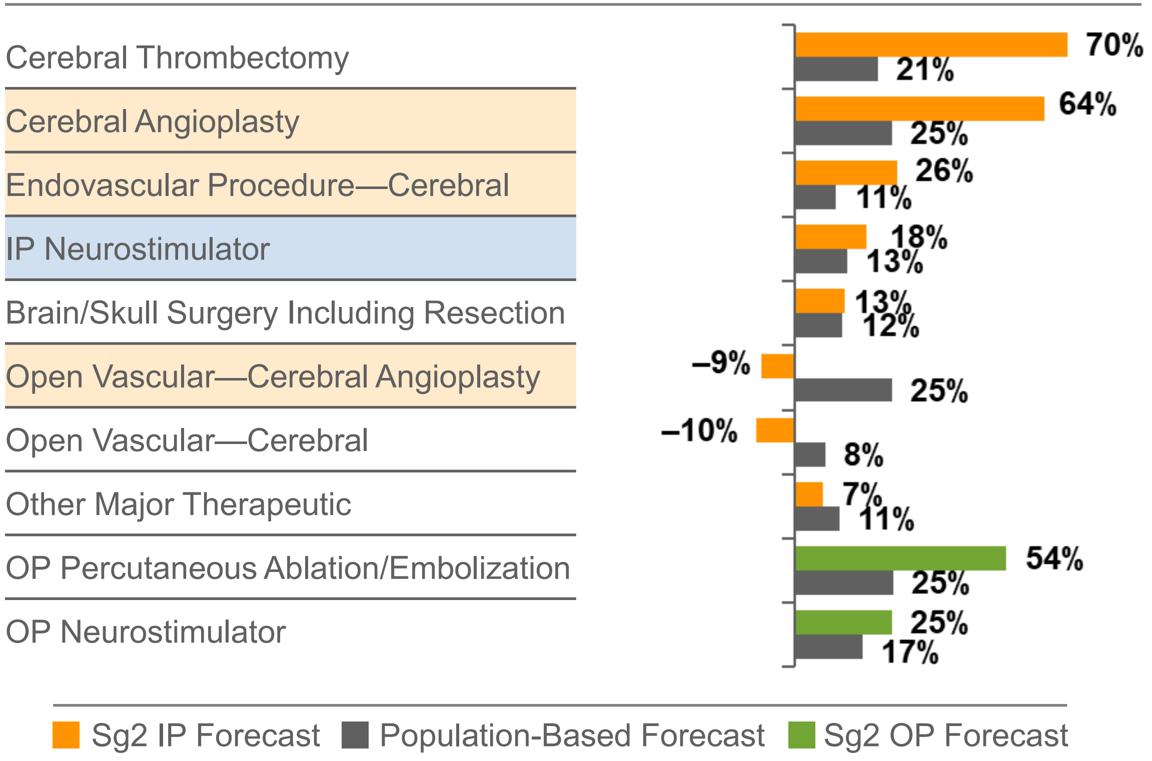
Note: Analysis excludes 0–17 age group and includes the neurosciences service line and Brain/CNS Cancer CARE Family. CNS = central nervous system; ICH = intracerebral hemorrhage; MIS = minimally invasive surgery; MMA = middle meningeal artery; SDH = subdural hemorrhage. **Sources** Impact of Change®, 2025; HCUP National Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP) 2021. Agency for Healthcare Research and Quality, Rockville, MD; Proprietary Sg2 All-Payer Claims Data Set, 2023; The following 2023 CMS Limited Data Sets (LDS): Carrier, Denominator, Home Health Agency, Hospice, Outpatient, Skilled Nursing Facility; Claritas Pop-Facts®, 2025; Sg2 Analysis, 2025.

Clinical Innovation Continues to Drive Growth but Necessitates Effective Programs, Strategic Distribution of Services

Neurovascular Disease Only -	LOS (days)
Endovascular Cerebral - Angioplasty	2.1
Endovascular Cerebral - Other	2.1
Open Vascular – Cerebral Angioplasty	1.9

PD/Movement Disorders Only - LOS (days)	
Neurostimulator Procedures	1.6

Neurosciences Forecast
Select Procedures, US Market, 2025–2035



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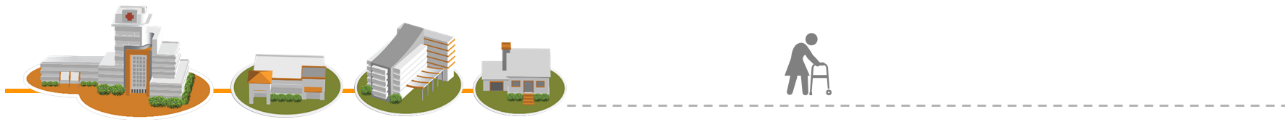
Procedural Advances Drive Growth, Utilization Shifts

Trends Influencing Neurostimulation

- Prior Authorization efforts expand
  - Selected HOPD procedures incl. Spinal Cord Stimulation
  - WISeR launching 2026
- Inpatient Only List Retirement
- Increasingly patient-specific devices
- Broadening indications (eg, **VNS for stroke** recovery, rheumatoid arthritis…)



Therapeutic Advances: Vagus Nerve Stimulation (VNS) Supports Stroke Recovery in Chronic Phase

