# **MUC2018-115: Inpatient Chronic Obstructive Pulmonary Disease (COPD) Exacerbation**

**Measure Information**

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| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-115 |
| **Title** | Inpatient Chronic Obstructive Pulmonary Disease (COPD) Exacerbation |
| **Program** | Merit-based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | New measure never reviewed by MAP Workgroup or used in a CMS program |
| **Measure Description:** | The Inpatient Chronic Obstructive Pulmonary Disease (COPD) Exacerbation Measure is meant to apply to clinicians who manage the inpatient care of Medicare beneficiaries hospitalized for exacerbation of COPD. This acute episode captures patients hospitalized for an exacerbation of COPD. The measure evaluates a clinician’s risk-adjusted cost for the episode group by averaging it across all episodes attributed to the clinician during the performance period. The cost of each episode is the sum of the cost to Medicare for assigned services performed by the attributed clinician and other healthcare providers during the episode window. |
| **Numerator:** | The numerator for the Inpatient Chronic Obstructive Pulmonary Disease (COPD) Exacerbation measure is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all episodes attributed to a clinician. This sum is then multiplied by the national average observed episode cost to generate a dollar figure. Mathematically, this is represented as: sum of (observed episode cost/expected episode cost) \* national average observed cost. |
| **Denominator:** | The denominator for the Inpatient Chronic Obstructive Pulmonary Disease (COPD) Exacerbation measure is the total number of episodes from this episode group attributed to a clinician. |
| **Exclusions:** | The following episode-level exclusions apply:  (a) The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.  (b) No TIN is attributed the episode.  (c) The beneficiary’s date of birth is missing.  (d) The beneficiary’s death date occurred before the episode ended.  (e) The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.  (f) The trigger IP stay has the same admission date as another IP stay.  (g) The IP facility is not one that is paid under the Inpatient Prospective Payment System (IPPS).  IP COPD exacerbation episodes are also removed using exclusions specific to the IP COPD Exacerbation measure that were developed with input from the measure-specific workgroup. The “Exclusions” and “Exclusions\_Details” tabs in the [IP COPD Exacerbation Measure Codes List File](https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-episode-based-cost-measures-zip-file.zip) include the list of these exclusions as well as the codes used to define them. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Internal medicine |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | COPD is a serious condition defined as the “physiologic finding of nonreversible pulmonary function impairment,” and includes chronic bronchitis and emphysema (NHLBI, 2012). In the United States, COPD is the third leading cause of death, affecting approximately 24 million Americans, accounting for more than 56 percent of deaths from lung disease, and representing over 700,000 hospital admissions in 2010 (CDC, 2017). In addition, evidence from the 1988 -1994 National Health and Nutrition Examination Survey suggests that as many as 12 million people in the United States may have undiagnosed COPD (NHLBI, 2012).   Exacerbation of COPD and subsequent complications lead to a large majority of COPD costs. Studies in 2008 found Medicare beneficiaries with COPD incur annual health care costs $15,000 to $20,000 greater than costs for beneficiaries without COPD, with the majority of this cost resulting from inpatient hospitalizations for COPD (Menzin, 2008). Approximately 56 percent of patients with COPD were hospitalized in 2004 compared to 14 percent for patients without COPD (Vogelmeier 2017). Hospitalization for an acute exacerbation of COPD (AECOPD) is a known cause and predictor of COPD progression (Vogelmeier, 2017). In one study, hospitalizations due to COPD cost over $19,000 on average whereas hospitalizations unrelated to COPD had an average cost below $4,000 (Menzin, 2008). Mitigation of COPD readmissions and subsequent complications therefore has potential for substantial improvement in patients’ quality of life, care quality, as well as cost savings to Medicare.   CDC. "Faststats: Chronic Obstructive Pulmonary Disease (COPD) Includes: Chronic Bronchitis and Emphysema." Centers for Disease Control and Prevention, 2017 <https://www.cdc.gov/nchs/fastats/copd.htm>.  “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017  Menzin, J., L. Boulanger, J. Marton, L. Guadagno, H. Dastani, R. Dirani, A. Phillips, and H. Shah. "The Economic Burden of Chronic Obstructive Pulmonary Disease (COPD) in a U.S. Medicare Population." [In Eng]. Respir Med 102, no. 9 (Sep 2008): 1248-56.  NHLBI. Morbidity & Mortality: 2012 Chart Book on Cardiovascular, Lung, and Blood Diseases. Edited by National Institutes of Health: National Heart, Lung, and Blood Institute, 2012.  Vogelmeier, C. F., G. J. Criner, F. J. Martinez, A. Anzueto, P. J. Barnes, J. Bourbeau, B. R. Celli, et al. "Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease 2017 Report. Gold Executive Summary." [In Eng]. Am J Respir Crit Care Med 195, no. 5 (Mar 01 2017): 557-82. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | As part of the second wave of measure development, the Pulmonary Disease Management Clinical Subcommittee selected this measure for development during an in-person meeting in April 2018 and a corresponding smaller measure-specific workgroup provided detailed clinical input on its specifications throughout the summer of 2018. The Subcommittee chose the Inpatient Chronic Obstructive Pulmonary Disease Exacerbation episode group to develop, using as a starting point the December 2016 Draft List of MACRA Episode Groups and Trigger Codes and an accompanying document on episode-based cost measure development for the Quality Payment Program (together, the “December 2016 posting”). The Pulmonary Disease Management Clinical Subcommittee comprises 25 members affiliated with 23 specialty societies and were selected after a public call for nominations in February - March 2018. The workgroup comprises 13 members affiliated with 14 specialty societies.  The Pulmonary Disease Management Clinical Subcommittee and the measure-specific workgroup provided input on every component of this measure through a variety of forums, including in-person meetings, webinars, and online polls. Members discussed and provided input on the selection of an episode group for cost measure development, and the workgroup provided further input on: (i) episode triggers and sub-groups, (ii) episode window, (iii) service assignment rules, (iv) risk adjustors, and (v) exclusions.  In addition to the input of the Clinical Subcommittee and the measure-specific workgroup, a technical expert panel (TEP) was convened for meetings in August and December 2016, March and August 2017, and May 2018. The TEP provided high-level guidance on the concepts and direction of measure development, methods to best operationalize feedback from the patient and family committee, and actionable enhancements for feedback reports. The information gathered has been incorporated into the process and utilized by the Pulmonary Disease Management Clinical Subcommittee during the first and second wave of episode-based cost measure development.  The measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 10-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other episode-based cost measures that underwent field testing. There were 78,221 episode-based cost measure field test reports that were distributed on the CMS Enterprise Portal. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the measure-specific workgroup members to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians and clinician groups across a range of case minimums.   * For TINs at a 10-episode case minimum, the mean reliability was 0.62. For TINs at a 20-episode case minimum, the mean reliability was 0.74. For TINs at a 30-episode case minimum, the mean reliability was 0.80. * For TIN-NPIs at a 10-episode case minimum, the mean reliability was 0.39. For TIN-NPIs at a 20-episode case minimum, the mean reliability was 0.50. For TIN-NPIs at a 30-episode case minimum, the mean reliability was 0.59. |
| **In which setting was this measure tested?** | Hospital inpatient |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs for which they are directly responsible for, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be made through changes in clinical practice.   According to the literature and previous feedback received through stakeholder input activities, this measure represents an area where there are opportunities for improvement. Opportunities for improvement for AECOPD exist within multiple performance gaps including appropriate antibiotic use in treatment, and reducing readmissions that may result from poor education, such as improper inhaler teaching.   Antibiotics are frequently used to treat AECOPD in hospital settings. Although these treatments for AECOPD remain controversial, new attempts at using biomarkers to identify patients who would benefit from antibiotics makes antibiotic treatment a potential area for clinical improvement as further research on this topic progresses. Antibiotic use in treating AECOPD is controversial as evidence of its efficacy is currently limited and discerning which patients benefit remains difficult (Manalan, 2015). Complications from antibiotic use include gastrointestinal side effects including diarrhea, nausea, and vomiting, as well as Clostridium difficile associated diarrhea (CDAD), which is the leading cause of healthcare-associated diarrhea and has an estimated cost of $3 billion per year. Antibiotic resistance is also a complication and a public health concern. A systematic review and meta-analysis done in 2014 found that third generation cephalosporins and fluoroquinolones were among the common antibiotics causing CDAD. These antibiotics are also the most common antibiotics used in patients hospitalized for AECOPD (Slimings, 2014). Finally, associations between antibiotic use and other serious adverse events, including pneumonia, urinary tract infection, and myocardial infarction, have been reported in multiple studies (Manalan, 2015).   There is also an opportunity for improvement in preventing readmissions due to improper inhaler teaching and use. Respiratory therapists or nurses usually administer nebulizer treatment for patients hospitalized with AECOPD, however, upon discharge, patients must know how to administer their medication via inhaler devices. As such, education and training in proper inhaler device technique is paramount. On average, more than two thirds of patients make at least one error when using an inhalation device. According to one study, adherence to the use of a dry powder inhaler (DPI) could be confirmed in only 23 percent of discharged COPD patients. The primary errors in inhaler device use “relate to problems with inspiratory flow, inhalation duration, coordination, dose preparation, exhalation maneuver prior to inhalation and breath-holding following dose inhalation” (Vogelmeier, 2017). A notable relationship has been established between inhaler misuse and poor symptom control in COPD patients, increasing the likelihood of readmission (Vogelmeier, 2017).  This measure aims to address these example areas of opportunities for improvement. Medicare beneficiaries with COPD incur annual health care costs $15,000 to $20,000 greater than costs for beneficiaries without COPD, with the majority of this cost resulting from inpatient hospitalizations for COPD. The use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. There is substantial variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 281,913 Inpatient Chronic Obstructive Pulmonary Disease (COPD) Exacerbation episodes for 220,083 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 10-episode case minimum.   * The mean risk-adjusted cost per episode was $13,177.19. The risk-adjusted cost per episode at the 5th percentile was $7,114.63, compared to $28,691.43 at the 95th percentile. * For TINs, the mean measure score was $13,661.00. The score at the 5th percentile was $10,848.50, compared to $17,372.47 at the 95th percentile. * For TIN-NPIs, the mean measure score was $15,210.08. The score at the 5th percentile was $11,782.28, compared to $19,360.14 at the 95th percentile.   Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  Manalan, K., T. Rashid, and A. Singanayagam. "Antibiotic Treatment in Exacerbations of Chronic Obstructive Pulmonary Disease: Recent Trial Results." Clin. Invest. (Lond.) 5, no. 2 (2015).  Vogelmeier, C. F., G. J. Criner, F. J. Martinez, A. Anzueto, P. J. Barnes, J. Bourbeau, B. R. Celli, et al. "Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease 2017 Report. Gold Executive Summary." [In Eng]. Am J Respir Crit Care Med 195, no. 5 (Mar 01 2017): 557-82. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:  •Devising an appropriate risk adjustment model for episode-based cost measures  •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** | Section 101(f) of MACRA |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-116: Femoral or Inguinal Hernia Repair**

