

CQI VALUE ASSESSMENT

MSSIC Improvement Efforts Contribute to an Estimated \$66.8 Million in Cost Savings from Reductions in Urinary Retention Complications After Spine Surgery

December 2025



AT A GLANCE

About MSSIC

- Funded by BCBSM Value Partnerships
- Works to improve the quality of spine surgery in Michigan
- Supports 32+ sites

MSSIC Resources

- MSSIC registry
- Provider protocols
- Performance reports
- Custom support
- Patient education materials



“The analyses here show how decreasing rates of what some may consider to be a ‘minor complication’ of surgery can have profound consequence in terms of cost savings for patients, employers, and other payers.”

**-Kari Jarabek, BSN, RN
Senior MSSIC QI Lead**

BACKGROUND

The Michigan Spine Surgery Improvement Collaborative (MSSIC) is a statewide quality improvement collaborative involving orthopedic surgeons and neurosurgeons with the aim of improving the quality of spine surgery in Michigan. MSSIC supports a registry that allows all participating hospitals and surgeons to see their performance relative to peers on a variety of process and outcome metrics. They also host three collaborative-wide meetings per year to support quality improvement (QI) among members.

Analyses of MSSIC registry data in 2015-2016 suggested early ambulation (defined as up and moving within eight hours of surgery) for patients across Michigan was associated with reductions in the rate of three specific adverse events: surgical site infections (SSI), hospital readmission within 90 days of discharge, and post-operative urinary retention (POUR). In 2017, MSSIC began working with hospitals to increase rates of early ambulation and reduce the rate of adverse events or complications post-surgery.

MSSIC first partnered with the Michigan Value Collaborative (MVC) in 2021 to evaluate the impact of this work, and at that time estimated \$16M in direct cost savings to payers due to fewer SSIs, readmissions, and POUR events. Following several years of additional QI work, MSSIC and MVC came together in 2025 to update prior cost savings estimates using MVC’s most recent medical insurance claims data for spine patients in Michigan, this time adding Medicaid to the payer mix. This summary highlights findings specifically related to POUR.

MSSIC Strategies to Support Sites in Reducing POUR Events

To help drive reductions in the rate of POUR events following spine surgery, the primary QI intervention was early ambulation. MSSIC also offered its sites coaching, resources, benchmarking, and QI support paired with MSSIC’s BCBSM pay-for-performance and value-based-reimbursement incentives. POUR measures were similarly adopted by other BCBSM CQIs (e.g., MSQC) as well as CMS for other procedures. MSSIC hospitals also reviewed their existing protocols for the prevention and management of POUR, updating protocols to reflect best practices. Some of those best practices included: limiting the placement of indwelling urinary catheters in the operating room, prompt removal of the catheter before leaving the recovery room, and basing catheter placement decisions on a stricter set of criteria for medical necessity. Some sites also implemented post-void bladder screening to ensure that pre-existing urinary retention was known and documented.

METHODOLOGY

At the outset of this updated analysis, MSSIC provided MVC with a dataset of lumbar and cervical spine patients that included the presence or absence of POUR complications as abstracted from medical records. Spine patients were matched to the MVC analytic tables and spine cohort for Medicare Fee-For-Service (FFS), Medicaid, Blue Cross Blue Shield of Michigan (BCBSM) Commercial, BCBSM Medicare Advantage (MA), Blue Care Network (BCN) Commercial, and BCN MA claims.



Matching Methodological Approach

The MVC Coordinating Center was tasked with matching MSSIC's patients to MVC episodes, providing descriptive statistics on the population, and performing analyses of episode payments with and without adverse events. To achieve this, MVC implemented a stepwise, deterministic match to link MSSIC patients to MVC data using birth date, admission date, discharge date, gender, and hospital of surgery. Patients with index admissions between Dec. 28, 2016, and Nov. 29, 2024, were included in the match.