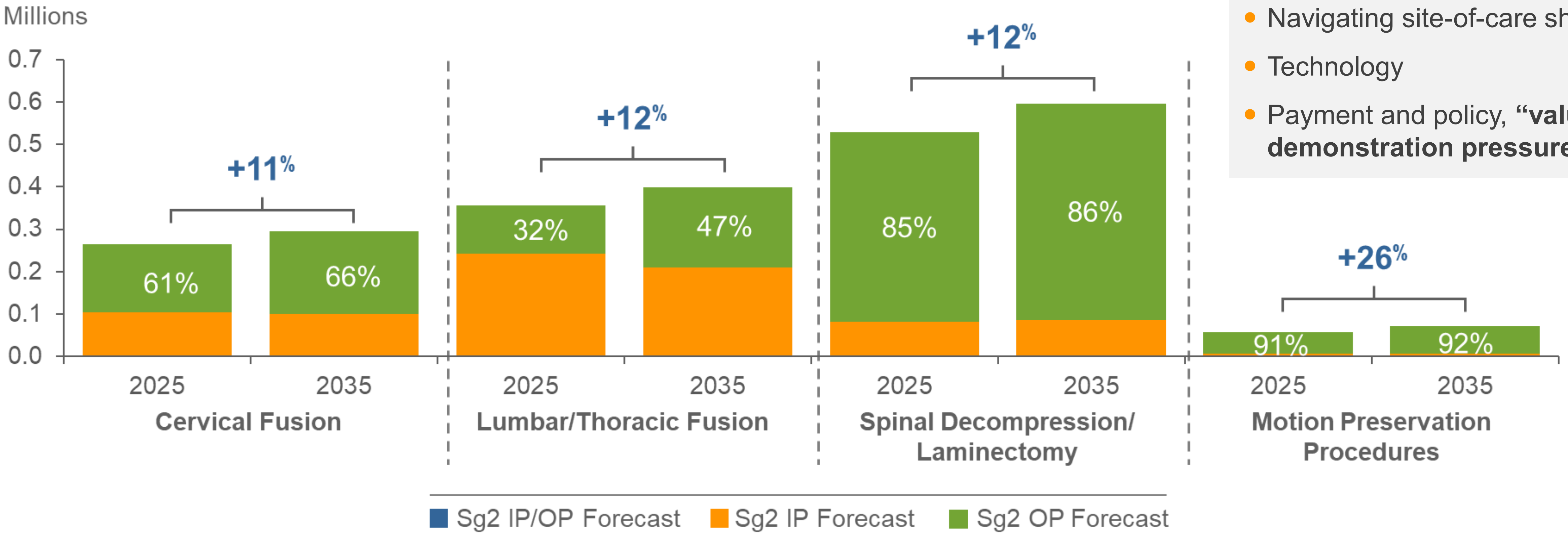
- Designed to help survivors with chronic upper limb motor deficits recover function in cases where progress has plateaued
- Delivered in conjunction with intensive task-specific therapy

- Expanding Indications for Neurostimulation Broaden Pool of Candidates But Will Necessitate Programmatic Infrastructure, Ability to Navigate Logistical Challenges
- Heightened Pressures Necessitate Operational Effectiveness

Notes: WISeR = Wasteful and Inappropriate Service Reduction; HOPD = Hospital Outpatient Department. **Sources:** Vivistim website

Spine Growth Occurs Amid Maturing OP Shift; Programs Reevaluate Foundational Program Capabilities

Spine Growth and OP Shift Forecast
US Market, 2025 vs 2035



Top-of-Mind Issues

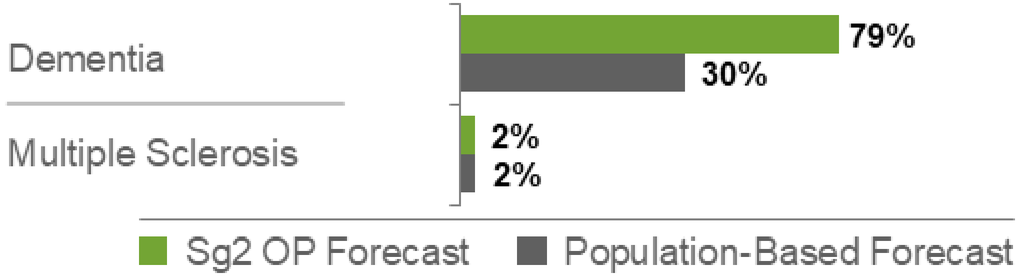
- Reevaluating foundational program elements
- Navigating site-of-care shifts
- Technology
- Payment and policy, **"value" demonstration pressure**

Note: Analysis excludes 0–17 age group and includes the spine service line. **Sources:** Impact of Change®, 2025; HCUP National Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP) 2021. Agency for Healthcare Research and Quality, Rockville, MD; Proprietary Sg2 All-Payer Claims Data Set, 2023; The following 2023 CMS Limited Data Sets (LDS): Carrier, Denominator, Home Health Agency, Hospice, Outpatient, Skilled Nursing Facility; Claritas Pop-Facts®, 2025; Sg2 Analysis, 2025.