**Measure Information**

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| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-116 |
| **Title** | Femoral or Inguinal Hernia Repair |
| **Program** | Merit-based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | New measure never reviewed by MAP Workgroup or used in a CMS program |
| **Measure Description:** | The Femoral or Inguinal Hernia Repair Measure is meant to apply to clinicians who perform this procedure for Medicare beneficiaries. This procedural episode captures patients who undergo a femoral or inguinal hernia repair procedure. The measure evaluates a clinician’s risk-adjusted cost for the episode group by averaging it across all episodes attributed to the clinician during the performance period. The cost of each episode is the sum of the cost to Medicare for assigned services performed by the attributed clinician and other healthcare providers during the episode window. |
| **Numerator:** | The numerator for the Femoral or Inguinal Hernia Repair measure is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all episodes attributed to a clinician. This sum is then multiplied by the national average observed episode cost to generate a dollar figure. Mathematically, this is represented as: sum of (observed episode cost/expected episode cost) \* national average observed cost. |
| **Denominator:** | The denominator for the Femoral or Inguinal Hernia Repair measure is the total number of episodes from this episode group attributed to a clinician. |
| **Exclusions:** | The following episode-level exclusions apply:  (a) The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.  (b) No main clinician is attributed the episode.  (c) The beneficiary’s date of birth is missing.  (d) The beneficiary’s death date occurred before the episode ended.  (e) The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.  (f) The episode trigger claim was not performed in an ambulatory/office-based care, IP hospital, OP hospital, or ASC setting based on its place of service.   Femoral or Inguinal Hernia Repair episodes are also removed using exclusions specific to the Femoral or Inguinal Hernia Repair measure that were developed with input from the measure-specific workgroup. The “Exclusions” and “Exclusions\_Details” tabs in the [Femoral or Inguinal Hernia Repair Measure Codes List File](https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-episode-based-cost-measures-zip-file.zip) include the list of these exclusions as well as the codes used to define them. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | General surgery |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | Treating abdominal wall hernias, including femoral and inguinal hernias, is a common procedure. In the US, more than 1 million abdominal wall hernias are treated and or repaired annually, the majority of which are inguinal hernias (Matthews & Neumayer, 2008). On average, these hernia repair procedures cost approximately $2000 to $2500, representing nearly $2.5 billion in annual health care costs (Rutkow, 2003). Inguinal hernia repair remains one of the most performed surgical operations around the world and is a common surgical problem for older patients (Sanjay et al., 2011). Femoral or inguinal hernia repair has been shown to be safe for elderly patients, despite some surgeon reluctance to offer the procedure to elderly patients due to concerns of increased risk (Kurzer et al., 2009; Sinha et al., 2017; Wu et al., 2017). Cost calculations for hernia are confounded by the many surgical and anesthesia treatment options available, according to the International Guidelines for Groin Hernia Management (2018). Open procedures have been found to be less costly than laparoscopic procedures in some instances (Smink et al., 2009).   “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017  "International Guidelines for Groin Hernia Management." Hernia: The Journal Of Hernias And Abdominal Wall Surgery 22, no. 1 (2018): 1-165.  Kurzer, M., A. Kark, and S. T. Hussain. "Day-Case Inguinal Hernia Repair in the Elderly: A Surgical Priority." Hernia: The Journal Of Hernias And Abdominal Wall Surgery 13, no. 2 (2009): 131-36.  Matthews, R. Douglas and Leigh Neumayer. "Inguinal Hernia in the 21st Century: An Evidence-Based Review." Current Problems In Surgery 45, no. 4 (2008): 257-59.  Rutkow, Ira M. "Demographic and Socioeconomic Aspects of Hernia Repair in the United States in 2003." The Surgical Clinics Of North America 83, no. 5 (2003): 1045.  Sanjay, Pandanaboyana, Heather Leaver, Irshad Shaikh, and Alan Woodward. "Lichtenstein Hernia Repair under Different Anaesthetic Techniques with Special Emphasis on Outcomes in Older People." Australasian Journal on Ageing 30, no. 2 (2011): 93-97.  Sinha, Surajit, G. Srinivas, J. Montgomery, and D. DeFriend. "Outcome of Day-Case Inguinal Hernia in Elderly Patients: How Safe Is It?". Hernia: The Journal Of Hernias And Abdominal Wall Surgery 11, no. 3 (2007): 253-56.  Smink, Douglas S., Ian M. Paquette, and Samuel R. G. Finlayson. "Utilization of Laparoscopic and Open Inguinal Hernia Repair: A Population-Based Analysis." Journal Of Laparoendoscopic & Advanced Surgical Techniques. Part A 19, no. 6 (2009): 745-48.  Wu, J. J., B. C. Baldwin, E. Goldwater, and T. C. Counihan. "Should We Perform Elective Inguinal Hernia Repair in the Elderly?". Hernia: The Journal Of Hernias And Abdominal Wall Surgery 21, no. 1 (2017): 51-57. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | As part of the second wave of measure development, the Gastrointestinal Disease Management - Medical and Surgical Clinical Subcommittee selected this measure for development during an in-person meeting in April 2018 and a corresponding smaller measure-specific workgroup provided detailed clinical input on its specifications throughout the summer of 2018. The Subcommittee chose the Femoral or Inguinal Hernia Repair episode group to develop, using as a starting point the December 2016 Draft List of MACRA Episode Groups and Trigger Codes and an accompanying document on episode-based cost measure development for the Quality Payment Program (together, the “December 2016 posting”). The Gastrointestinal Disease Management - Medical and Surgical Clinical Subcommittee is composed of 52 members affiliated with 31 specialty societies and were selected after a public call for nominations in February - March 2018. The workgroup comprises 9 members affiliated with 8 specialty societies.  The Gastrointestinal Disease Management - Medical and Surgical Clinical Subcommittee and workgroup provided detailed clinical input on every component of this measure through a variety of forums, including in-person meetings, webinars, and online polls. Members discussed and provided input on the selection an episode group for cost measure development, and will provide further input on: (i) episode triggers and sub-groups, (ii) episode window, (iii) service assignment rules, (iv) risk adjustors, and (v) exclusions.  In addition to the input of the Clinical Subcommittee and the measure-specific workgroup, a technical expert panel (TEP) was convened for meetings in August and December 2016, March and August 2017, and May 2018. The TEP provided high-level guidance on the concepts and direction of measure development, methods to best operationalize feedback from the patient and family committee, and actionable enhancements for feedback reports. The information gathered has been incorporated into the process and utilized by the Gastrointestinal Disease Management - Medical and Surgical Clinical Subcommittee during the first and second wave of episode-based cost measure development.  The measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 10-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other episode-based cost measures that underwent field testing. 78,221 episode-based cost measure field test reports that were distributed on the CMS Enterprise Portal. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the measure-specific workgroup members to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians (TIN-NPI) and clinician groups (TIN) across a range of case minimums.   * For TINs at a 10-episode case minimum, the mean reliability was 0.80. For TINs at a 20-episode case minimum, the mean reliability was 0.87. For TINs at a 30-episode case minimum, the mean reliability was 0.90. * For TIN-NPIs at a 10-episode case minimum, the mean reliability was 0.71. For TIN-NPIs at a 20-episode case minimum, the mean reliability was 0.81. For TIN-NPIs at a 30-episode case minimum, the mean reliability was 0.86. |
| **In which setting was this measure tested?** | Ambulatory surgery center, Hospital outpatient department (HOD), Hospital inpatient |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs attributable to their decision making, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be achieved through changes in clinical practice.   According to the literature and previous feedback received through stakeholder input activities, this measure represents an area where there are opportunities for improvement. Opportunities for improvement for femoral or inguinal hernia repair is primarily found within the variation in hernia repair techniques, where standardization of techniques and protocols may produce improved outcomes and potentially lower the cost of care during the episode.   Abdominal wall hernia repair surgery, including femoral and inguinal hernia repair, is a surgical procedure that can be treated by either suturing closed the defect or placing a synthetic mesh over the defect without tension. The treatment can be done laparoscopically or through an open surgical operation (Vale, et al., 2004). The Lichtenstein technique, an open mesh method, is widely used because it is considered relatively easy to perform, low risk, and low cost. Laparoscopic repair is considered more complicated to perform, tends to cost more, and may lead to more complications, though recovery time and pain are reduced (Arregui & Young, 2005). A 2009 study concluded that although laparoscopic treatment of hernia repair is influenced by clinical decisions, financial considerations may also influence the choice of surgical approach. The study of 58,172 inguinal hernia repairs in the state of Florida in 2002 and 2003 found that only 11,351 (19.5 percent) were performed laparoscopically and their cost was significantly higher ($12,087 for laparoscopic repairs compared with $7580 for open repairs) (Smink et al., 2009). Inguinal hernia repair treated laparoscopically is frequently completed using a transabdominal preperitoneal (TAPP) procedure and a meta-analysis of randomized controlled trials found that the TAPP procedure resulted in significantly less inguinal pain postoperatively compared to the Lichtenstein technique. In a paper analyzing data from 8 randomized studies involving 425 patients who received TAPP repair and 411 patients who received a Lichtenstein repair, researchers found that the patients who received the TAPP procedure had less pain in the 12 hours after surgery and less chronic pain, with no difference in complications between the two procedures (Scheuermann et al., 2017).   Other areas of variation in femoral or inguinal hernia repair include bilateral hernia repair and patient comorbidities. Data from the German Herniamed Registry with data on 15,176 open hernia repairs, between 2009 and 2014, revealed a significantly higher percentage of postoperative complications in patients who had bilateral procedures compared to unilateral procedures (1.9 percent compared to 0.9 percent, with an odds ratio of 2.13) (Jacob et al., 2015). This information was developed to guide surgeons who propose bilateral surgery on a unilateral inguinal hernia as prophylaxis for the hernia developing on the other side (Köckerling et al., 2015). Coexisting conditions or therapies may increase complications after hernia surgery. For example, for inguinal hernia repair, data from the Herniamed Registry provide information on improving outcomes when the procedure is required in patients on antithrombotic therapy or with coagulopathies. Data on 9115 patients showed that post-operative bleeding within 30 days of the procedure was more than three times more prevalent in these patients (3.91 percent compared to 1.12 percent). Furthermore, bleeding was more likely to occur in open procedures, in older patients, in patients with higher ASA ratings, and in patients with larger hernias. Endoscopic hernia repair tends to reduce the risk secondary bleeding and complication-related reoperation when a delicate dissection technique is employed, compared to open procedures. Bilateral hernia operations also had a higher chance of requiring a complication related reoperation. (Köckerling et al., 2016).  This measure aims to address these example areas of opportunities for improvement. On average, hernia repair procedures cost approximately $2000 to $2500, representing nearly $2.5 billion in annual health care costs. As such, the use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. There is substantial variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 57,436 Femoral or Inguinal Hernia Repair episodes for 56,969 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 10-episode case minimum.   * The mean risk-adjusted cost per episode was $3,983.56. The risk-adjusted cost per episode at the 5th percentile was $1,348.95, compared to $5,048.19 at the 95th percentile. * For TINs, the mean measure score was $3,967.20. The score at the 5th percentile was $3,122.23, compared to $4,512.09 at the 95th percentile. * For TIN-NPIs, the mean measure score was $3,971.89. The score at the 5th percentile was $2,993.80, compared to $4,600.56 at the 95th percentile.   Arregui, Maurice E., and Susan B. Young. "Groin Hernia Repair by Laparoscopic Techniques: Current Status and Controversies." World Journal Of Surgery 29, no. 8 (2005): 1052-57.  Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  Scheuermann, Uwe, Stefan Niebisch, Orestis Lyros, Boris Jansen-Winkeln, and Ines Gockel. "Transabdominal Preperitoneal (Tapp) Versus Lichtenstein Operation for Primary Inguinal Hernia Repair - a Systematic Review and Meta-Analysis of Randomized Controlled Trials." BMC Surgery 17, no. 1 (2017): 55-55.  Smink, Douglas S., Ian M. Paquette, and Samuel R. G. Finlayson. "Utilization of Laparoscopic and Open Inguinal Hernia Repair: A Population-Based Analysis." Journal Of Laparoendoscopic & Advanced Surgical Techniques. Part A 19, no. 6 (2009): 745-48.  Vale, Luke, Adrian Grant, Kirsty McCormack, and Neil W. Scott. "Cost-Effectiveness of Alternative Methods of Surgical Repair of Inguinal Hernia." International Journal Of Technology Assessment In Health Care 20, no. 2 (2004): 192-200. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:  •Devising an appropriate risk adjustment model for episode-based cost measures  •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** | Section 101(f) of MACRA |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-117: Lumbar Spine Fusion for Degenerative Disease, 1-3 Levels**

**Measure Information**

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| --- | --- |
| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-117 |
| **Title** | Lumbar Spine Fusion for Degenerative Disease, 1-3 Levels |
| **Program** | Merit-Based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | New measure never reviewed by MAP Workgroup or used in a CMS program |
| **Measure Description:** | The Lumbar Spine Fusion for Degenerative Disease, 1-3 Levels Measure is meant to apply to clinicians who perform this procedure for Medicare beneficiaries. This procedural episode captures patients who undergo a lumbar spinal fusion surgery. The measure evaluates a clinician’s risk-adjusted cost for the episode group by averaging it across all episodes attributed to the clinician during the performance period. The cost of each episode is the sum of the cost to Medicare for assigned services performed by the attributed clinician and other healthcare providers during the episode window. |
| **Numerator:** | The numerator for the Lumbar Spine Fusion for Degenerative Disease, 1-3 Levels measure is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all episodes attributed to a clinician. This sum is then multiplied by the national average observed episode cost to generate a dollar figure. Mathematically, this is represented as: sum of (observed episode cost/expected episode cost) \* national average observed cost. |
| **Denominator:** | The denominator for the Lumbar Spine Fusion for Degenerative Disease, 1-3 Levels measure is the total number of episodes from this episode group attributed to a clinician. |
| **Exclusions:** | The following episode-level exclusions apply:  (a) The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.  (b) No main clinician is attributed the episode.  (c) The beneficiary’s date of birth is missing.  (d) The beneficiary’s death date occurred before the episode ended.  (e) The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.  (f) The episode trigger claim was not performed in an ambulatory/office-based care, IP hospital, OP hospital, or ASC setting based on its place of service.  (g) The IP facility is not one that is paid under the Inpatient Prospective Payment System (IPPS) when an IP stay concurrent with the trigger is found. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Neurosurgery |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | Lower back pain is the most common medical problem worldwide and the top cause of years lived with disability, with over 600,000 cases in 2013, a 56.75 percent increase from 1990 (Global Burden of Disease, 2015). Common conditions responsible for lower back pain include: degenerative disk disease, spondylolysis, spondylolisthesis, trauma and spinal stenosis.   Surgery is one of several options to consider for older patients with symptomatic lumbar spine disease that causes lower back pain. Between 2006 and 2012, over 6 million Medicare patients were diagnosed with lumbar degenerative conditions (Buser et al., 2017), and lumbar spine procedures are increasingly used in elderly patients to treat these conditions. For example, lumbar fusion rates have increased from 0.3 per 1000 Medicare beneficiaries in 1992 to 1.1 per 1000 in 2003 (Puvanesarajah, 2016). One study found that 5.9 per 100 patients progressed to lumbar fusion within 1 year, and there was an increase of 18.5 percent in the incidence of fusion procedures within 1 year of diagnosis between 2006 and 2011, with the age group 65 to 69 having the highest incidence (Buser et al., 2017). Furthermore, the 65 to 69 years age group also had the highest incidence of patients that underwent fusion within 1 year of diagnosis, while patients 80 to 84 and greater than 85 years of age had the greatest relative increase in fusion incidence between 2008 and 2011 (Buser et al., 2017).   The cost of lumbar fusion has also increased, as noted by a 2012 study looking at the trends in spinal fusion from 1998 to 2008, where the cost per case increased from $24,676 to $81,960 (Rajaee et al., 2012). Based on a review of the Medicare Provider Analysis and Review file, total spending on lumbar spinal fusion surgery is also one of the highest admission outlays in the Medicare program, costing over $3.6 billion dollars in 2013 (Culler et al., 2016).   Buser, Z., B. Ortega, A. D'Oro, W. Pannell, J. R. Cohen, J. Wang, R. Golish, M. Reed, and J. C. Wang. "Spine Degenerative Conditions and Their Treatments: National Trends in the United States of America." [In eng]. Global Spine J 8, no. 1 (Feb 2018): 57-67.  Culler, S. D., D. S. Jevsevar, K. G. Shea, K. J. McGuire, M. Schlosser, K. K. Wright, and A. W. Simon. "Incremental Hospital Cost and Length-of-Stay Associated with Treating Adverse Events among Medicare Beneficiaries Undergoing Lumbar Spinal Fusion During Fiscal Year 2013." [In eng]. Spine (Phila Pa 1976) 41, no. 20 (Oct 15 2016): 1613-20.  “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017.  "Global, Regional, and National Incidence, Prevalence, and Years Lived with Disability for 301 Acute and Chronic Diseases and Injuries in 188 Countries, 1990-2013: A Systematic Analysis for the Global Burden of Disease Study 2013." [In eng]. Lancet 386, no. 9995 (Aug 22 2015): 743-800.  Puvanesarajah, V., B. C. Werner, J. M. Cancienne, A. Jain, H. Pehlivan, A. L. Shimer, A. Singla, F. Shen, and H. Hassanzadeh. "Morbid Obesity and Lumbar Fusion in Patients Older Than 65 Years: Complications, Readmissions, Costs, and Length of Stay." [In eng]. Spine (Phila Pa 1976) 42, no. 2 (Jan 15 2017): 122-27.  Rajaee, S. S., H. W. Bae, L. E. Kanim, and R. B. Delamarter. "Spinal Fusion in the United States: Analysis of Trends from 1998 to 2008." [In eng]. Spine (Phila Pa 1976) 37, no. 1 (Jan 1 2012): 67-76. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | As part of the second wave of measure development, the Musculoskeletal Disease Management – Spine Clinical Subcommittee selected this measure for development during an in-person meeting in April 2018 and a corresponding smaller measure-specific workgroup provided detailed clinical input on its specifications throughout the summer of 2018. The Subcommittee chose the Lumbar Spine Fusion for Degenerative Disease, 1-3 Levels episode group to develop, using as a starting point the December 2016 Draft List of MACRA Episode Groups and Trigger Codes and an accompanying document on episode-based cost measure development for the Quality Payment Program (together, the “December 2016 posting”). The Musculoskeletal Disease Management – Spine Clinical Subcommittee is composed of 22 members affiliated with 19 specialty societies and were selected after a public call for nominations in February - March 2018. The workgroup comprises 13 members affiliated with 13 specialty societies.  The Musculoskeletal Disease Management – Spine Clinical Subcommittee and workgroup provided detailed clinical input on every component of this measure through a variety of forums, including in-person meetings, webinars, and online polls. Members discussed and provided input on the selection an episode group for cost measure development, and the workgroup provided further input on: (i) episode triggers and sub-groups, (ii) episode window, (iii) service assignment rules, (iv) risk adjustors, and (v) exclusions.  In addition to the input of the Clinical Subcommittee and the measure-specific workgroup, a technical expert panel (TEP) was convened for meetings in August and December 2016, March and August 2017, and May 2018. The TEP provided high-level guidance on the concepts and direction of measure development, methods to best operationalize feedback from the patient and family committee, and actionable enhancements for feedback reports. The information gathered has been incorporated into the process and utilized by the Musculoskeletal Disease Management – Spine Clinical Subcommittee during the first and second wave of episode-based cost measure development.  The measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 10-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other episode-based cost measures that underwent field testing. There were 78,221 episode-based cost measure field test reports that were distributed on the CMS Enterprise Portal. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the measure-specific workgroup members to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians (TIN-NPI) and clinician groups (TIN) across a range of case minimums.   * For TINs at a 10-episode case minimum, the mean reliability was 0.77. For TINs at a 20-episode case minimum, the mean reliability was 0.84. For TINs at a 30-episode case minimum, the mean reliability was 0.88. * For TIN-NPIs s at a 10-episode case minimum, the mean reliability was 0.71. For TIN-NPIs at a 20-episode case minimum, the mean reliability was 0.80. For TINs at a 30-episode case minimum, the mean reliability was 0.85. |
| **In which setting was this measure tested?** | Ambulatory surgery center, Hospital outpatient department (HOD), Hospital inpatient |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs attributable to their decision making, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be made through changes in clinical practice.   According to the literature and previous feedback received through stakeholder input activities, this measure represents an area where there is opportunity for improvement. An opportunity for improvement for lumbar spine fusion for degenerative disease exists within a primary performance gap: mitigation of complications, especially wound complications, which increases the risk for readmission.   Medicare beneficiaries have been undergoing elective spine surgery for degenerative changes at increasing rates, and with this has come increasing rates of complications and costs associated with these complications (Puvanesajarah, 2016; Buser et al., 2017; Rajaee et al., 2012). Compared to other lumbar spine surgeries such as laminectomies or discectomies, lumbar spinal fusion is associated with greater complication rates due to a variety of factors, including its greater complexity, more extensive dissection, prolonged operative periods, greater risk of intraoperative blood loss, and implant/instrumentation failure, requiring greater health care resource use (Kalakoti et al., 2016, Deyo et al., 2010). Lumbar fusion surgery can be categorized by invasiveness, and studies have shown that risk for life-threatening complications was higher with increasing surgical invasiveness (Deyo et al., 2010). One study found that the risk-adjusted estimated incremental cost of each complication among Medicare beneficiaries exceeded $10,000 (Culler et al., 2016).   Occurrence of complications also contribute to increased risk of readmission. A 2017 study of patients in New York State who underwent lumbar spine fusion found 25 percent were readmitted within 90 days, with the average time to readmission being 7 days. The most common complications were wound complications at 3.7 percent and wound infections at 3.1 percent (Baaj et al., 2017). Other studies have similarly found wound complications among the most common complications following lumbar fusion (Deyo et al., 2010)(Martin et al., 2013). Given the impact of surgical complications on resource use, mitigation of these complications provide an area of opportunity for improvement, with potential improvement in care quality and cost savings. One study found that an opportunity for reducing complications exist with intense presurgical planning, medical optimization, utilization of minimally invasive approaches, and adequate communications with general practitioners. By implementing these strategies, there is potential for reducing readmissions as a result of complications (Baaj et al.,2017).  This measure aims to address these example areas of opportunities for improvement. Lumbar fusion rates have increased from 0.3 per 1000 Medicare beneficiaries in 1992 to 1.1 per 1000 in 2003, and total spending on lumbar spinal fusion surgery is also one of the highest admission outlays in the Medicare program, costing over $3.6 billion dollars in 2013. As such, the use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. There is substantial variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 43,749 Lumbar Spine Fusion for Degenerative Disease, 1-3 Levels episodes for 43,289 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 10-episode case minimum.   * The mean risk-adjusted cost per episode was $36,161.46. The risk-adjusted cost per episode at the 5th percentile was $26,559.30, compared to $55,989.18 at the 95th percentile. * For TINs, the mean measure score was $36,895.16. The score at the 5th percentile was $32,107.33, compared to $42,965.71 at the 95th percentile. * For TIN-NPIs, the mean measure score was $36,823.88. The score at the 5th percentile was $31,960.75, compared to $43,597.88 at the 95th percentile.   Baaj, A. A., G. Lang, W. C. Hsu, M. J. Avila, J. Mao, and A. Sedrakyan. "90-Day Readmission after Lumbar Spinal Fusion Surgery in New York State between 2005 and 2014: A 10-Year Analysis of a Statewide Cohort." [In eng]. Spine (Phila Pa 1976) 42, no. 22 (Nov 15 2017): 1706-16.  Buser, Z., B. Ortega, A. D'Oro, W. Pannell, J. R. Cohen, J. Wang, R. Golish, M. Reed, and J. C. Wang. "Spine Degenerative Conditions and Their Treatments: National Trends in the United States of America." [In eng]. Global Spine J 8, no. 1 (Feb 2018): 57-67.  Culler, S. D., D. S. Jevsevar, K. G. Shea, K. J. McGuire, M. Schlosser, K. K. Wright, and A. W. Simon. "Incremental Hospital Cost and Length-of-Stay Associated with Treating Adverse Events among Medicare Beneficiaries Undergoing Lumbar Spinal Fusion During Fiscal Year 2013." [In eng]. Spine (Phila Pa 1976) 41, no. 20 (Oct 15 2016): 1613-20.  Deyo, R. A., S. K. Mirza, B. I. Martin, W. Kreuter, D. C. Goodman, and J. G. Jarvik. "Trends, Major Medical Complications, and Charges Associated with Surgery for Lumbar Spinal Stenosis in Older Adults." [In eng]. JAMA 303, no. 13 (Apr 7 2010): 1259-65.  Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  Kalakoti, P., S. Missios, T. Maiti, S. Konar, S. Bir, P. Bollam, and A. Nanda. "Inpatient Outcomes and Postoperative Complications after Primary Versus Revision Lumbar Spinal Fusion Surgeries for Degenerative Lumbar Disc Disease: A National (Nationwide) Inpatient Sample Analysis, 2002-2011." [In eng]. World Neurosurg 85 (Jan 2016): 114-24.  Martin, B. I., S. K. Mirza, G. M. Franklin, J. D. Lurie, T. A. MacKenzie, and R. A. Deyo. "Hospital and Surgeon Variation in Complications and Repeat Surgery Following Incident Lumbar Fusion for Common Degenerative Diagnoses." [In eng]. Health Serv Res 48, no. 1 (Feb 2013): 1-25.  Puvanesarajah, V., B. C. Werner, J. M. Cancienne, A. Jain, H. Pehlivan, A. L. Shimer, A. Singla, F. Shen, and H. Hassanzadeh. "Morbid Obesity and Lumbar Fusion in Patients Older Than 65 Years: Complications, Readmissions, Costs, and Length of Stay." [In eng]. Spine (Phila Pa 1976) 42, no. 2 (Jan 15 2017): 122-27.  Rajaee, S. S., H. W. Bae, L. E. Kanim, and R. B. Delamarter. "Spinal Fusion in the United States: Analysis of Trends from 1998 to 2008." [In eng]. Spine (Phila Pa 1976) 37, no. 1 (Jan 1 2012): 67-76. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:  •Devising an appropriate risk adjustment model for episode-based cost measures  •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** | Section 101(f) of MACRA |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-119: Psychoses/Related Conditions**