Of the MVC records, 32,483 were matched to MSSIC cases, giving a raw match rate of 48%. MSSIC's sampling strategy resulted in the collection of roughly 60% of spine surgeries. Assuming MVC has all spine surgeries for its payer population, the MVC denominator should be reduced by 40% in order to better estimate the match rate. This results in an adjusted denominator of 40,611 which yields a match rate of 80%. Descriptive statistics were calculated to verify the generalizability of the matched population. MVC evaluated the matched population for readmission status and price-standardized facility payments associated with POUR. MVC and MSSIC used the rates of adverse events pre- and post-QI to estimate the number of events averted. MVC payment data was then used to calculate cost savings from averted events.

Limitations

Not all MSSIC patients were identifiable in the MVC data due to differing definitions of the spine surgery cohort and a lack of patient identifiers. Payment averages were calculated using price-standardized payments to the Medicare FFS schedule, which may underestimate total cost savings. Furthermore, cost savings estimates do not include professional payments and are therefore likely understated.

FINDINGS

The analysis conducted revealed that there were statistically significant reductions in the rates of POUR and readmissions between 2016-2024 from which to estimate cost savings. Specific to POUR, MVC and MSSIC estimated there were 5,197 POUR events averted (Table 1). Using the MVC-based estimate of 21.7% of POUR events also involving readmission, MVC and MSSIC estimated there were 1,128 readmissions averted.

Table 1. Rates of POUR Events Averted Through QI Initiatives 2017-2024

Metric	POUR	
	Lumbar	Cervical
2016 Baseline Rate	7.84%	4.46%
2017 - 2024 Average Rate	3.90%	2.47%
Absolute Difference	3.94%	1.99%
Number of Cases Affected by QI	108,427	46,468
POUR Events Averted	4,272	925
Total POUR Events Averted	5,197	

Table 2. Calculation of Additional Inpatient Diagnosis-Related Group (DRG) Payments Based on Complications and Comorbidities (CC) by POUR Status

Category	Average Payment	No POUR (31,408)	POUR (1,072)
No CC	\$23,285.00	56.91%	42.61%
With CC	\$27,236.00	36.79%	40.14%
With major CC	\$40,505.00	5.20%	14.44%
Other DRG	\$33,194.00	1.10%	2.82%
Average Payments			
Weighted Average Payments		\$25,743.40	\$27,603.20
Additional DRG Payment Associated with POUR		\$1,859.80	

Table 3. Calculation of Post-Discharge Price-Standardized Payments Associated with POUR

Post-Discharge Price-Standardized Payment Metric	No POUR (31,408)	POUR (839)	POUR w Readmission (233)
Average Payment	\$1,691.00	\$5,646.00	\$34,268.00
Weighted Average Payment for Patients with POUR		\$12,684.65	
Average Payment for Patients without POUR		\$1,691.00	
Additional Average Payment Associated with POUR		\$10,993.65	

To estimate cost savings from averted POUR events, MVC completed a comparative analysis of diagnosis-related group (DRG) and post-discharge payments among lumbar and cervical spine patients with no POUR compared to those with POUR events. The results of the analysis of higher inpatient DRG payments (Table 2) show that the weighted average DRG payments for patients without POUR were \$25,743.40; the weighted average payments for those with POUR was \$27,603.20, a difference of \$1,859.80 per patient.

Looking at post-discharge payments (Table 3), MVC found that the average payment for a patient without POUR was \$1,691. The weighted average payment for

those with POUR (21.7% with readmission and 78.3% without readmission) was \$12,684.65, a difference of \$10,993.65 between patients with POUR and those without.

The estimated total direct cost savings to payors from POUR rate reductions in July 2017 to August 2024 were \$66,799,380 based on additional inpatient and outpatient costs of \$12,853.45 per event multiplied by 5,197 averted POUR events.

These findings demonstrated that MSSIC efforts delivered significant net savings for its BCBSM sponsor and healthcare providers in Michigan.