Innovation and Market Pressures Yield Varied Impacts on Nonsurgical Growth

Pharmacologic Advances Disrupt Infusion Volumes for Some Conditions While Driving Growth for Others

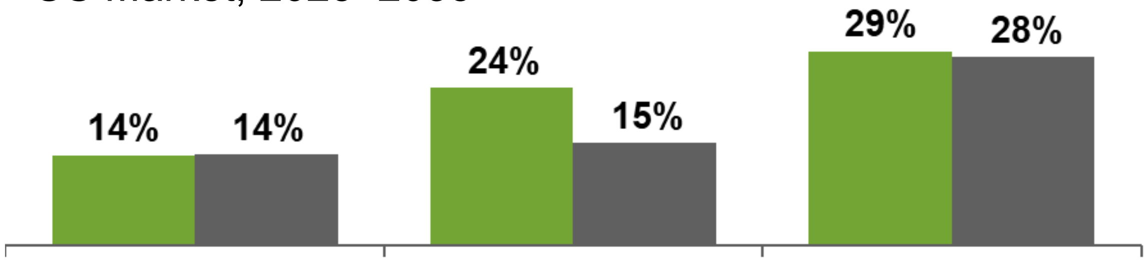
Chemotherapy
US Market, 2025–2035



Select Infusion Trends

- Expansion of disease-modifying therapeutics
- Evolution in delivery (eg, oral, subcutaneous options)
- Payer-driven site-of-care shifts
- Diagnostic advances supporting development of new therapies; potential to reduce access barriers

Rehabilitation 10-Year Forecast (Neuro + Spine)
US Market, 2025–2035



OUTPATIENT (VOLUMES)		
Rehab: PT/OT	PT/OT Evaluations	Home PT/OT
309M	11M	25M

Factors Shaping the Rehabilitation Landscape

- Cost pressures reduce per-person PT/OT visits.
- Clinical advances drive demand for functional rehab.
- Value-based care is emphasized.
- The use of home health is increasing.
- Telerehabilitation is emerging.
- Opportunity exists for rehab to serve as a “front door.”

Note: Analysis excludes 0–17 age group. Rehab includes Neurosciences, Spine and Brain/CNS Cancer **Sources:** Impact of Change®, 2025; Proprietary Sg2 All-Payer Claims Data Set, 2023; The following 2023 CMS Limited Data Sets (LDS): Carrier, Denominator, Home Health Agency, Hospice, Outpatient, Skilled Nursing Facility; Claritas Pop-Facts®, 2025; Sg2 Analysis, 2025.

"Center of Gravity" Varies Across and Within Service Lines

Hemorrhagic Stroke—SAH

4:1

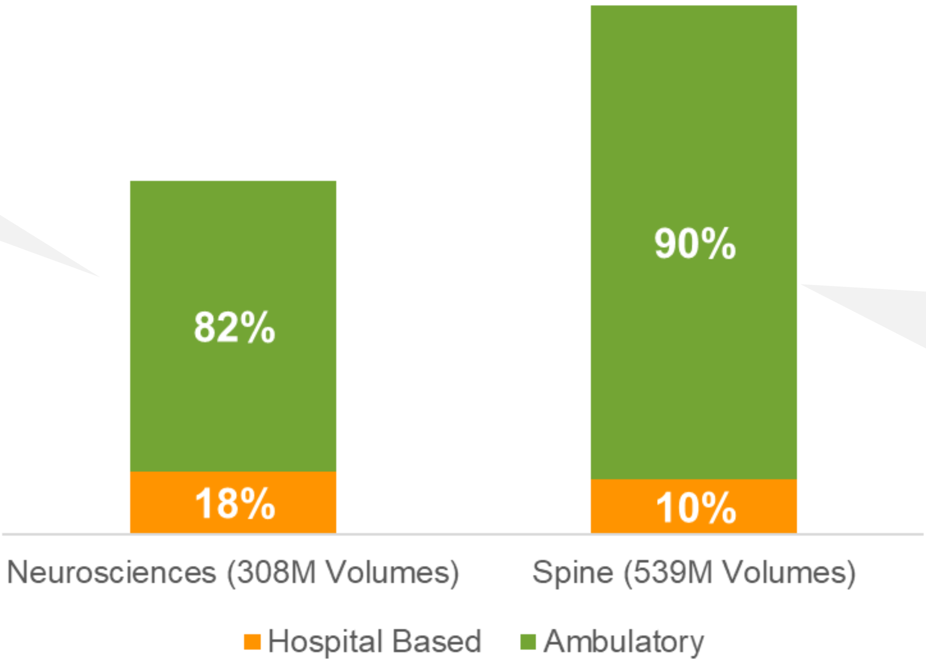
- ED/EMS
- Transfers

Epilepsy and Seizure Disorders

743:1

- Neurology, Primary care
- Neurodiagnostics precede surgery.

Neurosciences vs. Spine
Total Volumes (US Market) and Hospital vs Ambulatory Distribution



Total E&M Visits per IP Major Therapeutic Procedure and Key Referral Sources

Spine Service Line

159:1

- Primary care
- Pain; rehab/physiatry
- Self-referral; payer steerage

Clinical nuances matter. Execute optimization efforts at the Service Line or programmatic Level.

Note: Analysis excludes 0–17 age group. SAH = Subarachnoid Hemorrhage. **Sources:** Impact of Change®, 2025; HCUP National Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP) 2021. Agency for Healthcare Research and Quality, Rockville, MD; Proprietary Sg2 All-Payer Claims Data Set, 2023; The following 2023 CMS Limited Data Sets (LDS): Carrier, Denominator, Home Health Agency, Hospice, Outpatient, Skilled Nursing Facility; Claritas Pop-Facts®, 2025; Sg2 Analysis, 2025.