**Measure Information**

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| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-119 |
| **Title** | Psychoses/Related Conditions |
| **Program** | Merit-Based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | New measure never reviewed by MAP Workgroup or used in a CMS program |
| **Measure Description:** | The Psychoses/Related Conditions Measure is meant to apply to clinicians who manage the inpatient care of Medicare beneficiaries hospitalized with these conditions. This acute episode captures patients who are treated for psychoses and related conditions. The measure evaluates a clinician’s risk-adjusted cost for the episode group by averaging it across all episodes attributed to the clinician during the performance period. The cost of each episode is the sum of the cost to Medicare for assigned services performed by the attributed clinician and other healthcare providers during the episode window. |
| **Numerator:** | The numerator for the Psychoses/Related Conditions measure is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all episodes attributed to a clinician. This sum is then multiplied by the national average observed episode cost to generate a dollar figure. Mathematically, this is represented as: sum of (observed episode cost/expected episode cost) \* national average observed cost. |
| **Denominator:** | The denominator for the Psychoses/Related Conditions measure is the total number of episodes from this episode group attributed to a clinician. |
| **Exclusions:** | The following episode-level exclusions apply:  (a) The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.  (b) No TIN is attributed the episode.  (c) The beneficiary’s date of birth is missing.  (d) The beneficiary’s death date occurred before the episode ended.  (e) The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.  (f) The trigger IP stay has the same admission date as another IP stay.  (g) The IP facility is not one that is paid under the Inpatient Prospective Payment System (IPPS) or the Inpatient Psychiatric Facility (IPF) Prospective Payment System (PPS).  Psychoses/Related Conditions episodes are also removed using exclusions specific to the Psychoses/Related Conditions measure that were developed with input from the measure-specific workgroup. The “Exclusions” and “Exclusions\_Details” tabs in the [Psychoses/Related Conditions Measure Codes List File](https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-episode-based-cost-measures-zip-file.zip) include the list of these exclusions as well as the codes used to define them. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Psychiatry |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | Psychotic disorders, which are associated with disturbances in thought processing and behaviors that result in a loss of contact with reality, occur throughout the lifespan. Chronic psychotic disorders, including schizophrenia spectrum disorders, cause impairment in social, self-care and/or occupational functioning, and are among the most disabling disorders worldwide. Data from the 2010 Global Burden of Diseases, Injuries, and Risk Factors Study shows that mental and substance use disorders are the leading cause of years lived with disability. Despite being less prevalent than other disorders, schizophrenia accounted for 7.4 percent of disability-adjusted life years worldwide (Whiteford et al., 2013). Schizophrenia is diagnosed in between 0.3 percent and 1.6 percent of the US population and is one of the costliest mental illnesses, with treatment costs approximately double than that for major depression disorder and quadruple that for anxiety disorders (Desai et al., 2013; Zhu et al., 2008). Additionally, adults with schizophrenia represent a greater percent of Medicare beneficiaries than the general adult US population (approximately 1.5 percent and 1 percent, respectively) (Feldman et al., 2014). The direct costs of treating schizophrenia in the US are estimated to be between $33 and $65 billion annually, with inpatient services and medication representing the largest proportion of the costs (Wilson et al., 2011). Indirect costs represent a large cost burden as well and are estimated to cost $18.68 billion annually, which includes costs associated with lost productivity due to missed work, reduced employment and employability, premature death, and caregivers’ costs (Desai et al., 2013).   “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017  Desai, Pooja R., Kenneth A. Lawson, Jamie C. Barner, and Karen L. Rascati. "Estimating the Direct and Indirect Costs for Community-Dwelling Patients with Schizophrenia." Journal of Pharmaceutical Health Services Research 4, no. 4 (2013): 187-94.  Feldman, Rachel, Robert A. Bailey, James Muller, Jennifer Le, and Riad Dirani. "Cost of Schizophrenia in the Medicare Program." Population Health Management 17, no. 3 (2014): 190-96.  Whiteford, Harvey A., Louisa Degenhardt, Jürgen Rehm, Amanda J. Baxter, Alize J. Ferrari, Holly E. Erskine, Fiona J. Charlson, et al. "Global Burden of Disease Attributable to Mental and Substance Use Disorders: Findings from the Global Burden of Disease Study 2010." The Lancet 382, no. 9904 (2013): 1575-86.  Wilson, Leslie S., Gitlin, Matthew, Lightwood, Jim. "Schizophrenia Costs for Newly Diagnosed Versus Previously Diagnosed Patients." The American Journal of Pharmacy Benefits, vol. 3, no. 2, 2011, pp. 107-115.  Zhu, Baojin, Haya Ascher-Svanum, Douglas E. Faries, Xiaomei Peng, David Salkever, and Eric P. Slade. "Costs of Treating Patients with Schizophrenia Who Have Illness-Related Crisis Events." BMC Psychiatry 8 (2008): 72-72. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | As part of the second wave of measure development, the Neuropsychiatric Disease Management Clinical Subcommittee selected this measure for development during an in-person meeting in April 2018 and a corresponding smaller measure-specific workgroup provided detailed clinical input on its specifications throughout the summer of 2018. The Subcommittee chose to develop the Psychoses/Related Conditions episode group, using as a starting point the December 2016 Draft List of MACRA Episode Groups and Trigger Codes and an accompanying document on episode-based cost measure development for the Quality Payment Program (together, the “December 2016 posting”). The Neuropsychiatric Disease Management Clinical Subcommittee is composed of 26 members affiliated with 27 specialty societies and were selected after a public call for nominations in February - March 2018. The workgroup comprises 15 members affiliated with 15 specialty societies.  The Neuropsychiatric Disease Management Clinical Subcommittee and workgroup provided input on every component of this measure through a variety of forums, including in-person meetings, webinars, and online polls. Members discussed and provided input on the selection an episode group for cost measure development, and the workgroup provided further input on: (i) episode triggers and sub-groups, (ii) episode window, (iii) service assignment rules, (iv) risk adjustors, and (v) exclusions.  In addition to the input of the Clinical Subcommittee and the measure-specific workgroup, a technical expert panel (TEP) was convened for meetings in August and December 2016, March and August 2017, and May 2018. The TEP provided high-level guidance on the concepts and direction of measure development, methods to best operationalize feedback from the patient and family committee, and actionable enhancements for feedback reports. The information gathered has been incorporated into the process and utilized by the Neuropsychiatric Disease Management Clinical Subcommittee during the first and second wave of episode-based cost measure development.  The measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 10-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other episode-based cost measures that underwent field testing. 78,221 episode-based cost measure field test reports that were distributed on the CMS Enterprise Portal. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the measure-specific workgroup members to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians (TIN-NPI) and clinician groups (TIN) across a range of case minimums.   * For TINs at a 10-episode case minimum, the mean reliability was 0.80. For TINs at a 20-episode case minimum, the mean reliability was 0.85. For TINs at a 30-episode case minimum, the mean reliability was 0.88. * For TIN-NPIs at a 10-episode case minimum, the mean reliability was 0.80. For TIN-NPIs at a 20-episode case minimum, the mean reliability was 0.87. For TIN-NPIs at a 30-episode case minimum, the mean reliability was 0.90. |
| **In which setting was this measure tested?** | Hospital inpatient |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs attributable to their decision making, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be achieved through changes in clinical practice.   According to the literature and previous feedback received through stakeholder input activities, this measure represents areas where there are opportunities for improvement. Opportunities for improvement for the treatment of psychoses and related conditions are found in the variation in medication adherence and its impact on the length and cost of inpatient hospital stays and in patient outcomes.   Psychotic conditions are treated most effectively with neuroleptic or antipsychotic medications and adherence to these medications represents an area for improvement. Partial adherence and nonadherence to medication in the treatment of schizophrenia may lead to relapse and nonadherence is associated with a greater risk of hospitalization (Lacro & Jeste, 1997). In a 2010 retrospective study, nonadherent patients with schizophrenia spectrum disorders were 27 percent more likely to be hospitalized when compared to adherent patients (Lang et al, 2010). Rehospitalization costs due to antipsychotic medication nonadherence in 2005 were nearly $1.5 billion (Sun, et al., 2007). Adding to the challenges of management, older adults require reduced dosages and incur an increased risk of side effects from antipsychotic medications (Jeste & Maglione, 2014). A 2014 study found that Medicare beneficiaries with schizophrenia cost significantly more on average than other beneficiaries and that most of their costs were related to psychiatric and medical hospitalization; hospital utilization was the highest cost for approximately 30 percent of beneficiaries with schizophrenia (Feldman et al., 2014).   There is significant variation in the length and cost of inpatient hospital stays for the treatment of psychoses and related conditions. A reduction in the cost of hospital stays could potentially be used as an indicator that outpatient treatment and medication adherence rates increased. Although the length of stay (LOS) for the treatment of psychiatric conditions has been in decline in recent decades, inpatient hospitalization costs are still estimated to represent 16 percent of mental health spending in the United States. LOS is typically longer for the treatment of psychiatric disorders than for physical disorders, especially for schizophrenia (Tulloch, et al., 2011). LOS and cost of stay (COS) are influenced by a wide range of clinical and patient-level characteristics. A 2017 study found that Medicare patients being treated for psychotic disorders had both longer (1.52 days longer) and the costliest hospital stays compared to the mean LOS (Bessaha et al., 2017). Additional COS differences were observed based on geographic factors. COS among all patients were found to be 7 percent higher for women. African-American and Hispanic patients had lower costs by 4 percent and 2 percent, respectively, when compared to white patients. On the other hand, Asian/Pacific Islander patients had about 10 percent higher COS (Bessaha et al., 2017). Severely mentally ill geriatric patients may be expected to require longer hospitalizations due to greater levels of functional disability, cognitive impairment, and comorbid conditions. Increased LOS among this population has been associated with receiving electroconvulsive therapy (ECT), higher positive symptoms scores, falls during hospitalization, medication complications, multiple prior psychiatric hospitalizations, seeking court permission to continue hospitalization or medication against a patient’s will, consultation delays, and facilities not performing ECT on weekends.   An additional area for improvement are potential disparities in health outcomes. Individuals with mental illness have a life expectancy 8 years shorter than the general US population and the life expectancy of those with psychotic disorders is 11 years shorter (Druss, et al., 2011). Patients diagnosed with schizophrenia and related psychoses have higher morbidity and mortality rates associated with cardiovascular disease in the US (Hennekens, et al., 2006). Additionally, disparities in the risk of cardiovascular disease risk factors may exist between socioeconomic and racial/ethnic minority groups with serious mental illness. Minority groups with schizophrenia-spectrum disorders or bipolar disorder may have worse cardiovascular disease health outcomes than the general population and white individuals with the same psychiatric disorders (Carliner, et al., 2014). Improved cardiovascular disease management of patients in minority groups has the potential to reduce disparities. The potential reduction, along with improving care for all patients, has the potential for significant cost savings.  This measure aims to address these example areas of opportunities for improvement. Chronic psychotic disorders, including schizophrenia spectrum disorders, cause impairment in social, self-care and/or occupational functioning, and are among the most disabling disorders worldwide. Adults with schizophrenia represent a greater percent of Medicare beneficiaries than the general adult US population As such, the use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. There is substantial variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 153,943 Psychoses/Related Conditions episodes for 96,541 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 10-episode case minimum.   * The mean risk-adjusted cost per episode was $22,330.27. The mean risk-adjusted cost per episode at the 5th percentile was $5,828.74, compared to $56,336.97 at the 95th percentile. * For TINs, the mean measure score was $22,289.66. The score at the 5th percentile was $14,473.88, compared to $32,009.31 at the 95th percentile. * For TIN-NPIs, the mean measure score was $26,708.03. The score at the 5th percentile was $16,071.24, compared to $40,742.56 at the 95th percentile.   Bessaha, Melissa L., Martha Shumway, Melissa Edmondson Smith, Charlotte L. Bright, and George J. Unick. "Predictors of Hospital Length and Cost of Stay in a National Sample of Adult Patients with Psychotic Disorders." Psychiatric Services (Washington, D.C.) 68, no. 6 (2017): 559-65.  Carliner, Hannah, Pamela Y. Collins, Leopoldo J. Cabassa, Ann McNallen, Sarah S. Joestl, and Roberto Lewis-Fernández. "Prevalence of Cardiovascular Risk Factors among Racial and Ethnic Minorities with Schizophrenia Spectrum and Bipolar Disorders: A Critical Literature Review." Comprehensive Psychiatry 55, no. 2 (2014): 233-47.  Druss, Benjamin G., Liping Zhao, Silke Von Esenwein, Elaine H. Morrato, and Steven C. Marcus. "Understanding Excess Mortality in Persons with Mental Illness: 17-Year Follow up of a Nationally Representative Us Survey." Medical Care 49, no. 6 (2011): 599-604.  Feldman, Rachel, Robert A. Bailey, James Muller, Jennifer Le, and Riad Dirani. "Cost of Schizophrenia in the Medicare Program." Population Health Management 17, no. 3 (2014): 190-96.  Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  Hennekens, Charles H, Hennekens, Alissa R., Hollar, Danielle, and Casey, Daniel E. "Schizophrenia and Increased Risk of Cardiovascular Disease." American Heart Journal 151, no. 5 (2006): e8-e8.  Jeste, Dilip V., and Jeanne E. Maglione. "Treating Older Adults with Schizophrenia: Challenges and Opportunities." Schizophrenia Bulletin 39, no. 5 (2013): 966-68.  Lacro, J. P., and D. V. Jeste. "Geriatric Psychosis." The Psychiatric Quarterly 68, no. 3 (1997): 247-60.  Sun, Shawn X., Gordon G. Liu, Dale B. Christensen, and Alex Z. Fu. "Review and Analysis of Hospitalization Costs Associated with Antipsychotic Nonadherence in the Treatment of Schizophrenia in the United States." Current Medical Research And Opinion 23, no. 10 (2007): 2305-12.  Tulloch, Alex D., Paul Fearon, and Anthony S. David. "Length of Stay of General Psychiatric Inpatients in the United States: Systematic Review." Administration And Policy In Mental Health 38, no. 3 (2011): 155-68. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:  •Devising an appropriate risk adjustment model for episode-based cost measures  •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** | Section 101(f) of MACRA |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-120: Lumpectomy, Partial Mastectomy, Simple Mastectomy**

