

# CQI VALUE ASSESSMENT

Direct and Indirect Cost Savings from  
a Statewide CQI for Spine Surgery

October 2021



## AT A GLANCE

### About MSSIC

- Funded by BCBSM
- Works to improve the quality of care of spine surgery
- Supports 31+ sites

### MSSIC Resources

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



*"By adding the savings from averted urinary retention events and averted readmissions, the total estimated cost savings was \$16,490,726, resulting from \$6,813,283 from prevented readmissions and \$9,677,443 from prevented events of urinary retention."*



## 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 care of spine surgery. The objective of this collaborative is to heighten patient care outcomes while consequently increasing the efficiency of treatment.

To estimate the cost savings to payers from reductions in rates of adverse events delivered by collaborative activity, the MSSIC Coordinating Center reached out to the Michigan Value Collaborative in 2020. Using its rich data sources, the MVC team estimated direct cost savings from fewer medical care events associated with complications. In doing so, the three specific adverse events or complications evaluated were surgical site infection, hospital readmission within 90 days of discharge, and post-operative urinary retention (UR) for lumbar and cervical spine patients in Michigan. The MSSIC team also estimated indirect savings to employers from fewer days missed from work using data from the MSSIC registry.

## METHODOLOGY

At the outset of this analysis, the MSSIC Coordinating Center provided MVC with a dataset of lumbar and cervical spine patients that included the presence or absence of the complications of interest (surgical site infections and post-operative UR) as abstracted from medical records. These patients were matched to the MVC analytic tables and spine cohort for Medicare Fee-For-Service, Blue Cross Blue Shield of Michigan (BCBSM) PPO Commercial, BCBSM Medicare Advantage (MA), Blue Care Network (BCN) HMO Commercial, and BCN MA claims.