Stroke and Neurovascular Disease: An Aging Population and Rising Acuity Influence Demand

GROWTH AT A GLANCE

Ten-Year Total Growth (2025-2035)

INPATIENT DISCHARGES	+16%	OUT-PATIENT:	+33%
DAYS	+19%		

Key Areas of Opportunity

Neurointerventional procedures	Advanced imaging	Functional rehabilitation

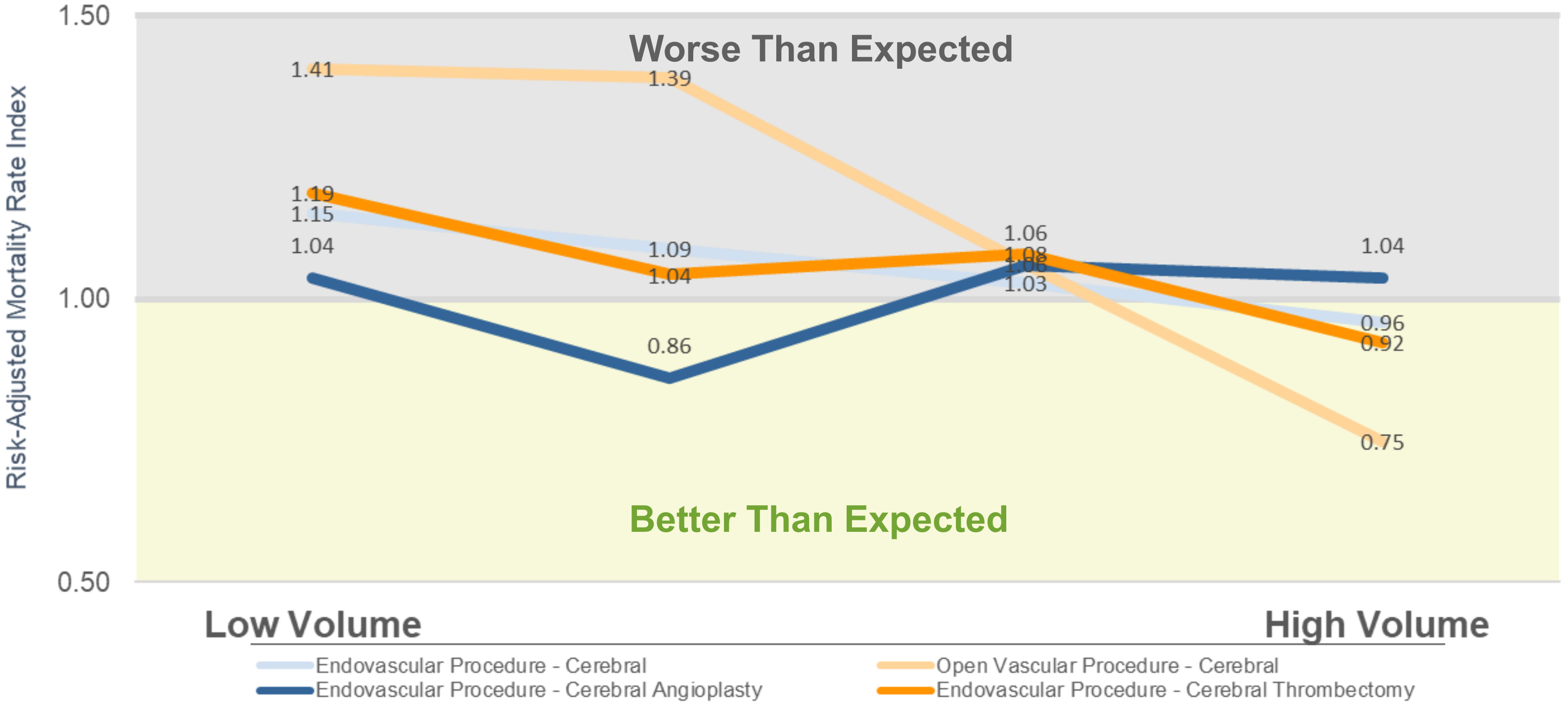
An aging population drives growing demand, exacerbated by **rising incidence in younger patients.** Advances in treatments and diagnostics are **improving outcomes**, which creates a greater need for rehabilitation and **post-acute care coordination**.

While stroke care continues to advance, **balancing access and expertise** remains a challenge. Addressing resource constraints and competitive pressures will require system-level collaboration and a regional approach to continuum-wide stroke care.

Sources: Impact of Change®, 2025; HCUP National Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP) 2021. Agency for Healthcare Research and Quality, Rockville, MD; Proprietary Sg2 All-Payer Claims Data Set, 2023; The following 2023 CMS Limited Data Sets (LDS): Carrier, Denominator, Home Health Agency, Hospice, Outpatient, Skilled Nursing Facility; Claritas Pop-Facts®, 2025; Sg2 Analysis, 2025.

System Optimization Is Critical to Sustaining Quality and Outcomes Amid Ongoing Performance Pressures and Evolving Therapeutic Options.

Volume-Quality Relationship Variation by Procedure: Stroke/Cerebrovascular
All Payers, Q3 2022–Q2 2025



Key Takeaway

Identify where program consolidation is and is not beneficial, and leverage scale to enhance outcomes, market relevance and program sustainability.