**Measure Information**

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| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-120 |
| **Title** | Lumpectomy, Partial Mastectomy, Simple Mastectomy |
| **Program** | Merit-Based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | New measure never reviewed by MAP Workgroup or used in a CMS program |
| **Measure Description:** | The Lumpectomy, Partial Mastectomy, Simple Mastectomy Measure is meant to apply to clinicians who perform these procedures for Medicare beneficiaries. This procedural episode captures patients who receive surgical treatment for breast cancer. The measure evaluates a clinician’s risk-adjusted cost for the episode group by averaging it across all episodes attributed to the clinician during the performance period. The cost of each episode is the sum of the cost to Medicare for assigned services performed by the attributed clinician and other healthcare providers during the episode window. |
| **Numerator:** | The numerator for the Lumpectomy, Partial Mastectomy, Simple Mastectomy measure is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all episodes attributed to a clinician. This sum is then multiplied by the national average observed episode cost to generate a dollar figure. Mathematically, this is represented as: sum of (observed episode cost/expected episode cost) \* national average observed cost. |
| **Denominator:** | The denominator for the Lumpectomy, Partial Mastectomy, Simple Mastectomy measure is the total number of episodes from this episode group attributed to a clinician. |
| **Exclusions:** | The following episode-level exclusions apply:  (a) The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.  (b) No main clinician is attributed the episode.  (c) The beneficiary’s date of birth is missing.  (d) The beneficiary’s death date occurred before the episode ended.  (e) The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.  (f) The episode trigger claim was not performed in an ambulatory/office-based care, IP hospital, OP hospital, or ASC setting based on its place of service.   Lumpectomy, Partial Mastectomy, Simple Mastectomy episodes are also removed using exclusions specific to the Lumpectomy, Partial Mastectomy, Simple Mastectomy measure that were developed with input from the measure-specific workgroup. The “Exclusions” and “Exclusions\_Details” tabs in the [Lumpectomy, Partial Mastectomy, Simple Mastectomy Measure Codes List File](https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-episode-based-cost-measures-zip-file.zip) include the list of these exclusions as well as the codes used to define them. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Surgical oncology |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | The American Cancer Society estimates that breast cancer accounts for 29 percent of all new cancer diagnoses in women and has the highest treatment costs among all cancer types; estimated at $16.5 billion in 2010 (Siegel et al., 2016, Greenup et al., 2017). Breast cancer is the second most common cause of cancer mortality for women and surgery remains the primary treatment modality. Furthermore, the adoption and use of screening mammography has resulted in increased rates of detection of early-stage breast cancer and increased demand for surgical intervention (Helvie et al., 2014). As such, the surgical treatment of breast cancer including lumpectomy, partial mastectomy, and simple mastectomy represent a significant economic burden (Al-Hilli et al., 2015).  Al-Hilli, Zahraa, Kristine M. Thomsen, Elizabeth B. Habermann, James W. Jakub, and Judy C. Boughey. "Reoperation for Complications after Lumpectomy and Mastectomy for Breast Cancer from the 2012 National Surgical Quality Improvement Program (Acs-Nsqip)." Annals Of Surgical Oncology 22 Suppl 3 (2015): S459-S69.  “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017.   Greenup, Rachel A., Rachel C. Blitzblau, Kevin L. Houck, Julie Ann Sosa, Janet Horton, Jeffrey M. Peppercorn, Alphonse G. Taghian, Barbara L. Smith, and E. Shelley Hwang. "Cost Implications of an Evidence-Based Approach to Radiation Treatment after Lumpectomy for Early-Stage Breast Cancer." Journal Of Oncology Practice 13, no. 4 (2017): e283-e90.  Helvie, Mark A., Joanne T. Chang, R. Edward Hendrick, and Mousumi Banerjee. "Reduction in Late-Stage Breast Cancer Incidence in the Mammography Era: Implications for Overdiagnosis of Invasive Cancer." Cancer 120, no. 17 (2014): 2649-56.  Siegel, Rebecca L., Kimberly D. Miller, and Ahmedin Jemal. "Cancer Statistics, 2016." CA: A Cancer Journal For Clinicians 66, no. 1 (2016): 7-30. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | As part of the second wave of measure development, the Oncologic Disease Management – Medical, Radiation, and Surgical Clinical Subcommittee selected this measure for development during an in-person meeting in April 2018 and a corresponding smaller measure-specific workgroup provided detailed clinical input on its specifications throughout the summer of 2018. The Subcommittee chose to develop the Lumpectomy, Partial Mastectomy, Simple Mastectomy episode, using as a starting point the December 2016 Draft List of MACRA Episode Groups and Trigger Codes and an accompanying document on episode-based cost measure development for the Quality Payment Program (together, the “December 2016 posting”). The Oncologic Disease Management – Medical, Radiation, and Surgical Clinical Subcommittee is composed of 40 members affiliated with 32 specialty societies and were selected after a public call for nominations in February - March 2018. The workgroup comprises 13 members affiliated with 15 specialty societies.  The Oncologic Disease Management – Medical, Radiation, and Surgical Clinical Subcommittee and workgroup provided input on every component of this measure through a variety of forums, including in-person meetings, webinars, and online polls. Members discussed and provided input on the selection an episode group for cost measure development, and the workgroup provided further input on: (i) episode triggers and sub-groups, (ii) episode window, (iii) service assignment rules, (iv) risk adjustors, and (v) exclusions.  In addition to the input of the Clinical Subcommittee and the measure-specific workgroup, a technical expert panel (TEP) was convened for meetings in August and December 2016, March and August 2017, and May 2018. The TEP provided high-level guidance on the concepts and direction of measure development, methods to best operationalize feedback from the patient and family committee, and actionable enhancements for feedback reports. The information gathered has been incorporated into the process and utilized by the Oncologic Disease Management – Medical, Radiation, and Surgical Clinical Subcommittee during the first and second wave of episode-based cost measure development.  The measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 10-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other episode-based cost measures that underwent field testing. 78,221 episode-based cost measure field test reports that were distributed on the CMS Enterprise Portal. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the measure-specific workgroup members to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians (TIN-NPI) and clinician groups (TIN) across a range of case minimums.   * For TINs at a 10-episode case minimum, the mean reliability was 0.59. For TINs at a 20-episode case minimum, the mean reliability was 0.69. For TINs at a 30-episode case minimum, the mean reliability was 0.75. * For TIN-NPIs at a 10-episode case minimum, the mean reliability was 0.54. For TIN-NPIs at a 20-episode case minimum, the mean reliability was 0.65. For TIN-NPIs at a 30-episode case minimum, the mean reliability was 0.71. |
| **In which setting was this measure tested?** | Ambulatory surgery center, Hospital outpatient department (HOD), Hospital inpatient |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs attributable to their decision making, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be achieved through changes in clinical practice.   According to the literature and previous feedback received through stakeholder input activities, this measure represents an area with significant opportunities for improvement. Opportunities for improvement for lumpectomy, partial mastectomy, or simple mastectomy exist within multiple performance gaps, such as the variation in approach to disease management, including surgical approach and use of adjuvant therapies, in addition to variability in outcomes, rates of complications, and potential health care expenditure savings.   A 2015 study that identified 18,500 patients who underwent breast cancer operations using the 2012 National Surgical Quality Improvement Program ACS-NSQIP dataset, a nationally validated outcomes-based program, concluded that unplanned reoperations following breast cancer surgery are more frequent after mastectomy with immediate breast reconstruction (IBR) than mastectomy without IBR, or lumpectomy with or without IBR (Al-Hilli et al., 2015). Bleeding was the most common complication that required reoperation within 30 days for patients over 60 years of age, with 1.3 percent of patients between 60 and 69 years of age requiring reoperation, 0.9 percent of patients between 70 and 79 years of age, and 1.3 percent of patients over the age of 80 (Al-Hilli et al., 2015). A 2016 study that also analyzed the 2012 NSQIP dataset compared patient outcomes between breast conserving surgery (BCS) and simple mastectomy with implant reconstruction. The study concluded that in early stage breast cancer, BCS had fewer postoperative complications in the 30-days following the procedure than simple mastectomy with implant reconstruction, even in groups with greater preoperative risk factors. The overall rate of complications for BCS was 2.1 percent compared to 5.5 percent for simple mastectomy with implant reconstruction (Pyfer et al., 2016). Lumpectomy plus radiation treatment (RT) has been shown to be a safe alternative to mastectomy, resulting in no difference in disease-specific or overall survival among patients (Greenup et al., 2017). Hospital readmissions or unplanned reoperations following breast cancer treatment surgery not only have cost implications, but their impact on health care costs can be seen as a quality indicator (Al-Hilli et al., 2015, Tsai et al., 2013).   There are a wide variety of options available with respect to diagnosis and treatment for breast cancer, including a range of available adjuvant therapies. Identifying high-value breast cancer treatment approaches that maintain patient health outcomes while offering potential health care cost savings is important since breast cancer treatment costs are the highest among all cancer types and are estimated to reach $20 billion by 2020 (Greenup et al., 2017). Each option has its own set of risks, potential benefits, and associated costs. For example, brachytherapy following lumpectomy is an increasingly popular breast cancer treatment. A 2014 study found that among women aged 66 years or older with invasive breast cancer, brachytherapy use increased from 0.8 percent of patients in 2002 to 6.9 percent in 2007 (Smith et al., 2014). During the same period, use of external beam radiation therapy (EBRT) decreased and rates of treatment with lumpectomy alone remained stable. The study concluded that, despite its decline in use, EBRT results in greater breast-preservation benefit compared to brachytherapy (Smith et al., 2014). Intraoperative radiotherapy (IORT), an alternative treatment following BCS, has been shown to be safe for a select group of patients and delivers radiation to the tumor bed during surgery (Rakhra et al., 2017). Similarly, outcomes from a retrospective review of 935 patients that received IORT following BCS found low rates of complications and cancer recurrences. The study additionally found that the use of IORT is increasing in North America, is less costly compared to EBRT, and does not require multiple appointments for RT (Valente et al., 2016). A 2013 cost-effectiveness study of IORT following BCS concluded that it was both less costly and more effective than the current standard of care (Alvarado et al., 2013). Furthermore, a 2017 study that examined data from more than 43,000 patients in the National Cancer Database concluded that 57 percent of patients were safely eligible to receive shorter RT or no RT compared to the treatment they received. Patients that received the least expensive RT regimens for which they were safely eligible cost 39 percent less than the population that received longer RT (annual estimated RT costs were $256.2 million and $420.2 million respectively) (Greenup et al., 2017).  This measure aims to address these example areas of opportunities for improvement. Breast cancer accounts for 29 percent of all new cancer diagnoses in women and has the highest treatment costs among all cancer types. It is also the second most common cause of cancer mortality for women and surgery remains the primary treatment modality As such, the use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. There is substantial variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 43,297 Lumpectomy, Partial Mastectomy, Simple Mastectomy episodes for 39,705 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 10-episode case minimum.   * The mean risk-adjusted cost per episode was $5,486.73. The risk-adjusted cost per episode at the 5th percentile was $2,161.40, compared to $9,250.91 at the 95th percentile. * For TINs, the mean measure score was $5,517.16. The score at the 5th percentile was $4,460.31, compared to $6,437.55 at the 95th percentile. * For TIN-NPIs, the mean measure score was $5,552.46. The score at the 5th percentile was $4,239.33, compared to $6,602.54 at the 95th percentile.   Al-Hilli, Zahraa, Kristine M. Thomsen, Elizabeth B. Habermann, James W. Jakub, and Judy C. Boughey. "Reoperation for Complications after Lumpectomy and Mastectomy for Breast Cancer from the 2012 National Surgical Quality Improvement Program (Acs-Nsqip)." Annals Of Surgical Oncology 22 Suppl 3 (2015): S459-S69.  Alvarado Michael D, Aron J Mohan, Laura J Esserman, Catherine C Park, Brittany L Harrison, Rebecca J Howe, Cristina Thorsen, and Elissa M Ozanne. "Cost-Effectiveness Analysis of Intraoperaive Radiation Therapy for Early-Stage Breast Cancer." Annals of Surgical Oncology, vol. 20, no. 9, 2013, pp. 2873-2880.  Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  Greenup, Rachel A., Rachel C. Blitzblau, Kevin L. Houck, Julie Ann Sosa, Janet Horton, Jeffrey M. Peppercorn, Alphonse G. Taghian, Barbara L. Smith, and E. Shelley Hwang. "Cost Implications of an Evidence-Based Approach to Radiation Treatment after Lumpectomy for Early-Stage Breast Cancer." Journal Of Oncology Practice 13, no. 4 (2017): e283-e90.  Pyfer, Bryan, Abhishek Chatterjee, Lilian Chen, John Nigriny, Brian Czerniecki, Julia Tchou, and Carla Fisher. "Early Postoperative Outcomes in Breast Conservation Surgery Versus Simple Mastectomy with Implant Reconstruction: A Nsqip Analysis of 11,645 Patients." Annals Of Surgical Oncology 23, no. 1 (2016): 92-98.  Rakhra, Sunpreet, Kevin Bethke, Jonathan Strauss, John P. Hayes, Nora Hansen, Seema A. Khan, Irene Helenowski, and Eric D. Donnelly. "Risk Factors Leading to Complications in Early-Stage Breast Cancer Following Breast-Conserving Surgery and Intraoperative Radiotherapy." Annals Of Surgical Oncology 24, no. 5 (2017): 1258-61.  Smith, Grace L., Jing Jiang, Thomas A. Buchholz, Ying Xu, Karen E. Hoffman, Sharon H. Giordano, Kelly K. Hunt, and Benjamin D. Smith. "Benefit of Adjuvant Brachytherapy Versus External Beam Radiation for Early Breast Cancer: Impact of Patient Stratification on Breast Preservation." International Journal Of Radiation Oncology, Biology, Physics 88, no. 2 (2014): 274-84.    Tsai, Thomas C., Karen E. Joynt, E. John Orav, Atul A. Gawande, and Ashish K. Jha. "Variation in Surgical-Readmission Rates and Quality of Hospital Care." The New England Journal Of Medicine 369, no. 12 (2013): 1134-42.   Valente, Stephanie A., Rahul D. Tendulkar, Sheen Cherian, Colin O'Rourke, Jon M. Greif, Lisa Bailey, Valery Uhl, et al. "Targit-R (Retrospective): North American Experience with Intraoperative Radiation Using Low-Kilovoltage X-Rays for Breast Cancer." Annals Of Surgical Oncology 23, no. 9 (2016): 2809-15. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:  •Devising an appropriate risk adjustment model for episode-based cost measures  •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** | Section 101(f) of MACRA |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-121: Acute Kidney Injury Requiring New Inpatient Dialysis**

