

Quality Measures Fact Sheet

CMS Patient Safety Indicators PSI 90 (NQF #0531)

National Quality Strategy Domain: Patient Safety

Quality Measures Set: Administrative Data Source: Hospital Inpatient Quality Reporting Program

BPCI Advanced and Quality

The Center for Medicare & Medicaid Innovation's (the CMS Innovation Center's) BPCI Advanced Model rewards health care providers for delivering services more efficiently, supports enhanced care coordination, and recognizes high quality care. Hospitals and clinicians should work collaboratively to achieve these goals, which have the potential to improve the BPCI Advanced Beneficiary experience and align to the CMS Quality Strategy goals of promoting effective communication and care coordination, highlighting best practices, and making care safer and more affordable. A goal of the BPCI Advanced Model is to promote seamless, patient-centered care throughout each Clinical Episode, regardless of who is responsible for a specific element of that care.

Background on CMS Patient Safety Indicators 90

Following the seminal 'To Err is Human' report from the Institute of Medicine, the Agency for Healthcare Research and Quality (AHRQ) developed measures that health providers can use to identify potential in-hospital patient safety problems for targeted institution-level quality improvement efforts. These Patient Safety Indicators (PSIs) are comprised of 26 measures (including 18 provider-level indicators) that highlight safety-related adverse events occurring in hospitals following operations, procedures, and childbirth. CMS developed the PSIs after a comprehensive literature review, analysis of available International Statistical Classification of Diseases (ICD) codes, review by clinical panels, implementation of risk adjustment, and empirical analyses.

CMS Innovation Center Rationale for Including the CMS PSI 90 Measure in BPCI Advanced

The CMS Patient Safety and Adverse Events Composite (CMS PSI 90) is used to support CMS public reporting and pay-for-performance programs. The PSIs are calibrated using the Medicare fee-for-service population and based on the AHRQ Patient Safety Indicators. The CMS PSI 90 v. 10.0 measure summarizes patient safety across multiple indicators, monitors performance over time, and facilitates comparative reporting and quality improvement at the hospital level. The CMS PSI 90 composite measure (updated 5/15/2020) intends to reflect the safety climate of a hospital by providing a marker of patient safety during the delivery of care. The CMS Innovation Center is promoting this measure for BPCI Advanced because it may inform how patients select care options, providers allocate resources,

and payers evaluate performance. CMS uses the CMS PSI 90 v.10.0 software to produce the CMS PSI 90 results. CMS has used or is currently using the CMS PSI 90 measure in the following Federal programs: the Hospital Inpatient Quality Reporting (IQR) Program, Value-Based Purchasing Program (VBP), and Hospital-Acquired Condition (HAC) Reduction Program.

Applicable Clinical Episodes

The CMS PSI 90 measure is included in the Administrative Quality Measures Set and applies to the following inpatient Clinical Episodes¹:

- AMI: Medicare Severity–Diagnosis-Related Groups (MS-DRGs) 280, 281, and 282
- Back and Neck Except Spinal Fusion: MS-DRGs 518, 519, and 520
- Bariatric Surgery: MS-DRGs 619, 620, and 621
- Cardiac arrhythmia: MS-DRGs 308, 309, and 310
- Cardiac Defibrillator: MS-DRGs 222, 223, 224, 225, 226, and 227
- Cardiac Valve: MS-DRGs 216, 217, 218, 219, 220, and 221
- Cellulitis: MS-DRGs 602 and 603
- Congestive Heart Failure: MS-DRGs 291, 292, and 293
- COPD, bronchitis, asthma: MS-DRGs 190, 191, 192, 202, and 203
- Coronary Artery Bypass Graft: MS-DRGs 231, 232, 233, 234, 235, and 236
- Disorders of the liver excluding malignancy, cirrhosis, alcoholic hepatitis: MS-DRGs 441, 442, and 443
- Double Joint Replacement of the Lower Extremity: MS-DRGs 461 and 462
- Fractures of the Femur and Hip or Pelvis: MS-DRGs 533, 534, 535, and 536
- Gastrointestinal hemorrhage: MS-DRGs 377, 378, and 379
- Gastrointestinal obstruction: MS-DRGs 388, 389, and 390
- Hip and Femur Procedures Except Major Joint: MS-DRGs 480, 481, and 482
- Inflammatory Bowel Disease: MS-DRGs 385, 386, and 387
- Lower Extremity and Humerus Procedure Except Hip, Foot, Femur: MS-DRGs 492, 493, and 494
- Major Bowel Procedure: MS-DRGs 329, 330, and 331
- Major Joint Replacement of the Lower Extremity: MS-DRGs 469, 470, 521, and 522; Healthcare Common Procedure Coding System (HCPCS) 27447
- Major Joint Replacement of the Upper Extremity: MS-DRG 483
- Pacemaker: MS-DRGs 242, 243, and 244
- Percutaneous Coronary Intervention (PCI): MS-DRGs 246, 247, 248, 249, 250, and 251
- Renal failure: MS-DRGs 682, 683, and 684
- Seizures: MS-DRGs 100 and 101
- Sepsis: MS-DRGs 870, 871, and 872
- Simple pneumonia and respiratory infections: MS-DRGs 177, 178, 179, 193, 194, and 195
- Spinal Fusion: MS-DRGs 453, 454, 455, 459, 460, 471, 472, and 473
- Stroke: MS-DRGs 061, 062, 063, 064, 065, and 066
- Transcatheter Aortic Valve Replacement (TAVR): MS-DRGs 266 and 267

¹ MS-DRGs are up to date as of Model Year 3 (2020) and will be updated for Model Year 4 as needed.