Imperative | **Use data to drive complex and difficult system-wide decisions.**

Note: Analysis excludes 0–17 age group. Volumes grouped into quartiles based on annual volumes for three-year period (Q3 2022 to Q2 2025). Analysis includes only hospitals with a minimum average of five procedures per year **Sources:** Data from Vizient Clinical Data Base, used with permission of Vizient, Inc. All rights reserved; Sg2 Analysis, 2025.

Rising Costs, Persistent Variation and Remaining Opportunities to Optimize Care Keep Spine Under the Microscope

Low back and neck pain economic burden in the US: **annual costs exceeding $134 billion**; rising at a rate greater than 2x overall health care spending

NEWS ***Forbes***

14% of Spine Surgeries Deemed Unnecessary. Could RFK Jr Change That?

32% of cost variation for inpatient spinal fusions **attributable to hospital-level characteristics** (eg, bed size, geography, teaching status)*—not patient characteristics.

CMS targets hospital-based procedures and more:

- Prior Authorization efforts expand
  - Selected HOPD procedures
  - WISeR to launch 2026
- TEAM
- Ambulatory Specialty Model

Spine ED Imaging Costs on the Rise:

ED Imaging Spend/10K Medicare Beneficiaries (US): 2021–2023

CT:	MRI:
+24%	**+19%**

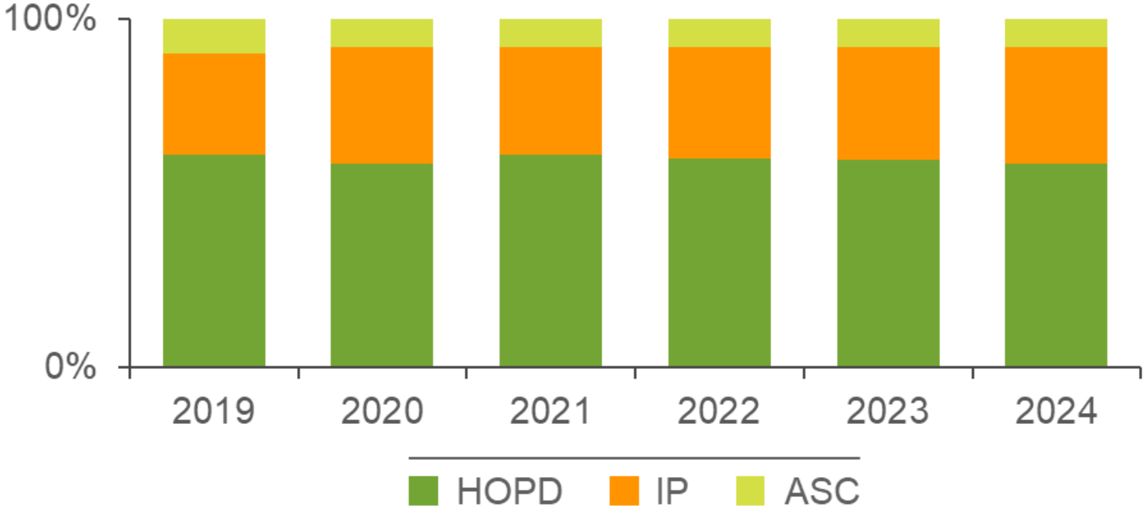
Intrasystem Variation in Back Pain ED Imaging Persists:

Between 2016 and 2019, **75%** of health systems showed **no improvement** or **more intrasystem variation****

*Based on 2016–2020 NIS data. **Comparing 2015–2017 vs 2012–2014 from Vizient Research Institute studies. **Note:** Readmission analysis includes Degenerative Spine and Disc Injury CARE Family only. Top readmission diagnoses are unplanned only, non–health care facility origin only. NIS = National Inpatient Sample. ED imaging spend comes from the Harvey L. Nieman Health Policy Institute. **Sources:** Dieleman J et al. *JAMA*. 2020;323(9):863–884; Harvey L. Neiman Health Policy Institute. U.S. Imaging Cost and Trends. Accessed August 2025; Curry J et al. *PLoS One*. 2024;19(2). Menger R. 14% of spine surgeries deemed unnecessary. Could RFK Jr. change that? *Forbes*. December 4, 2024; Vizient Research Institute, analysis of Medicare claims data, 2012–2014 and 2015–2017; Vizient Clinical Data Base used with permission of Vizient, Inc. All rights reserved; Sg2 Analysis, 2025.