**Measure Information**

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| --- | --- |
| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-121 |
| **Title** | Acute Kidney Injury Requiring New Inpatient Dialysis |
| **Program** | Merit-Based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | New measure never reviewed by MAP Workgroup or used in a CMS program |
| **Measure Description:** | The Acute Kidney Injury (AKI) Requiring New Inpatient Dialysis Measure is meant to apply to clinicians who supervise dialysis procedures for AKI Medicare beneficiaries. This acute episode captures patients previously not dependent on dialysis who undergo AKI dialysis. The measure evaluates a clinician’s risk-adjusted cost for the episode group by averaging it across all episodes attributed to the clinician during the performance period. The cost of each episode is the sum of the cost to Medicare for assigned services performed by the attributed clinician and other healthcare providers during the episode window. |
| **Numerator:** | The numerator for the Acute Kidney Injury Requiring New Inpatient Dialysis measure is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all episodes attributed to a clinician. This sum is then multiplied by the national average observed episode cost to generate a dollar figure. Mathematically, this is represented as: sum of (observed episode cost/expected episode cost) \* national average observed cost. |
| **Denominator:** | The denominator for the Acute Kidney Injury Requiring New Inpatient Dialysis measure is the total number of episodes from this episode group attributed to a clinician. |
| **Exclusions:** | The following episode-level exclusions apply:  (a) The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.  (b) No main clinician is attributed the episode.  (c) The beneficiary’s date of birth is missing.  (d) The beneficiary’s death date occurred before the episode ended.  (e) The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.  (f) The IP facility is not one that is paid under the Inpatient Prospective Payment System (IPPS) when an IP stay concurrent with the trigger is found.   AKI Requiring New Inpatient Dialysis episodes are also removed using exclusions specific to the AKI Requiring New Inpatient Dialysis measure that were developed with input from the measure-specific workgroup. The “Exclusions” and “Exclusions\_Details” tabs in the [AKI Requiring New Inpatient Dialysis Measure Codes List File](https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-episode-based-cost-measures-zip-file.zip) include the list of these exclusions as well as the codes used to define them. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Nephrology |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | AKI is one of the most serious complications among hospitalized patients. It is associated with a significant number of acute and chronic conditions, worse operative outcomes, increased mortality, and high resource utilization (Lysak et al., 2017; Hsu et al., 2016). The severity of AKI is associated with worse outcomes, and negatively affects length of stay, resource use, and in-hospital and post-discharge costs. The annual expenditure of hospital-based AKI exceeds $10 billion, and each year there is approximately 600,000 cases of AKI (Lysak et al., 2017; Chawla et al., 2011). From 2000 to 2014, hospitalization rates for dialysis-requiring AKI increased by 57% among adults with diagnosed diabetes and by 64% among adults without diagnosed diabetes (Pavkov et al., 2018). In 2015, 4.3 percent of Medicare beneficiaries experienced a hospitalization complicated by AKI (USRDS, 2017). More specifically, over a span of 9 years, over 1.09 million hospitalizations involved AKI requiring dialysis (AKI-D) (Hsu, 2012). Older patients in particular have higher rates for poor outcomes, including a greater chance of nonrecovery renal function upon discharge after treatment (Coca et al., 2011). In 2009, the inpatient case fatality rate for a single episode of AKI-D was 23.5 percent (Hsu et al., 2012). Therefore, developing a measure that leads to improved care for, or prevention of, AKI-D could lead to significant cost savings.  Chawla, Lakhmir S, Richard L Amdur, Susan Amodeo, Paul L Kimmel, and Carlos E Palant. “The Severity of Acute Kidney Injury Predicts Progression to Chronic Kidney Disease.” Kidney Inernational, vol. 79, no. 12, 2011, pp. 1361-1369.  Coca, Steven G, Kerry C Cho, and Chi-yuan Hsu. “Acute Kidney Injury in the Elderly: Predisposition to Chronic Kidney Diseas and Vice Versa.” Nephron Clinical Practice, vol. 119, 2011, pp. c19-c24.  “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017  Hsu, Raymond K, Charles E McCulloch, Michael Heung, Rajiv Saran, Vahakn B Shahinian, Meda E Pavkov, Nilka Ríos Burrows, Neil R Powe, and Chi-yuan Hsu, for the Centers for Disease Control and Prevention Chronic Kidney Disease Surveillance Team. “Exploring Potential Reasons for the Temporal Trend in Dialysis-Requiring AKI in the United States.” The Clinical Journal of the American Society of Nephrology, vol. 11, no. 1, 2016, pp. 14-20.  Hsu, Raymond K, Charles E McCulloch, R Adams Dudley, Lowell J Lo, and Chi-yuan Hsu. “Temporal Changes in incidence of Dialysis-Requiring AKI.” Journal of the American Society of Nephrology, vol. 24, no. 1, 2012, pp. 37-42.  Lysak, Nicholas, Azra Bihorac, and Charles Hobson. “Mortality and Cost of Acute and Chronic Kidney Disease After Cardiac Surgery.” Current Opinion in Anesthesiology, vol. 30, no. 1, 2017, pp. 113-117.  Pavkov, Meda E, Jessica L. Harding, and Nilka Ríos Burrows. “Trends in Hospitalizations for Acute Kidney Injury — United States, 2000–2014.” MMWR Morb Mortal Wkly Rep, vol. 67, no. 10, 2018, pp. 289–293.  United States Renal Data System. 2017 USRDS annual data report: Epidemiology of kidney disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2017. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | As part of the second wave of measure development, the Renal Disease Management Clinical Subcommittee selected this measure for development during an in-person meeting in April 2018 and a corresponding smaller measure-specific workgroup provided detailed clinical input on its specifications throughout the summer of 2018. The Subcommittee chose to develop the Acute Kidney Injury Requiring New Inpatient Dialysis episode group, using as a starting point the December 2016 Draft List of MACRA Episode Groups and Trigger Codes and an accompanying document on episode-based cost measure development for the Quality Payment Program (together, the “December 2016 posting”). The Renal Disease Management Clinical Subcommittee is composed of 17 members affiliated with 14 specialty societies and were selected after a public call for nominations in February - March 2018. The workgroup comprises 11 members affiliated with 9 specialty societies.  The Renal Disease Management Clinical Subcommittee and workgroup provided input on every component of this measure through a variety of forums, including in-person meetings, webinars, and online polls. Members discussed and provided input on the selection an episode group for cost measure development, and the workgroup provided further input on: (i) episode triggers and sub-groups, (ii) episode window, (iii) service assignment rules, (iv) risk adjustors, and (v) exclusions.  In addition to the input of the Clinical Subcommittee and the measure-specific workgroup, a technical expert panel (TEP) was convened for meetings in August and December 2016, March and August 2017, and May 2018. The TEP provided high-level guidance on the concepts and direction of measure development, methods to best operationalize feedback from the patient and family committee, and actionable enhancements for feedback reports. The information gathered has been incorporated into the process and utilized by the Renal Disease Management Clinical Subcommittee during the first and second wave of episode-based cost measure development.  The measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 10-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other episode-based cost measures that underwent field testing. There were 78,221 episode-based cost measure field test reports that were distributed on the CMS Enterprise Portal. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the measure-specific workgroup members to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians (TIN-NPI) and clinician groups (TIN) across a range of case minimums.   * For TINs at a 10-episode case minimum, the mean reliability was 0.41. For TINs at a 20-episode case minimum, the mean reliability was 0.53. For TINs at a 30-episode case minimum, the mean reliability was 0.60. * For TIN-NPIs at a 10-episode case minimum, the mean reliability was 0.47. For TIN-NPIs at a 20-episode case minimum, the mean reliability was 0.60. For TIN-NPIs at a 30-episode case minimum, the mean reliability was 0.68. |
| **In which setting was this measure tested?** | Hospital inpatient |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs attributable to their decision making, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be achieved through changes in clinical practice.   According to the literature and previous feedback received through stakeholder input activities, this measure represents an area where there are opportunities for improvement. These include mitigating the rates of adverse outcomes and AKI-D readmissions, and improving early detection of AKI-D.   Reducing the rates of adverse outcomes could have a substantial impact on patient health and their subsequent healthcare costs. Post discharge, AKI patients are still at high risk for adverse events and re-hospitalization. Patients 66 years and older have a 35 percent chance of recurrent AKI hospitalization within a year (USRDS, 2017). Therefore, addressing hospital readmission related to AKI presents an opportunity to decrease health care spending. Approximately 20 percent of Medicare beneficiaries discharged from a hospital were readmitted within 30 days (Koulouridis et al., 2015). AKI patients in particular have significantly higher 30-, 60-, and 90-day hospital readmission rates than patients without AKI (Koulouridis et al., 2015). Spending for treatment can range anywhere from $10,700 to $44,335 (Silver, 2017; Lysak, 2017). AKI-D, the most severe form of AKI, results in an increase of $42,077 in hospitalization costs and an increase in length of stay by 11.5 days (Silver et al., 2017). However, USRDS reported only 1 out of every 7 Medicare patients hospitalized for AKI saw a kidney doctor after discharge. Improving follow-up protocols could potentially help prevent the onset of additional complications and readmission.   Improving awareness and early diagnosis of AKI-D could also lead to improved patient outcomes. Early identification and effective assessment during hospitalization has been proposed as a way to prevent worse outcomes and reduce expenditures (Chawla et. al., 2011).AKI-D is associated with several diagnoses ranging from septicemia to heart failure or even hypertension (Hsu et al., 2016). AKI-D also predisposes patients to chronic kidney disease (CKD) and is a strong predictor of stage 4 CKD progression (Coca et al., 2011). Chawla et al. (2011) found age increases the odds of developing CKD by 2 percent each year, while a 1 unit (mg/dl) increase of serum creatinine concentration during AKI hospitalization increases the odds of developing stage 4 CKD by 44-50 percent and having acute tubular necrosis (ATN) by 60 percent. This reveals an opportunity to improve care by identifying patients at risk prior to discharge to implement interventions strategies early.  This measure aims to address these example areas of opportunities for improvement. AKI is one of the most serious complications among hospitalized patients, and severity of this complication has been associated with worse outcomes, and negatively affects length of stay, resource use, and in-hospital and post-discharge costs. As such, the use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. There is substantial variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 17,112 Acute Kidney Injury Requiring New Inpatient Dialysis episodes for 16,063 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 10-episode case minimum.   * The mean risk-adjusted cost per episode was $41,870.27. The risk-adjusted cost at the 5th percentile was $17,571.85, compared to $88,349.80 at the 95th percentile. * For TINs, the mean measure score was $42,905.52. The score at the 5th percentile was $31,779.81, compared to $56,412.86 at the 95th percentile. * For TIN-NPIs, the mean measure score was $50,088.49. The score at the 5th percentile was $37,007.06, compared to $67,109.90 at the 95th percentile.   Chawla, Lakhmir S, Richard L Amdur, Susan Amodeo, Paul L Kimmel, and Carlos E Palant. “The Severity of Acute Kidney Injury Predicts Progression to Chronic Kidney Disease.” Kidney Inernational, vol. 79, no. 12, 2011, pp. 1361-1369.  Coca, Steven G, Kerry C Cho, and Chi-yuan Hsu. “Acute Kidney Injury in the Elderly: Predisposition to Chronic Kidney Disease and Vice Versa.” Nephron Clinical Practice, vol. 119, 2011, pp. c19-c24.  Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  Hsu, Raymond K, Charles E McCulloch, Michael Heung, Rajiv Saran, Vahakn B Shahinian, Meda E Pavkov, Nia Rios Burrows, Neil R Powe, and Chi-yuan Hsu, for the Centers for Disease Control and Prevention Chronic Kidney Disease Surveillance Team. “Exploring Potential Reasons for the Temporal Trend in Dialysis-Requiring AKI in the United States.” The Clinical Journal of the American Society of Nephrology, vol. 11, no. 1, 2016, pp. 14-20.  Koulouridis, Ioannis, Lori Lyn Price, Nicolaos E Madias, and Bertrand L Jaber. “Hospital-Acquired Acute Kidney Injury and Hospital Readmission: A Cohort Study.” American Journal of Kidney Disease, vol. 65, no. 2, 2014, pp. 275-282.  Lysak, Nicholas, Azra Bihorac, and Charles Hobson. “Mortality and Cost of Acute and Chronic Kidney Disease After Cardiac Surgery.” Current Opinion in Anesthesiology, vol. 30, no. 1, 2017, pp. 113-117.  United States Renal Data System. 2017 USRDS annual data report: Epidemiology of kidney disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2017.  Silver, Samuel A, Jin Long, Yuanchao Zheng, and Glenn M Chertow. "Cost of Acute Kidney Injury in Hospitalized Patients." Journal of Hospital Medicine, vol. 12, no. 2, 2017, pp. 70-76. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:  •Devising an appropriate risk adjustment model for episode-based cost measures  •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** | Section 101(f) of MACRA |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-122: Lower Gastrointestinal Hemorrhage**