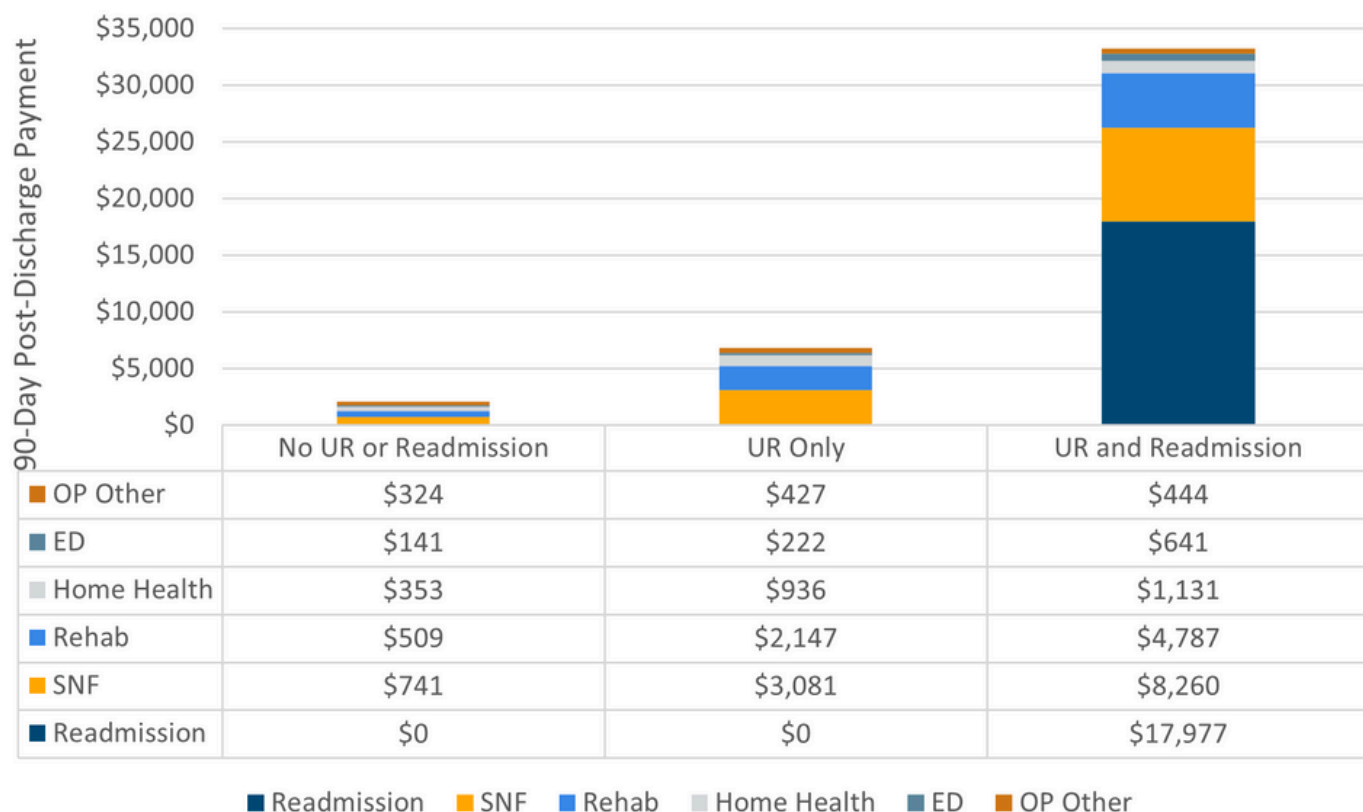
### Matching Methodological Approach

As part of MSSIC's operations, hospitals develop quality improvement (QI) initiatives to improve outcomes and reduce complications. A MSSIC requirement to have QI initiatives in place began in Jan. 2017, but hospitals implemented initiatives at various speeds. The earliest date at which all hospitals had active QI initiatives in place was July 1, 2017.

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 Jan. 1, 2015, and June 30, 2019, were included in the match.

Of the MVC records, 12,493 were matched to MSSIC cases, giving a raw match rate of 53.8%. 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 yields an adjusted denominator of 13,925 which adjusts the match rate to 89.7%. Descriptive statistics were calculated to verify the generalizability of the matched population. MVC also evaluated the matched population for readmission

**Figure 1. Breakdown of 90-Day Post-Discharge Payments by Urinary Retention (UR) and Readmission Status (Irrespective of Surgical Site Infection Status)**



status and price-standardized facility payments associated with surgical site infections and post-operative urinary retention.

MSSIC used the rates of adverse events pre- and post-QI to estimate the number of events averted. MVC cost 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 per event.

## FINDINGS

The analysis revealed there were statistically significant reductions in the rates of both UR and readmissions (Table 1) following the implementation of

**Table 1. Rates of Adverse Events and Numbers of Adverse Events Averted Through QI Initiatives 2017-2019**

	Urinary Retention	Readmission
2016 Baseline Rate	6.93%	7.81%
July 2017-2019 Rate	4.54%	6.92%
Absolute Difference	2.39%	0.89%
Number of Cases Affected by QI	42,616	42,616
Events Averted	1,019	379

QI initiatives at participating hospitals. MSSIC calculated 1,019 averted events of UR and 379 averted readmissions.

The MVC analysis determined a total expected cost for post-operative UR of \$9,497, based on the summed price-standardized post-discharge payments captured for UR-only patients (\$6,813) plus the MVC-calculated DRG payment associated with UR (\$2,684). Multiplying this total expected cost for UR by the 1,019 averted UR events, the analysis estimated \$9,677,443 in savings attributed to averted UR events. Similarly, MVC calculated the estimated cost savings from averted readmissions by multiplying the 379 averted readmissions by the average,

price-standardized cost of readmission among post-operative UR patients (\$17,977 from Figure 1), for an estimated savings of \$6,813,283. By adding the savings from averted UR events and averted readmissions, the total estimated cost savings following QI implementation was \$16,490,726. MSSIC analysts also estimated indirect savings to employers through fewer days missed from work with fewer post-surgical complications, and found approximately \$5 million in additional savings.

This analysis showed evidence of MSSIC's efforts resulting in significant reductions in adverse events for patients as well as net savings for its sponsor, BCBSM, and for employers in Michigan.