Cervical Fusion ASC Penetration Remains Steady But Varies Across Markets

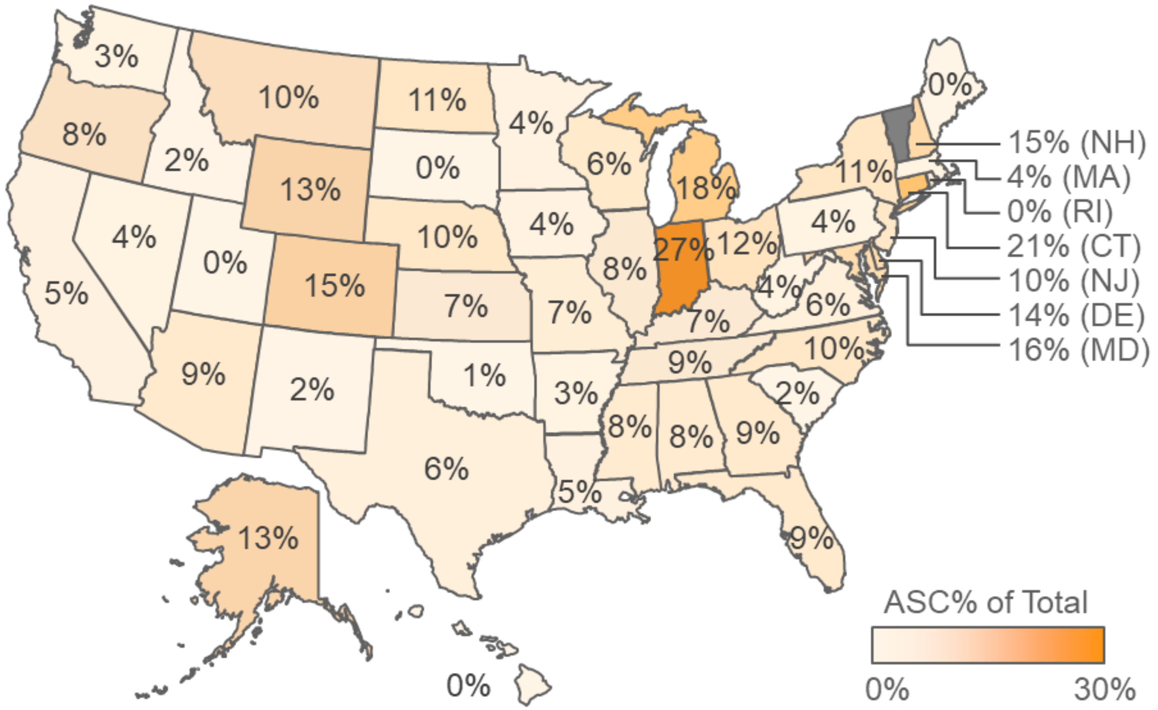
Commercial Cervical Fusion Site of Care



2024 National Commercial Cervical Fusion ASC Penetration = 8%

Percentage of Cervical Fusion in ASCs

Commercial Claims, 2024



STRATEGIC FOCUS | ASC utilization is increasing and capturing commercial volumes, squeezing out hospital-based care.

Sources: Proprietary Sg2 All-Payer Claims Data Set, 2023; The following 2023 CMS Limited Data Sets (LDS): Carrier, Denominator, Home Health Agency, Hospice, Outpatient, Skilled Nursing Facility; Claritas Pop-Facts®, 2025; Sg2 Analysis, 2025.

What is your primary access channel?

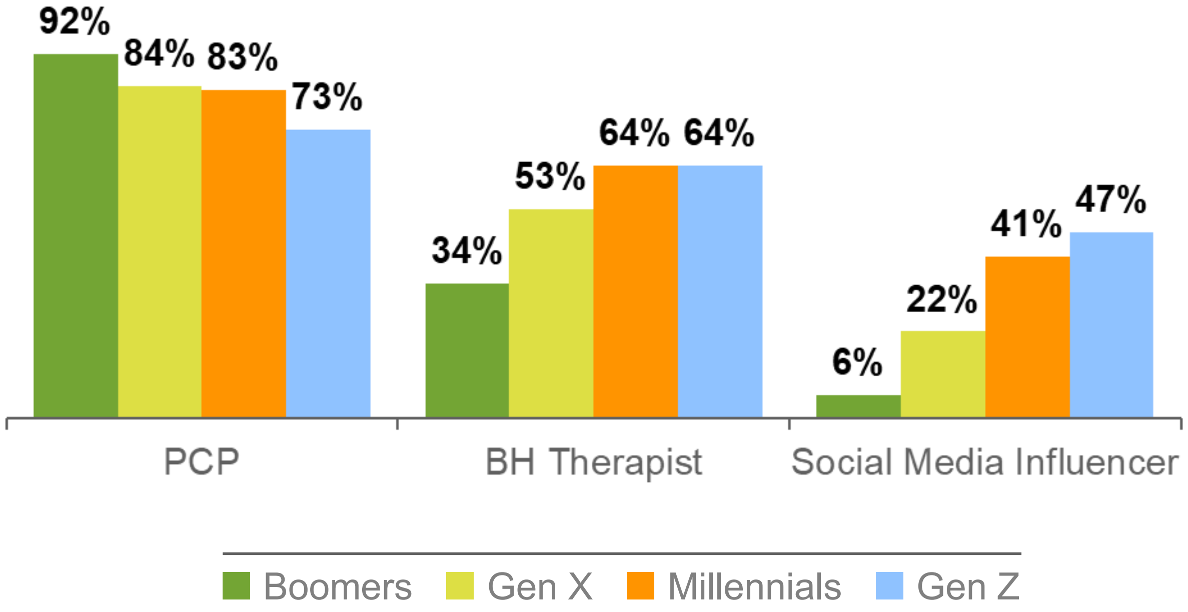
Percent of member responses *(n = 94)*

Primary Care 70%	**Self-Referral** 13%	**ED** 11%
Physical Therapy 2%	**Payor Directed** 1%	**Other** 3%

Note: ED = Emergency Department. **Sources:** Survey from Sg2 Spine Landscape 2025 Webinar, August 13, 2025

To Win With Consumers, Access and Convenience Matters; Sources of Truth Are Changing

How much would you trust the recommendation of each of the following to help you find a spine/neuro specialist?
(High/Very High)



51% of respondents expected to wait no longer than two weeks for nonemergency spinal/neurosurgery.