- Urinary Tract Infection: MS-DRGs 689 and 690

Measure Specifications

The CMS PSI 90 measure selected for BPCI Advanced follows National Quality Forum (NQF) #0531 measure specifications. CMS calculates the measure at the hospital level and calculates a weighted average based on each of the following indicators:

- PSI 03 Pressure Ulcer Rate
- PSI 06 Iatrogenic Pneumothorax Rate
- PSI 08 In-Hospital Fall with Hip Fracture Rate
- PSI 09 Perioperative Hemorrhage or Hematoma Rate
- PSI 10 Post-Operative Acute Kidney Injury Requiring Dialysis Rate
- PSI 11 Postoperative Respiratory Failure Rate
- PSI 12 Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate
- PSI 13 Postoperative Sepsis Rate
- PSI 14 Postoperative Wound Dehiscence Rate
- PSI 15 Unrecognized Accidental Puncture or Laceration Rate

The CMS Innovation Center will calculate Acute Care Hospital (ACH) performance at the hospital level for all Medicare beneficiaries included in the denominator. For Physician Group Practices (PGPs), the CMS Innovation Center will calculate the measure as specified at the hospital level, then weight the measure based on PGP Clinical Episode volume for each ACH where a PGP triggers an episode.

Denominator and Numerator

The table below provides high level descriptions of the numerator and denominator for each component of the CMS PSI 90. The CMS PSI 90 measure is not limited to BPCI Advanced Beneficiaries. More detailed measure specifications, as well as inclusion and/or exclusion criteria, are in the links provided in the “Other Resources” table, including the “CMS Measures Inventory Tool: PSI 90” and the ten PSI measure ICD-10-CM/PCS specification overviews.

Measure	Numerator	Denominator
PSI 03: Pressure Ulcer Rate	Qualifying discharges with any secondary ICD-10-CM diagnosis codes for pressure ulcer stage III or IV (or unstageable).	Surgical or medical discharges for Medicare FFS beneficiaries ages 18 years and older.
PSI 06: Iatrogenic Pneumothorax Rate	Qualifying discharges with any secondary ICD-10-CM diagnosis codes for iatrogenic pneumothorax.	Surgical or medical discharges for Medicare FFS beneficiaries ages 18 years and older.
PSI 08: In-Hospital Fall with Hip Fracture Rate	Qualifying discharges with any secondary ICD-10-CM diagnosis codes for hip fracture.	Surgical or medical discharges for Medicare FFS beneficiaries ages 18 years and older.

Measure	Numerator	Denominator
PSI 09: Perioperative Hemorrhage and Hematoma Rate	Qualifying discharges with any secondary ICD-10-CM diagnosis codes for perioperative hemorrhage or hematoma AND any-listed ICD-10-PCS procedure codes for treatment of hemorrhage or Hematoma.	Surgical or medical discharges for Medicare FFS beneficiaries ages 18 years and older.
PSI 10: Postoperative Acute Kidney Injury Rate	Qualifying discharges with any secondary ICD-10-CM diagnosis codes for acute kidney failure AND any listed ICD-10-PCS procedure codes for dialysis.	Elective surgical discharges for Medicare FFS beneficiaries ages 18 years and older.
PSI 11: Postoperative Respiratory Failure Rate	Qualifying discharges with either: <ul style="list-style-type: none"> • Any secondary ICD-10-CM diagnosis code for acute respiratory failure; • Any secondary ICD-10 Procedure Coding System (ICD-10-PCS) procedure codes for a mechanical ventilation for 96 consecutive hours or more that occurs zero or more days after the first major operating room procedure code; • Any secondary ICD-10-PCS procedure codes for a mechanical ventilation for less than 96 consecutive hours (or undetermined) that occurs two or more days after the first major operating room procedure code; or • Any secondary ICD-10-PCS procedure codes for a reintubation that occurs one or more days after the first major operating room procedure code. 	Elective surgical discharges for Medicare FFS beneficiaries ages 18 years and older.
PSI 12: Perioperative Pulmonary Embolism and Deep Vein Thrombosis Rate	Qualifying discharges with a secondary ICD-10-CM diagnosis code for proximal deep vein thrombosis OR a secondary ICD10-CM diagnosis code for pulmonary embolism.	Surgical discharges for Medicare FFS beneficiaries ages 18 years and older.
PSI 13: Postoperative Sepsis Rate	Qualifying discharges with any secondary ICD-10-CM diagnosis codes for sepsis.	Elective surgical discharges for Medicare FFS beneficiaries ages 18 years and older.