**Measure Information**

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| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-122 |
| **Title** | Lower Gastrointestinal Hemorrhage |
| **Program** | Merit-Based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | New measure never reviewed by MAP Workgroup or used in a CMS program |
| **Measure Description:** | The Lower Gastrointestinal Hemorrhage Measure is meant to apply to clinicians who manage the inpatient care of Medicare beneficiaries hospitalized for acute lower gastrointestinal hemorrhage. This acute episode captures patients hospitalized for acute lower gastrointestinal hemorrhage. The measure evaluates a clinician’s risk-adjusted cost for the episode group by averaging it across all episodes attributed to the clinician during the performance period. The cost of each episode is the sum of the cost to Medicare for assigned services performed by the attributed clinician and other healthcare providers during the episode window. |
| **Numerator:** | The numerator for the Lower Gastrointestinal Hemorrhage measure is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all episodes attributed to a clinician. This sum is then multiplied by the national average observed episode cost to generate a dollar figure. Mathematically, this is represented as: sum of (observed episode cost/expected episode cost) \* national average observed cost. |
| **Denominator:** | The denominator for the Lower Gastrointestinal Hemorrhage measure is the total number of episodes from this episode group attributed to a clinician. |
| **Exclusions:** | The following episode-level exclusions apply:  (a) The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period to the trigger day.  (b) No main clinician is attributed the episode.  (c) The beneficiary’s date of birth is missing.  (d) The beneficiary’s death date occurred before the episode ended.  (e) The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.  (f) The trigger IP stay has the same admission date as another IP stay.  (g) The IP facility is not one that is paid under the Inpatient Prospective Payment System (IPPS).  Lower Gastrointestinal Hemorrhage episodes are also removed using exclusions specific to the Lower Gastrointestinal Hemorrhage measure that were developed with input from the measure-specific workgroup. The “Exclusions” and “Exclusions\_Details” tabs in the [Lower Gastrointestinal Hemorrhage Measure Codes List File](https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-episode-based-cost-measures-zip-file.zip) include the list of these exclusions as well as the codes used to define them. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Internal medicine |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | Gastrointestinal (GI) diseases are highly prevalent, costly, and utilize a significant amount of health care resources, especially in the Medicare population (Peery et al., 2015). Gastrointestinal bleeding is the most common cause of hospitalizations for gastrointestinal diseases, and over 500,000 patients are hospitalized annually for GI bleeds (Gralnek & Strate, 2017; Strate & Gralnek, 2016). Lower gastrointestinal bleeding (LGIB) is responsible for approximately 30 – 40 percent of all GI bleeding cases, with an incidence of around 36 per 100,000 persons (Gralnek & Strate, 2016; Parekh et al., 2014). Typically, bleeding resolves spontaneously for most patients with LGIB. However, tests and procedures to determine the bleeding source, as well as preventative treatments, may still be initiated to mitigate the risk for future catastrophic bleeding episodes (Gralnek & Strate, 2016). Patients who experience LGIB without spontaneous resolution are at risk for significant complications, including severe hemodynamic compromise, which may necessitate urgent and aggressive resuscitation and intervention measures. Morbidity and mortality also increase significantly for patients who are older and for those with preexisting medical conditions, leading to higher costs and resource use, particularly for Medicare patients (Jansen et al, 2009).   The three most common causes of LGIB are diverticulosis, vascular ectasia, and hemorrhoids (Ghassemi & Jensen, 2013). On average, $33,630 is spent per Medicare patient for further evaluation of obscure GI bleeding (OGIB) (Parekh et al., 2014). Diverticular disease as a whole is responsible for around 300,000 hospitalizations annually, costing the United States approximately 2.6 billion dollars per year (Papageorge et al., 2016).   Ghassemi, Kevin A and Dennis M Jensen. “Lower GI Bleeding: Epidemiology and Management.” Current Gastroenterology Reports vol. 15, no. 7, 2013.  Gralnek, Ian M, Ziv Neeman, and Lisa L Strate. “Acute Lower Gastrointestinal Bleeding.” The New England Journal of Medicine, no. 376, 2017, pp. 1054-1063.  “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017  Jansen, Antje, Sabine Harenberg, Uwe Grenda, and Christoph Elsing. “Risk Factors for Colonic Diverticular Bleeding: A Westernized Community Based Hospital Study.” World Journal of Gastroenterology, vol. 15, no. 4, 2009, pp. 457-461.  Papageorge, Christina M, Gregory D Kennedy, and Evie H Carchman. “National Trends in Short-term Outcomes Following Non-emergent Surgery for Diverticular Disease.” Journal of Gastrointestinal Surgery, vol. 20, 2016, pp. 1376-1387.  Parekh, Parth J, Ross C Buerlein, Rouzbeh Shams, Harlan Vingan, and David A Johnson. “Evaluation of Gastrointestinal Bleeding: Update of Current Radiologic Strategies.” World Journal of Gastrointestinal Pharmacology and Therapeutics, vol. 5, no. 4, 2014, pp. 200-208.  Peery, Ann F, Seth D Crockett, Alfred S Barrit, Evan S Dellon, Swathi Eluri, Lisa M Gangarosa, Elizabeth T Jensen, Jennifer L Lund, Sarina Pasricha, Thomas Runge, Monica Schmidt, Nicholas J Shaheen, and Robert S Sandler. “Burden of Gastrointestinal, Liver, and Pancreatic Diseases in the United States.” Gastroenterology, vol. 149, no. 7, 2015, pp. 1731-1741. Strate, Lisa L and Ian M Gralnek. “ACG Clinical Guideline: Management of Patients with Acute Lower Gastrointestinal Bleeding.” The American Journal of Gastroenterology, vol. 111, 2016, pp. 459-474. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | As part of the second wave of measure development, the Gastrointestinal Disease Management – Medical and Surgical Clinical Subcommittee selected this measure for development during an in-person meeting in April 2018 and a corresponding smaller measure-specific workgroup provided detailed clinical input on its specifications throughout the summer of 2018. The Subcommittee chose to develop the Lower Gastrointestinal Hemorrhage episode group, using as a starting point the December 2016 Draft List of MACRA Episode Groups and Trigger Codes and an accompanying document on episode-based cost measure development for the Quality Payment Program (together, the “December 2016 posting”). The Gastrointestinal Disease Management – Medical and Surgical Clinical Subcommittee is composed of 52 members affiliated with 31 specialty societies and were selected after a public call for nominations in February - March 2018. The workgroup comprises 13 members affiliated with 11 specialty societies.  The Gastrointestinal Disease Management – Medical and Surgical Clinical Subcommittee and workgroup provided input on every component of this measure through a variety of forums, including in-person meetings, webinars, and online polls. Members discussed and provided input on the selection an episode group for cost measure development, and the workgroup provided further input on: (i) episode triggers and sub-groups, (ii) episode window, (iii) service assignment rules, (iv) risk adjustors, and (v) exclusions.  In addition to the input of the Clinical Subcommittee and the measure-specific workgroup, a technical expert panel (TEP) was convened for meetings in August and December 2016, March and August 2017, and May 2018. The TEP provided high-level guidance on the concepts and direction of measure development, methods to best operationalize feedback from the patient and family committee, and actionable enhancements for feedback reports. The information gathered has been incorporated into the process and utilized by the Gastrointestinal Disease Management – Medical and Surgical Clinical Subcommittee during the first and second wave of episode-based cost measure development.  The measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 10-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other episode-based cost measures that underwent field testing. There were 78,221 episode-based cost measure field test reports that were distributed on the CMS Enterprise Portal. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the measure-specific workgroup members to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinician groups (TIN) across a range of case minimums.   * For TINs at a 10-episode case minimum, the mean reliability was 0.40. For TINs at a 20-episode case minimum, the mean reliability was 0.51. For TINs at a 30-episode case minimum, the mean reliability was 0.58. |
| **In which setting was this measure tested?** | Hospital inpatient |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs attributable to their decision making, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be achieved through changes in clinical practice.   According to the literature and previous feedback received through stakeholder input activities, LGIB as a measure represents an area where there are many opportunities for improvement. These include better methods for characterizing patients at higher risk for LGIB and rebleed, better approaches to treatment and ongoing management to reduce the incidence of recurrent bleeding for patients with complex medical histories, and improving the use of early intervention strategies to mitigate the risk for catastrophic bleeding and other associated downstream complications.   Promptly identifying patients at higher risk of LGIB and reducing risk factors when possible is one important strategy to lower the cost of care for this condition. Co-morbid diseases and adverse effects from medications, known to significantly increase the risk of bleeding, are two factors that increase the incidence and severity of LGIB, particularly in the elderly population (Chait, 2010). The presence of serious concurrent illnesses, such as cardiovascular disease, hypertension, renal disease, diabetes mellitus, and malignancy; is the second most important factor in predicting mortality for patients with LGIB (Chait, 2010). In a study evaluating the impact of seven common comorbidities (obesity, hypertension, hypercholesterolemia, hyperuricemia, impaired glucose utilization, arteriosclerosis, and immunosuppression), having three or more concomitant diseases was associated with a significantly higher risk of bleeding. (Jansen et al., 2009).   Closely monitoring a patient’s medical and drug history is an approach that can reduce the incidence of recurrent bleeding and the associated costs. The use of multiple medications is common in the elderly population. As the population ages, the use of antithrombotic drugs (ATDs) and nonsteroidal anti-inflammatory drugs (NSAIDs) increases as they are prescribed to treat other ailments associated with aging, such as cerebrovascular disease, atherosclerotic heart disease, or arthritis. However, the use of ATDs and NSAIDs are known to increase the risk of both an initial episode of LGIB and rebleed, leaving clinicians faced with a dilemma of how best to approach patients in need of multi-modal therapy. Novel oral anticoagulants (NOACs) such as direct thrombin inhibitor (dabigatran) and direct factor Xa inhibitors (rivaroxaban and edoxaban)—used to prevent embolic stroke in non-valvular atrial fibrillation or treat venous thromboembolism—are associated with a high risk of gastrointestinal bleeding, especially for patients 75 years and older (Cheung & Leung, 2017). Taki et al. (2017) also found LGIB was significantly associated with NSAIDs, low-dose aspirin, and warfarin use, with this risk increasing for atrial fibrillation patients over 75 years old. Careful attention needs to be given to the management of comorbid illness and prescribed drug history to reduce the likelihood of recurrent bleeding. Furthermore, clinicians are in need of improved access to information on risk comparisons at the individual patient level to make better informed decisions about management for patients at increased risk for LGIB, secondary to multimodal drug regimens and multiple comorbid conditions.   Lastly, establishing effective intervention strategies for LGIB risk factors may prevent the onset of additional complications. Risk factor models for LGIB predictors are not as well studied for LGIB as they are for upper gastrointestinal bleeding, however, some studies have found the likelihood of adverse outcomes for LGIB increases with the number of risk factors present. (Gralnek & Strate, 2017). Two of the main complications of diverticular disease, diverticulitis and diverticular bleeding, lead gastrointestinal indications for hospital admissions (Wheat & Strate, 2016). In 2009, there were around 2.7 million outpatient clinical visits for diverticular disease, accounting for the 6th highest diagnosis for all gastrointestinal diseases (Peery et al., 2012). Given that diverticular disease is the most common cause of LGIB, particularly in the elderly, better management of diverticular disease may significantly reduce the initial onset or severity of bleeding. This holds especially true for patients with high levels of risk factors, including comorbid conditions and multimodal drug regimens. With the median hospital cost for diverticulitis around $6,000 per patient and costing an estimated total of $2.6 billion per year in inpatient costs (Peery et al., 2012). Establishing a more standardized approach to evaluating and managing LGIB risk factors could potentially moderate downstream complications and costs associated LGIB.  This measure aims to address these example areas of opportunities for improvement. GI diseases are highly prevalent, costly, and utilize a significant amount of health care resources, especially in the Medicare population. As such, the use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. There is substantial variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 22,012 Lower Gastrointestinal Hemorrhage episodes for 20,834 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 10-episode case minimum.   * The mean risk-adjusted cost per episode was $11,080.24. The risk-adjusted cost per episode at the 5th percentile was $6,559.27, compared to $22,644.14 at the 95th percentile. * For TINs, the mean measure score was $10,897.28. The score at the 5th percentile was $9,048.46, compared to $12,904.88 at the 95th percentile. * For TIN-NPIs, the mean measure score was $12,239.58. The score at the 5th percentile was $9,898.69, compared to $15,373.85 at the 95th percentile.   Chait, Maxwell M. “Lower Gastrointestinal Bleeding in the Elderly.” World Journal of Gastrointestinal Endoscopy, vol. 2, no. 5, 2010, pp. 147-154.  Cheung, Ka-Shing and Wai K Leung. “Gastrointestinal Bleeding in Patients on Novel Oral Anticoagulants: Risk, Prevention and Management.” World Journal of Gastroenterology, no. 23, vol. 11, 2017, pp. 1954-1963.  Gralnek, Ian M, Ziv Neeman, and Lisa L Strate. “Acute Lower Gastrointestinal Bleeding.” The New England Journal of Medicine, no. 376, 2017, pp. 1054-1063.  Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  Jansen, Antje, Sabine Harenberg, Uwe Grenda, and Christoph Elsing. “Risk Factors for Colonic Diverticular Bleeding: A Westernized Community Based Hospital Study.” World Journal of Gastroenterology, vol. 15, no. 4, 2009, pp. 457-461.  Peery, Anne F, Evan S Dellon, Jennifer Lund, Seth D Crockett, Christopher E McGowan, William J Bulsiewicz, Lisa M Gangarosa, Michelle T Thiny, Karyn Stizenberg, Douglas R Morgan, Yehuda Ringel, Hanna P Kim, Marco daCosta DiVonaventura, Charlotte F Carroll, Jeffery K Allen, Suzanne F Cook, Robert S Sandler, Michael D Kappelman, Nicholas J Shaheen. “Burden of Gastrointestinal Disease in the United States: 2012 Update.” Gastroenterology, vol. 143, no. 5, 2012, pp. 1179-1187.  Taki, Masato, Tadyuki Oshima, Katsuyuki Tozawa, Yukako Taniguchi, Toshihiko Tomita, Yoshio Ohda, Hirokazu Fukui, Jiro Watari, and Hiroto Miwa. “Analysis of Risk Factors for Colonic Diverticular Bleeding and Recurrence.” Medicine (Baltimore), vol. 96, no. 38, 2017, pp. e8090.  Wheat, Chelle L and Lisa L Strate. “Trends in Hospitalization for Diverticulitis and Diverticular Bleeding in the United Sates from 2000 to 2010.” Clinical Gastroenterology and Hepatology, vol. 14, no. 1, 2016, pp. 96-103. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:  •Devising an appropriate risk adjustment model for episode-based cost measures  •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** | Section 101(f) of MACRA |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-123: Renal or Ureteral Stone Surgical Treatment**