Would you rather travel two or more hours for a renowned center of excellence (COE) or stay at your local health system that is within 30 minutes?

	Stay	Travel
Routine Specialist Visit	73%	27%
Routine Diagnostics	77%	23%
Rehabilitation	69%	31%
Routine Procedure	71%	29%
Neurosurgery	48%	52%

COE = center of excellence; PCP = primary care provider. **Sources:** Sg2 National Consumer Survey, 2025; Sg2 Analysis, 2025.

Physical Therapists Are Highly Trusted as Providers and Referral Sources, and They Have a Significant Impact on Overall Brand Perception

96%*

trust their physical therapist.

85%†

report that PT gave them a favorable perception of the health system and increased likelihood of going there for other services.

77%‡

want their orthopedics provider to offer physical therapy.

62%‡

trust their physical therapist's recommendation of an orthopedic specialist as much as or more than their PCP's.

Note: *n = 8,110 (respondents who underwent PT). †n = 5,673 (respondents who underwent PT affiliated with their health system). ‡n = 2,398 (respondents who saw an orthopedic specialist and underwent PT).
Sources: Sg2 National Consumer Survey, 2025; Sg2 Analysis, 2025.

Embedding Physical Therapy Provides Access Points and Increases Patient Satisfaction

MEMBER SPOTLIGHT: Bon Secours Mercy Health

Cincinnati, OH | Free Consultations With Physical Therapists

CAPTURE RATE

75%+ in 2023

REFERRAL RATE

25% comes from the early access program or walk-ins

- Free 15-minute physical therapy screenings for patients with MSK concerns take place in existing PT locations and select PCP offices.
- Screenings can result in a referral to continue PT or a recommendation to follow up with a Bon Secours Mercy Health physician.

Greenville, SC | PT Embedded in Spine Offices

Immediate Access

Efficient Scheduling

Postoperative Protocols

I was able to get in to see someone right away. If I have a question that he doesn't know the answer to, the doctor is right around the corner and I have an answer before I leave.

—Patient

STRATEGIC CONSIDERATIONS

- Identify market-based **physician champions**.
- Engage physical therapists.
- Provide **advanced training** for therapists.
- Plan for PT **demand** to increase.
- Prepare to address **insurance approvals** for same-day PT visits.

MSK = musculoskeletal. **Source:** Sg2 Interviews With Bon Secours Mercy Health, 2024 and 2025.

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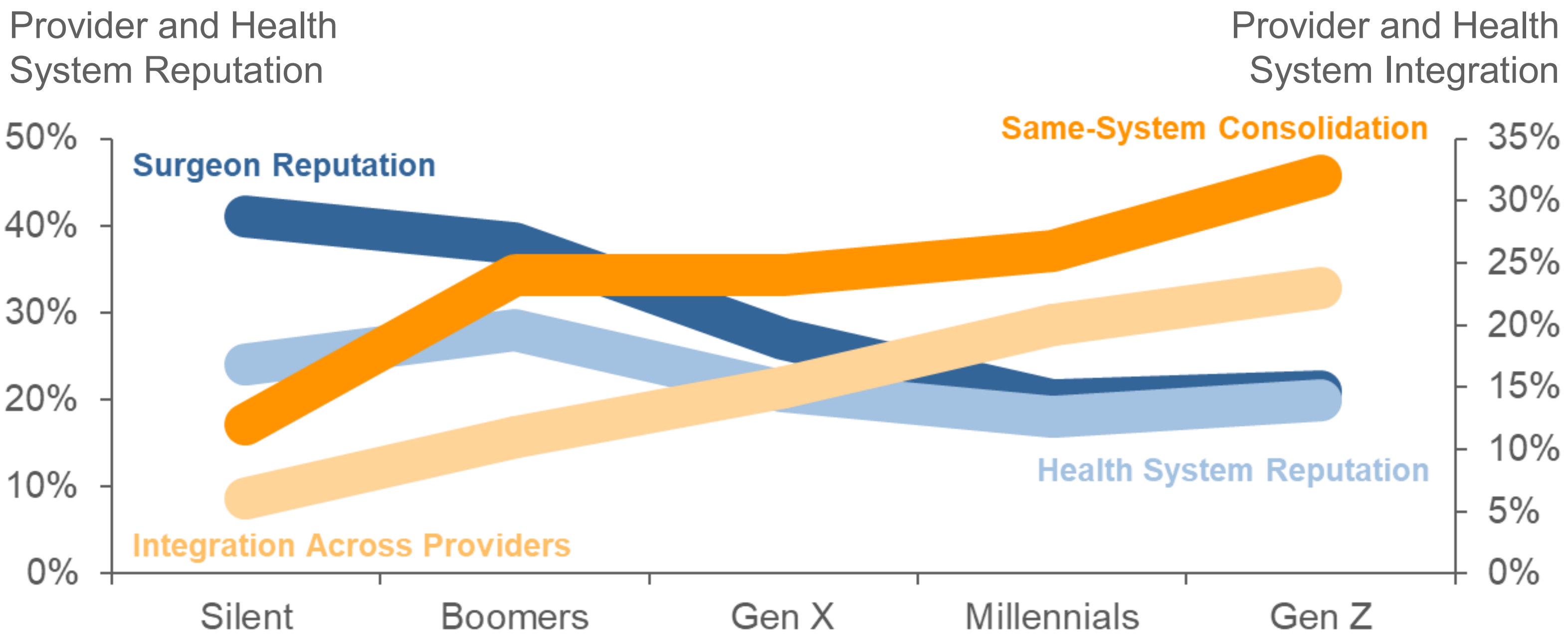
Signals of Standout Expertise Give Way to Desire for Systemness and Seamless Journeys

% of Respondents Who Ranked Each Attribute Below as Most Important in Choosing a Neurosurgeon, by Generation



The generational shift makes it clear: expertise is assumed; orchestration is the differentiator.