Measure	Numerator	Denominator
PSI 14: Postoperative Wound Dehiscence Rate	Qualifying discharges with any listed ICD-10-PCS procedure code for repair of abdominal wall AND with any listed ICD-10-CM diagnosis code for disruption of internal surgical wound.	Discharges for Medicare FFS beneficiaries ages 18 years and older with any-listed ICD-10-PCS procedure codes for abdominopelvic surgery, open approach OR any-listed ICD-10-PCS procedure codes for abdominopelvic surgery, other than open approach.
PSI 15: Unrecognized Abdominopelvic Accidental Puncture/Laceration Rate	Qualifying discharges with any secondary ICD-10-CM diagnosis code for accidental puncture or laceration during a procedure AND a second abdominopelvic procedure =>1 day after an index abdominopelvic procedure.	Surgical or medical discharges for Medicare FFS beneficiaries/patients ages 18 years and older with any ICD-10-PCS procedure code for an abdominopelvic procedure.

Measure Submission

The CMS Innovation Center will calculate this measure using Medicare claims data and does not require action or reporting by Model Participants beyond what is currently involved in the Hospital IQR Program. To better align with the performance years of the BPCI Advanced Model, the Model uses January 1 through December 31 for measure calculation. The date of discharge on the index admission will determine the calendar year in which the claim belongs.

Revisions to the Published Specifications

The BPCI Advanced version of this measure is calculated a two-year period instead of a three-year period. In Model Year 4, the claims data will be collected from October 1, 2019 to September 30, 2021.

Composite Quality Score

The CMS PSI 90 measure is one component of the BPCI Advanced Composite Quality Score (CQS) calculation. The CMS Innovation Center uses the CQS to adjust a portion of any Positive Total Reconciliation Amount and any Negative Total Reconciliation Amount. The CQS adjustment will not adjust the Positive Total Reconciliation Amount downward by more than 10 percent, nor will it adjust the Negative Total Reconciliation Amount upward by more than 10 percent. More information is available at the BPCI Advanced website provided below.

Other Resources

Organization/Resource	Website Address
NQF #0531 specifications	http://www.qualityforum.org/QPS/0531
BPCI Advanced	https://innovation.cms.gov/initiatives/bpci-advanced
Agency for Healthcare Research and Quality	https://www.qualityindicators.ahrq.gov/Modules/psi_resources.aspx

Organization/Resource	Website Address
(AHRQ) Patient Safety Indicators overview	
AHRQ PSI 90 fact sheet	https://www.qualityindicators.ahrq.gov/News/PSI90_Factsheet_FAQ_v1.pdf
CMS Hospitals Inpatient Prospective Payment (IPPS) Final Rule (August 17, 2018)	https://www.federalregister.gov/documents/2018/08/17/2018-16766/medicare-program-hospital-inpatient-prospective-payment-systems-for-acute-care-hospitals-and-the
Institute of Medicine: to Err is Human	https://www.ncbi.nlm.nih.gov/pubmed/25077248
PSI 03: Pressure Ulcer Rate	https://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V2019/TechSpecs/PSI_03_Pressure_Ulcer_Rate.pdf
PSI 06: Iatrogenic Pneumothorax Rate	https://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V2019/TechSpecs/PSI_06_Iatrogenic_Pneumothorax_Rate.pdf
PSI 08: In-Hospital Fall with Hip Fracture Rate	https://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V2019/TechSpecs/PSI_08_In_Hospital_Fall_with_Hip_Fracture_Rate.pdf
PSI 09: Perioperative Hemorrhage and Hematoma Rate	https://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V2019/TechSpecs/PSI_09_Periooperative_Hemorrhage_or_Hematoma_Rate.pdf
PSI 10: Postoperative Acute Kidney Injury Rate	https://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V2019/TechSpecs/PSI_10_Postoperative_Acute_Kidney_Injury_Requiring_Dialysis.pdf
PSI 11: Postoperative Respiratory Failure Rate	https://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V2019/TechSpecs/PSI_11_Postoperative_Respiratory_Failure_Rate.pdf
PSI 12: Perioperative Pulmonary Embolism and Deep Vein Thrombosis Rate	https://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V2019/TechSpecs/PSI_12_Periooperative_Pulmonary_EMBOLISM_or_Deep_Vein_Thrombosis_Rate.pdf
PSI 13: Postoperative Sepsis Rate	https://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V2019/TechSpecs/PSI_13_Postoperative_Sepsis_Rate.pdf
PSI 14: Postoperative Wound Dehiscence Rate	https://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V2019/TechSpecs/PSI_14_Postoperative_Wound_DeHiscence_Rate.pdf
PSI 15: Unrecognized Abdominopelvic Accidental Puncture/Laceration Rate	https://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V2019/TechSpecs/PSI_15_Accidental_Puncture_or_Laceration_Rate.pdf