**Measure Information**

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| --- | --- |
| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-123 |
| **Title** | Renal or Ureteral Stone Surgical Treatment |
| **Program** | Merit-Based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | New measure never reviewed by MAP Workgroup or used in a CMS program |
| **Measure Description:** | The Renal or Ureteral Stone Surgical Treatment Measure is meant to apply to clinicians who perform this procedure for Medicare beneficiaries. This procedural episode captures patients who receive surgical treatment for renal or ureteral stones. The measure evaluates a clinician’s risk-adjusted cost for the episode group by averaging it across all episodes attributed to the clinician during the performance period. The cost of each episode is the sum of the cost to Medicare for assigned services performed by the attributed clinician and other healthcare providers during the episode window. |
| **Numerator:** | The numerator for the Renal or Ureteral Stone Surgical Treatment measure is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all episodes attributed to a clinician. This sum is then multiplied by the national average observed episode cost to generate a dollar figure. Mathematically, this is represented as: sum of (observed episode cost/expected episode cost) \* national average observed cost. |
| **Denominator:** | The denominator for the Renal or Ureteral Stone Surgical Treatment measure is the total number of episodes from this episode group attributed to a clinician. |
| **Exclusions:** | The following episode-level exclusions apply:  (a) The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.  (b) No main clinician is attributed the episode.  (c) The beneficiary’s date of birth is missing.  (d) The beneficiary’s death date occurred before the episode ended.  (e) The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.  (f) The episode trigger claim was not performed in an ambulatory/office-based care, IP hospital, OP hospital, or ASC setting based on its place of service.  (g) The IP facility is not one that is paid under the Inpatient Prospective Payment System (IPPS) when an IP stay concurrent with the trigger is found. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Urology |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | Urinary stone disease, or urolithiasis, is one of the most common and expensive urologic conditions. In the United States, one in 11 people will have a history of urinary stones in their lifetime, and approximately 50 percent of patients will experience a recurrence within 5 years of their first urinary stone (Scales et al., 2012). Urolithiasis is the second most expensive urologic problem, accounting for $2.1 billion of $11 billion spent annually on urologic diseases (NIH, 2007). From 2003 to 2007, the total expenditure among Medicare beneficiaries 65 and older for treatment of urinary tract stones exceeded $1.04 billion each year (HHS, 2012). Urolithiasis tends to be more severe in geriatric patients, who also have a two-fold increase risk of being hospitalized for treatment (Arampatzis et al., 2012). The treatment of urinary stones has a significant economic impact on health care spending, making this an important measure to establish to reduce costs related to renal and ureteral stone surgical treatment.   Arampatzis, Spyridon, Gregor Lindner, Filiz Irmak, Georg-Christian Funk, Heinz Zimmermann, and Aristomenis K Exadaktylos. “Geriatric Urolithiasis in the Emergency Department: Risk Factors for Hospitalization and Emergency Management Patterns of Acute Urolithiasis.” BMC Nephrology, no.13, 2012, pp. 117.  “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017  Table 14-46. Economic Impact of Urologic Disease. In:Chapter 14. Litwin MS, Saigal CS, editors. Urologic Diseases in America. US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases. Washington, DC: US Government Printing Office, 2012; NIH Publication No. 12-7865 pp. 486.   “Urologic Diseases Cost Americans $11 Billion a Year.” National Institutes of Health, 2007.  Scales, Jr. Charles D, Alexandria C Smith, Janet M Hanley, Christopher S Saigal, and Urologic Diseases in America Project. “Prevalence of Kidney Stones in the United States.” European Urology, vol. 62, no. 1, 2012, pp. 160-165. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | As part of the second wave of measure development, the Urologic Disease Management Clinical Subcommittee selected this measure for development during an in-person meeting in April 2018 and a corresponding smaller measure-specific workgroup provided detailed clinical input on its specifications throughout the summer of 2018. The Subcommittee chose to develop the Renal or Ureteral Stone Surgical Treatment episode group, using as a starting point the December 2016 Draft List of MACRA Episode Groups and Trigger Codes and an accompanying document on episode-based cost measure development for the Quality Payment Program (together, the “December 2016 posting”). The Urologic Disease Management Clinical Subcommittee is composed of 26 members affiliated with 22 specialty societies and were selected after a public call for nominations in February - March 2018. The workgroup comprises 12 members affiliated with 9 specialty societies.  The Urologic Disease Management Clinical Subcommittee and workgroup provided input on every component of this measure through a variety of forums, including in-person meetings, webinars, and online polls. Members discussed and provided input on the selection an episode group for cost measure development, and the workgroup provided further input on: (i) episode triggers and sub-groups, (ii) episode window, (iii) service assignment rules, (iv) risk adjustors, and (v) exclusions.  In addition to the input of the Clinical Subcommittee and the measure-specific workgroup, a technical expert panel (TEP) was convened for meetings in August and December 2016, March and August 2017, and May 2018. The TEP provided high-level guidance on the concepts and direction of measure development, methods to best operationalize feedback from the patient and family committee, and actionable enhancements for feedback reports. The information gathered has been incorporated into the process and utilized by the Urologic Disease Management Clinical Subcommittee during the first and second wave of episode-based cost measure development.  The measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 10-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other episode-based cost measures that underwent field testing. There were 78,221 episode-based cost measure field test reports that were distributed on the CMS Enterprise Portal. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the measure-specific workgroup members to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians (TIN-NPI) and clinician groups (TIN) across a range of case minimums.   * For TINs at a 10-episode case minimum, the mean reliability was 0.77. For TINs at a 20-episode case minimum, the mean reliability was 0.84. For TINs at a 30-episode case minimum, the mean reliability was 0.87. * For TIN-NPIs at a 10-episode case minimum, the mean reliability was 0.64. For TIN-NPIs at a 20-episode case minimum, the mean reliability was 0.74. For TIN-NPIs at a 30-episode case minimum, the mean reliability was 0.80. |
| **In which setting was this measure tested?** | Hospital outpatient department (HOD), Hospital inpatient |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs attributable to their decision making, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be achieved through changes in clinical practice.   According to the literature and previous feedback received through stakeholder input activities, this measure represents an area with opportunities for improvement. These include improving the quality of care in outpatient settings to mitigate costs and establishing treatment guidelines to reduce procedure variation and recurrence.   Shifting stone treatment to outpatient settings and ensuring that outpatient treatment is comparable to the quality of care received in the inpatient setting is one method to obtain both cost-efficient advantages and improved outcomes. Advanced technology has improved the efficiency of stone surgery, allowing more procedures to be done in the outpatient setting (Hollingsworth et al., 2009). As a result, the number of ambulatory evaluation and management visits for urinary stones has increased while the rate of inpatient hospitalizations has decreased. In 2013, approximately 23,000 Medicare beneficiaries were hospitalized with a primary diagnosis of kidney stones while approximately 1.1 million received ambulatory and outpatient evaluation and management, a 75 percent increase from 2004 (NIH, 2017).With this shift, optimizing the quality of care in outpatient settings could help preserve or increase the cost advantages of outpatient care. One way to improve the quality of care in outpatient settings is to improve adherence to medical guidelines, which if not followed could delay the provision of urgent intervention and lead to additional costs. A study examining adherence to clinical guidelines found that guideline-recommended care was absent or varied widely among patients who received outpatient services for kidney stone treatment (Scales et al., 2015). Only 40 percent of emergency department visits completed all three guideline-based laboratory tests, with utilization of each test widely varying, and pharmacologic therapy for facilitating stone passage was prescribed for only 17 percent of eligible visits. These shortcomings to care delivery could increase costs and temporary disability, suggesting there is an opportunity for improvement and substantial cost savings (Strope et al., 2009).   Establishing guidelines for treatment selection could mitigate variation in stone management and reduce rates of stone recurrence. Minimally invasive procedures have become the preferred mode of treatment for stone removal. The three most common procedures are extracorporeal shockwave lithotripsy (ESWL), ureteroscopy (URS), and percutaneous nephrolithotomy (PCNL). ESWL and URS are highly effective treatments but literature indicates wide variation on the determinants for treatment selection. Initially, ESWL was the preferred treatment option, but URS has recently become more favorable and may be the better option, with evidence showing longer stone-free rates and cost effectiveness when compared to ESWL (Matlaga et al., 2012). Five studies have found URS to have higher stone-free rates and lower costs compared to ESWL for proximal stones. For distal ureteral stones, URS was also found to have lower costs compared to ESWL (Matlaga et al., 2012). Furthermore, a repeat procedure was 1.73 times more likely to be performed for patients who initially received ESWL compared to patients who underwent URS (Matlaga et al., 2014). While stone size and location are the most important clinical factors for treatment selection, studies have found non-clinical factors may also play a role in treatment selection. Scales et al. (2011) found that women were less likely to undergo URS while patients with multiple comorbidities were more likely to undergo URS. In addition, less experienced clinicians were more likely to use URS, while clinicians performing high volumes of either treatment option were more likely to select the treatment option most familiar to them.  This measure aims to address these example areas of opportunities for improvement. From 2003 to 2007, the total expenditure among Medicare beneficiaries 65 and older for treatment of urinary tract stones exceeded $1.04 billion each year. As such, the use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. There is substantial variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 92,753 Renal or Ureteral Stone Surgical Treatment episodes for 77,502 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 10-episode case minimum.   * The mean risk-adjusted cost per episode was $6,698.32. The mean risk-adjusted cost per episode at the 5th percentile was $4,032.08, compared to $11,717.64 at the 95th percentile. * For TINs, the mean measure score was $6,718.48. The score at the 5th percentile was $5,565.06, compared to $8,331.51 at the 95th percentile. * For TIN-NPIs, the mean measure score was $6,699.77. The score at the 5th percentile was $5,465.05, compared to $8,354.88 at the 95th percentile.   Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  Hollingsworth, John M, Zaojun Ye, Sarah L Krein, Ann T Hollenbeck, and Brent K Hollenbeck. “Urologists Ownership of Ambulatory Surgery Centers and Urinary Stone Surgery Use.” Health Services Research Journal vol. 44, no. 4, 2009, pp. 1370-1384.  Matlaga, Brian R, Jeroen P Jansen, Lisa M Meckley, Thomas W Byrne, and james E Lingeman."Economic Outcomes of Treatment for Ureteral and Renal Stones: A Systematic Literature Review." The Journal of Urology, vol. 188, no. 2, 2012, pp. 449-454.  Scales, Jr. Charles D, Jonathan Bergman, Stacey Carter, Gregory Jack, Christopher S Saigal, Mark Litwin, and the NIDDK Urologic Diseases in America Project. “Quality of Acute Care for Patients with Urinary Stones in the United States.” Urology vol. 86, no. 5, 2015, pp. 914-921.  Scales, Jr. Charles D, Tracey L Krupski, Lesley H Curtis, Brian Matlaga, Yair Lotan, Margaret S Pearle, Christopher Saigal, and Glenn M Preminger. “Practice Variation in the Surgical Management of Urinary Lithiasis.” The Journal of Urology, vol. 186, no. 1, 2011, pp. 146-150.  Strope, Seth A, J Stuart Wolf Jr., Gary J Faerber, William W. Roberts, and Brent K Hollenbeck. “Changing Practice Locations for Upper Urinary Tract Stone Disease.” The Journal of Urology, vol. 182, no. 3, 2009, pp. 1005-1011.  “Urologic Diseases in America. Kidney Stones.” National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2017 |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:  •Devising an appropriate risk adjustment model for episode-based cost measures  •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** | Section 101(f) of MACRA |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-126: Hemodialysis Access Creation**

**Measure Information**

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| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-126 |
| **Title** | Hemodialysis Access Creation |
| **Program** | Merit-Based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | New measure never reviewed by MAP Workgroup or used in a CMS program |
| **Measure Description:** | The Hemodialysis Access Creation Measure is meant to apply to clinicians who perform this procedure for Medicare beneficiaries. This procedural episode captures patients who undergo a procedure for the creation of graft or fistula access for long-term hemodialysis. The measure evaluates a clinician’s risk-adjusted cost for the episode group by averaging it across all episodes attributed to the clinician during the performance period. The cost of each episode is the sum of the cost to Medicare for assigned services performed by the attributed clinician and other healthcare providers during the episode window. |
| **Numerator:** | The numerator for the Hemodialysis Access Creation measure is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all episodes attributed to a clinician. This sum is then multiplied by the national average observed episode cost to generate a dollar figure. Mathematically, this is represented as: sum of (observed episode cost/expected episode cost) \* national average observed cost. |
| **Denominator:** | The denominator for the Hemodialysis Access Creation measure is the total number of episodes from this episode group attributed to a clinician. |
| **Exclusions:** | The following episode-level exclusions apply:  (a) The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.  (b) No main clinician is attributed the episode.  (c) The beneficiary’s date of birth is missing.  (d) The beneficiary’s death date occurred before the episode ended.  (e) The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.  (f) The episode trigger claim was not performed in an ambulatory/office-based care, IP hospital, OP hospital, or ASC setting based on its place of service. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Vascular surgery |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | Because of a growing and aging population, the prevalence of beneficiaries with end-stage renal disease (ESRD) and enrollment for dialysis is rising (Ahmed et al., 2018). In 2015, there were 124,114 newly reported cases of ESRD, reaching a total of 703,243 people with ESRD for the year (NIH, 2017). Over 207,000 of those individuals were aged 65 and older, and accounted for approximately half of all individuals who received hemodialysis access for that year, which is a 22 percent increase from 2010 (NIH, 2017). The number ESRD cases increases by approximately 20,000 per year, with individuals aged 65 to 75 having the highest prevalence of ESRD and individuals aged 75 and older having the highest rate of new ESRD cases (NIH, 2017).   Though the ESRD population is less than 1 percent of the total Medicare population, they accounted for 7.1 percent of Medicare spending in 2015. The United States Renal Data System (USRDS) 2017 Annual Data Report found that Medicare spent $33.9 billion on beneficiaries with ESRD, and when combined with the cost of Chronic Kidney Disease (CKD), a total of over $98 billion. For hemodialysis care, Medicare spent a total of $88,750 per patient per year, excluding unknown modalities, and $1,677 for vascular access procedures (procedures to place or create vascular accesses and procedures to maintain them) (NIH, 2017).   Ahmed, Osman, Ketan Patel, Rana Rabei, Mikin V Patel, Michael Ginsburg, Bishir Clayton, and Bulent Arslan. "Hemodialysis Access Maintenance in the Medicare Population: An Analysis Over a Decade of Trends by Provider Specialty and Site of Service." Journal Of Vascular And Interventional Radiology, JVIR vol. 29, no. 2, 2018, pp. 159-169  “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017  United States Renal Data System, 2017 Annual Data Report: Epidemiology of Kidney Disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2017. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | As part of the second wave of measure development, the Peripheral Vascular Disease Management Clinical Subcommittee selected this measure for development during an in-person meeting in April 2018 and a corresponding smaller measure-specific workgroup provided detailed clinical input on its specifications throughout the summer of 2018. The Subcommittee chose to develop the Hemodialysis Access Creation episode group, using as a starting point the December 2016 Draft List of MACRA Episode Groups and Trigger Codes and an accompanying document on episode-based cost measure development for the Quality Payment Program (together, the “December 2016 posting”). The Peripheral Vascular Disease Management Clinical Subcommittee is composed of 32 members affiliated with 22 specialty societies and were selected after a public call for nominations in February - March 2018. The workgroup comprises 12 members affiliated with 9 specialty societies.  The Peripheral Vascular Disease Management Clinical Subcommittee and workgroup provided input on every component of this measure through a variety of forums, including in-person meetings, webinars, and online polls. Members discussed and provided input on the selection an episode group for cost measure development, and the workgroup provided further input on: (i) episode triggers and sub-groups, (ii) episode window, (iii) service assignment rules, (iv) risk adjustors, and (v) exclusions.  In addition to the input of the Clinical Subcommittee and the measure-specific workgroup, a technical expert panel (TEP) was convened for meetings in August and December 2016, March and August 2017, and May 2018. The TEP provided high-level guidance on the concepts and direction of measure development, methods to best operationalize feedback from the patient and family committee, and actionable enhancements for feedback reports. The information gathered has been incorporated into the process and utilized by the Peripheral Vascular Disease Management Clinical Subcommittee during the first and second wave of episode-based cost measure development.  The measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 10-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other episode-based cost measures that underwent field testing. There were 78,221 episode-based cost measure field test reports that were distributed on the CMS Enterprise Portal. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the measure-specific workgroup members to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians (TIN-NPI) and clinician groups (TIN) across a range of case minimums.   * For TINs at a 10-episode case minimum, the mean reliability was 0.50. For TINs at a 20-episode case minimum, the mean reliability was 0.59. For TINs at a 30-episode case minimum, the mean reliability was 0.65. * For TIN-NPIs at a 10-episode case minimum, the mean reliability was 0.48. For TIN-NPIs at a 20-episode case minimum, the mean reliability was 0.60. For TIN-NPIs at a 30-episode case minimum, the mean reliability was 0.68. |
| **In which setting was this measure tested?** | Ambulatory surgery center, Hospital outpatient department (HOD), Hospital inpatient |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs attributable to their decision making, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be achieved through changes in clinical practice.   According to the literature and previous feedback received through stakeholder input activities, this measure represents an area where there are opportunities for improvement. These include the mitigation of stenosis and thrombosis, which can lead to long-term consequences for future access placement or patient morbidity, and preventing other complications requiring long-term management or a return to the operating room such as aneurysm, infection, or steal syndrome.   Stenosis and thrombosis are the most frequent complications of arteriovenous fistulas (AVFs), which if mitigated could reduce costs and improve quality of life. The incidence of thrombosis is between 17-25 percent while the incidence of stenosis is between 14-42 percent (Stolic, 2013). Combined, stenosis and thrombosis make up more than half of all vascular access complications for hemodialysis patients. Thrombosis is the most common complication and is a major source of morbidity, hospitalization, and costs (Sidawy et al., 2008). Untreated stenosis or thrombosis can threaten the patency of a fistula, increasing the likelihood for a patient to need a new surgical creation. The estimated cost for an AVF insertion can range anywhere from $1,500 to $5,000 (Solid & Carlin, 2012). Lowering the incidence of stenosis and thrombosis could yield reductions in hospitalizations and Medicare costs.   The vascular access portal is susceptible to infections, bleeding, and other complications; and preventing these onsets would reduce the costs associated with hospitalization and additional interventional procedures (Schild, 2011). One study found the incidence of ischemic neuropathy, steal syndrome, aneurysm, and infection to range between 1-10 percent (Stolic, 2013). Infections are the second leading cause of hospitalization and deaths in ESRD patients (Sibbel et al., 2016). When an AVF or graft stops working, patients must receive dialysis through a central venous catheter (CVC) until a new fistula or graft can be sustained. However, with a catheter, hemodialysis patients have a 5 to 10-fold increased risk of hospitalization for serious infections compared to dialysis with a fistula (Nanalkov et al., 2013). The USRDS 2017 Annual Data Report found hospitalization accounts for around 33% of total Medicare expenditures for dialysis patients (NIH, 2017). Approximately 80,000 CVC-related bloodstream infections occur in the United States every year which could correspond to a significant amount of costs (Mernel et al., 2009). On average, hospitalizations for catheter-related bacteremia cost $23,000, which could translate to a cumulative cost of around $1.8 billion (Allon et al., 2011).  This measure aims to address these example areas of opportunities for improvement. Though the ESRD population is less than 1 percent of the total Medicare population, they accounted for 7.1 percent of Medicare spending in 2015. As such, the use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 40,120 Hemodialysis Access Creation episodes for 35,717 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 10-episode case minimum.   * The mean risk-adjusted cost per episode was $8,723.60. The mean risk-adjusted cost per episode at the 5th percentile was $1,756.03, compared to $23,732.41 at the 95th percentile. * For TINs, the mean measure score was $8,735.38. The score at the 5th percentile was $6,003.37, compared to $11,977.70 at the 95th percentile. * For TIN-NPIs, the mean measure score was $8,746.06. The score at the 5th percentile was $5,734.98, compared to $12,479.82 at the 95th percentile.   Ahmed, Osman, Ketan Patel, Rana Rabei, Mikin V Patel, Michael Ginsburg, Bishir Clayton, and Bulent Arslan. "Hemodialysis Access Maintenance in the Medicare Population: An Analysis Over a Decade of Trends by Provider Specialty and Site of Service." Journal Of Vascular And Interventional Radiology, JVIR vol. 29, no. 2, 2018, pp. 159-169.  Allon, Michael, Lesley Dinwiddie, Eduardo Jr. Lacson, Derrick L. Latos, Charmaine E. Lok, Theodore Steinman, and Daniel E Weiner. "Medicare reimbursement policies and hemodialysis vascular access outcomes: a need for change." Journal Of The American Society Of Nephrology: JASN, vol. 22, no. 3, 2011, pp.426-430.  Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  Mernel, Leonard A., Michael Allon, Emilio Bouza, Donald E. Craven, Patricia Flynn, Naomi P. O’Grady, Issam I. Raad, Bart J. A. Rijnders, Robert J. Sheretz, and David K. Warren. “Clinical Practice Guidelines for the Diagnosis and Management of Intravascular Catheter-Related Infection: 2009 Update by the Infectious Diseases Society of America.” Clinical Infectious Disease, vol. 49, no. 1, 2009, pp. 1 - 45.  Napalkov, Pavel, Diana M. Felici, Laura K. Chu, Joan R. Jacobs, and Susan M. Begelman. “Incidence of Catheter-related Complications in Patients with Central Venous or Hemodialysis Catheters: A Health Care Claims Database Analysis.” BMC Cardiovascular Disorders, vol. 13, 2013, pp. 86.  Schild, A Frederick. "Maintaining Vascular Access: The Management of Hemodialysis Arteriovenous Grafts." Journal of Vascular Access, vol. 11, no. 2, 2011, pp. 92-99.  Sibbel, Scott, Reiko Sato, Abigail Hunt, Wendy Turenne, and Steven M Brunelli. "The clinical and economic burden of pneumonia in patients enrolled in Medicare receiving dialysis: a retrospective, observational cohort study." BMC Nephrology, vol. 17, no. 1, 2016, pp. 199.  Sidawy, Anton N, Lawrence M Spergel, Anatole Besarab, Michael Allon, William C Jennings, Frank T, Jr Padberg, and Enrico Ascher, et al. "The Society for Vascular Surgery: clinical practice guidelines for the surgical placement and maintenance of arteriovenous hemodialysis access." Journal Of Vascular Surgery, vol. 48, no. 5 Suppl, 2008, pp. 2S-25S.  Solid, Craig A. and Caroline Carlin. "Timing of arteriovenous fistula placement and Medicare costs during dialysis initiation." American Journal Of Nephrology, vol. 35, no. 6, 2012, pp. 498-508.  Stolic, Radojica. "Most Important Chronic Complications of Arteriovenous Fistulas for Hemodialysis." Medical Principles and Practice, vol. 22, 2013, pp. 220 – 228.  United States Renal Data System, 2017 Annual Data Report: Epidemiology of Kidney Disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2017. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:  •Devising an appropriate risk adjustment model for episode-based cost measures  •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** | Section 101(f) of MACRA |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-137: Elective Primary Hip Arthroplasty**