Note: Only respondents who had a neurosciences-related surgery in the prior three years are included; n = 1,424, Silent Generation n = 17, Gen Z n = 187. All other generation groups total above 600.
Source: Sg2 National Consumer Survey, 2025.

Know Your Customer and Paint the Right Picture to Demonstrate Value

Payer
- Competitive prices
- Nonoperative focus
- Advanced certification

Employer
- Competitive prices
- Nonoperative focus
- Solutions
- Healthy, productive employees

Provider
- Ambulatory partnerships
- Well-functioning workshop

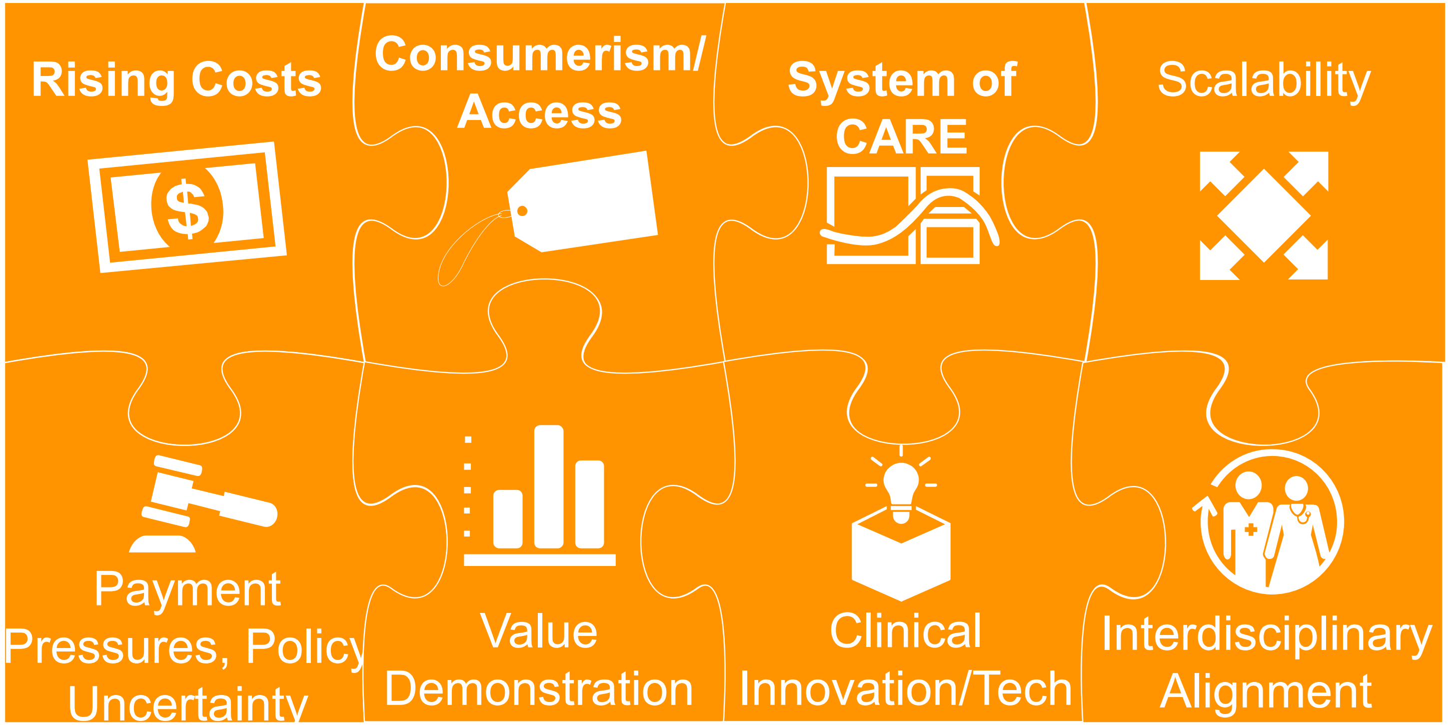
Consumer
- Access
- Seamless experience
- Affordability

Sample Metrics and Criteria:

- Volumes
- Readmissions
- Complications (eg, SSI)
- Access
- Patient reported outcomes
- Length of stay
- **"Appropriateness"**
- **Registry participation**
- **Primary care collaboration**

Note: SSI = surgical site infection

Amid Escalating Pressures, Successful Programs Put the Puzzle Pieces Together



Critical Elements:

- Unified approach to patient care
- Stakeholder-specific metrics that matter
- Convenient access and effective triage mechanisms
- Operational effectiveness/cost management
- Navigation and care orchestration
- Governance structure supports interdisciplinary collaboration

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