**Measure Information**

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| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-137 |
| **Title** | Elective Primary Hip Arthroplasty |
| **Program** | Merit-Based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | New measure never reviewed by MAP Workgroup or used in a CMS program |
| **Measure Description:** | The Elective Primary Hip Arthroplasty Measure is meant to apply to clinicians who perform this procedure for Medicare beneficiaries. This procedural episode captures patients who undergo elective primary hip arthroplasty. The measure evaluates a clinician’s risk-adjusted cost for the episode group by averaging it across all episodes attributed to the clinician during the performance period. The cost of each episode is the sum of the cost to Medicare for assigned services performed by the attributed clinician and other healthcare providers during the episode window. |
| **Numerator:** | The numerator for the Elective Primary Hip Arthroplasty measure is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all episodes attributed to a clinician. This sum is then multiplied by the national average observed episode cost to generate a dollar figure. Mathematically, this is represented as: sum of (observed episode cost/expected episode cost) \* national average observed cost. |
| **Denominator:** | The denominator for the Elective Primary Hip Arthroplasty measure is the total number of episodes from this episode group attributed to a clinician. |
| **Exclusions:** | The following episode-level exclusions apply:  (a) The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.  (b) No main clinician is attributed the episode.  (c) The beneficiary’s date of birth is missing.  (d) The beneficiary’s death date occurred before the episode ended.  (e) The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.  (f) The episode trigger claim was not performed in an ambulatory/office-based care, IP hospital, OP hospital, or ASC setting based on its place of service.  (g) The IP facility is not one that is paid under the Inpatient Prospective Payment System (IPPS) when an IP stay concurrent with the trigger is found.  Elective Primary Hip Arthroplasty episodes are also removed using exclusions specific to the Elective Primary Hip Arthroplasty measure that were developed with input from the measure-specific workgroup. The “Exclusions” and “Exclusions\_Details” tabs in the [Elective Primary Hip Arthroplasty Measure Codes List File](https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-episode-based-cost-measures-zip-file.zip) include the list of these exclusions as well as the codes used to define them. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Orthopedic surgery |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | Joint replacement surgery is a common procedure in the older population. According to a 2015 study, the 2010 prevalence of total hip replacement in the United States population was 0.83 percent, and increased with age, reaching 1.49 percent at sixty years, and 5.87 percent at ninety years of age. There were an estimated 2.5 million individuals with total hip replacement in 2010, and the demand for primary Total Hip Arthroplasties (THAs) is estimated to grow by 174 percent between 2005 and 2030 (Kremers et al., 2015; Kurtz et al., 2007).   Studies also suggest that hip arthroplasty accounts for a significant share of Medicare spending. A 2008 study found that the utilization of elective joint arthroplasty increases and Medicare becomes the primary payer after age 65 for these arthroplasties (Matlock, 2008). A 2016 study estimated that CMS payments per episode totaled between $18,030 and $21,661, depending on the presence of obesity (Meller et al., 2016). Hospital reimbursement for total hip replacement and knee replacement represented the largest payment group for CMS in 2008, combining for 4.6% of total payments (AHD, 2013).   American Hospital Directory (AHD). American Hospital Directory, 2013. Available at: <http://www.ahd.com/ip_ipps08.html>. Accessed January 29, 2014.  “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017  Kremers et al. (2015). “Prevalence of Total Hip and Knee Replacement in the United States.” Journal of Bone and Joint Surgery 97(17):1386-97.  Kurtz et al. (2007). “Projections of primary and revision hip and knee arthroplasty in the United States from 2005 to 2030.” Journal of Bone and Joint Surgery 89(4):780-5.  Matlock, Dan. (2008). “Utilization of Elective Hip and Knee Arthroplasty by Age and Payer.” Clinical Orthopaedics and Related Research 466(4): 914-919.  Meller, M. M., et al. (2016). "Surgical Risks and Costs of Care are Greater in Patients Who Are Super Obese and Undergoing THA." Clinical Orthopaedics and Related Research 474(11): 2472-2481. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | As part of the second wave of measure development, the Musculoskeletal Disease Management – Non-Spine Clinical Subcommittee selected this measure for development during an in-person meeting in April 2018 and a corresponding smaller measure-specific workgroup provided detailed clinical input on its specifications throughout the summer of 2018. The Subcommittee chose to develop the Elective Primary Hip Arthroplasty episode group, using as a starting point the December 2016 Draft List of MACRA Episode Groups and Trigger Codes and an accompanying document on episode-based cost measure development for the Quality Payment Program (together, the “December 2016 posting”). The Musculoskeletal Disease Management – Non-Spine Clinical Subcommittee is composed of 29 members affiliated with 26 specialty societies and were selected after a public call for nominations in February - March 2018. The workgroup comprises 15 members affiliated with 14 specialty societies.  The Musculoskeletal Disease Management – Non-Spine Clinical Subcommittee and workgroup provided input on every component of this measure through a variety of forums, including in-person meetings, webinars, and online polls. Members discussed and provided input on the selection an episode group for cost measure development, and the workgroup provided further input on: (i) episode triggers and sub-groups, (ii) episode window, (iii) service assignment rules, (iv) risk adjustors, and (v) exclusions.  In addition to the input of the Clinical Subcommittee and the measure-specific workgroup, a technical expert panel (TEP) was convened for meetings in August and December 2016, March and August 2017, and May 2018. The TEP provided high-level guidance on the concepts and direction of measure development, methods to best operationalize feedback from the patient and family committee, and actionable enhancements for feedback reports. The information gathered has been incorporated into the process and utilized by the Musculoskeletal Disease Management – Non-Spine Clinical Subcommittee during the first and second wave of episode-based cost measure development.  The measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 10-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other episode-based cost measures that underwent field testing. There were 78,221 episode-based cost measure field test reports that were distributed on the CMS Enterprise Portal. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the measure-specific workgroup members to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians (TIN-NPI) and clinician groups (TIN) across a range of case minimums.   * For TINs at a 10-episode case minimum, the mean reliability was 0.85. For TINs at a 20-episode case minimum, the mean reliability was 0.90. For TINs at a 30-episode case minimum, the mean reliability was 0.93. * For TIN-NPIs at a 10-episode case minimum, the mean reliability was 0.78. For TIN-NPIs at a 20-episode case minimum, the mean reliability was 0.86. For TIN-NPIs at a 30-episode case minimum, the mean reliability was 0.89. |
| **In which setting was this measure tested?** | Hospital inpatient |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs attributable to their decision making, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be achieved through changes in clinical practice.   According to the literature and previous feedback received through stakeholder input activities, this measure represents an area where there are significant opportunities for improvement. Opportunities for improvement for elective primary hip arthroplasty include mitigating of the use and variation of institutional post-acute care (e.g., having patients receive post-procedure treatment in a home health or outpatient therapy setting), reducing treatment variation, particularly to address the overuse of THAs; and increasing the use of less invasive surgical techniques.   The use of post-acute care accounts for a significant portion of the costs and cost variability for a THA episode (Shubeck et al., 2018). Two evaluations have demonstrated that decreasing the use of institutional post-acute care, either in inpatient rehabilitation facilities (IRFs) or in skilled nursing facilities (SNFs), lowers the cost of care. The cost of a THA episode was higher for patients receiving rehabilitation at IRFs or SNFs compared to a home health agency (Sabeh et al., 2017).   The high degree of variability in THA treatment reveals an opportunity to improve the quality of care and cost savings. Developing an appropriate criteria for THA could help identify patients who truly need the procedure and reduce overutilization (Ghomrawi et al., 2012). Findings show significant variation in joint replacement treatment by geography, patient preference, and clinical criteria followed by surgeons (Cobos, 2010; Mota, 2012). One study found surgeons followed different criteria when recommending surgery to patients with different severity levels, and that 25 percent of THAs performed could be considered inappropriate (Cobos et al., 2010). The establishment of defined post-acute care pathways led to lower costs in one study analyzing Bundled Payments for Care Improvement (BPCI) episodes (Tessier et al., 2016). An estimated $19,005 was spent per episode for THAs performed by physicians with care pathways compared to $22,195 for physicians without care pathways (Tessier et al., 2016), pointing to the possibility of significant cost savings if THA treatment variability is reduced.   Another performance gap in THA care is the use of less invasive surgical approaches. Surgeons have developed less invasive methods of inserting the THA prosthesis, and presently can use a direct anterior approach that effectively spares the muscles around the hip. One study found the use of the direct anterior approach resulted in a shorter length of acute hospital stay, increased discharges to home, and improved pain and Harris Hip Scores at three and six months post-surgery, with no differences in complication rates (Sibia, et al., 2017). A second study analyzing all-payer claims data for non-trauma related THAs found cost savings resulted from using two newer, minimally invasive techniques: modified lateral minimally invasive (modified Hardinge), and anterior-lateral muscle-sparing (modified Watson-Jones). During a 90-day window, a 19.9 percent and 19.6 percent reduction in costs of care were detected compared to the standard posterior approach, respectively (Goldstein et al., 2016). Another study analyzing Medicare claims found that 87.4 percent of THA patients were discharged to home after seeing an anterior approach surgeons compared to 68.7 percent of the other THA patients, which accounted for $3,326 in lower payments for post-acute care (Kamath et al., 2018).  This measure aims to address these example areas of opportunities for improvement. Hip arthroplasty accounts for a significant share of Medicare spending, and Medicare becomes the primary payer after age 65 for these arthroplasties. As such, the use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. There is substantial variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 100,895 Elective Primary Hip Arthroplasty episodes for 98,561 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 10-episode case minimum.   * The mean risk-adjusted cost per episode was $19,047.60. The risk-adjusted cost per episode at the 5th percentile was $13,113.03, compared to $31,240.03 at the 95th percentile. * For TINs, the mean measure score was $19,620.36. The score at the 5th percentile was $16,336.05, compared to $23,520.98 at the 95th percentile. * For TIN-NPIs, the mean measure score was $18,942.48. The score at the 5th percentile was $15,677.36, compared to $23,158.59 at the 95th percentile.   Cobos, Raquel, et al. (2010). “Variability of Indication Criteria in Knee and Hip Replacement: An Observational Study.” BMC Musculoskeletal Disorders 11: 249.  Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  Ghomrawi, Hassan M. K., et al. (2012). “Appropriateness Criteria and Elective Procedures – Total Joint Arthroplasty.” The New England Journal of Medicine 367: 2467-2469.  Goldstein, J. P., et al. (2016). "The Cost and Outcome Effectiveness of Total Hip Replacement: Technique Choice and Volume-Output Effects Matter." Applied Health Economics and Health Policy 14(6): 703-718.  Mota, Ruben E Jujica, et al. (2012). “Determinants of Demand for Total Hip and Knee Arthroplasty: A Systematic Literature Review.” BMC Health Services Research 12: 225.  Kamath, A. F., et al. (2018). "Medical Resource Utilization and Costs for Total Hip Arthroplasty: Benchmarking an Anterior Approach Technique in the Medicare Population." Journal of Medical Economics 21(2): 218-224.  Sabeh, K. G., et al. (2017). "The Impact of Discharge Disposition on Episode-of-Care Reimbursement after Primary Total Hip Arthroplasty." The Journal of Arthroplasty 32(10): 2969-2973.  Sibia, U. S., et al. (2017). "The Impact of Surgical Technique on Patient Reported Outcome Measures and Early Complications After Total Hip Arthroplasty." The Journal of Arthroplasty 32(4): 1171-1175.  Shubeck, S. P., et al. (2018). "Hot Spotting as a Strategy to Identify High-Cost Surgical Populations." Annals of Surgery  Tessier, J. E., et al. (2016). "Physicians With Defined Clear Care Pathways Have Better Discharge Disposition and Lower Cost." The Journal of Arthroplasty 31(9 Suppl): 54-58. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:  •Devising an appropriate risk adjustment model for episode-based cost measures  •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculation |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** | Section 101(f) of MACRA |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-140: Non-Emergent Coronary Artery Bypass Graft (CABG)**

**Measure Information**

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| --- | --- |
| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-140 |
| **Title** | Non-Emergent Coronary Artery Bypass Graft (CABG) |
| **Program** | Merit-Based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | New measure never reviewed by MAP Workgroup or used in a CMS program |
| **Measure Description:** | The Non-Emergent Coronary Artery Bypass Graft (CABG) Measure is meant to apply to clinicians who perform this procedure for Medicare beneficiaries. This procedural episode captures patients who undergo a CABG procedure. The measure evaluates a clinician’s risk-adjusted cost for the episode group by averaging it across all episodes attributed to the clinician during the performance period. The cost of each episode is the sum of the cost to Medicare for assigned services performed by the attributed clinician and other healthcare providers during the episode window. |
| **Numerator:** | The numerator for the Non-Emergent Coronary Artery Bypass Graft (CABG) measure is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all episodes attributed to a clinician. This sum is then multiplied by the national average observed episode cost to generate a dollar figure. Mathematically, this is represented as: sum of (observed episode cost/expected episode cost) \* national average observed cost. |
| **Denominator:** | The denominator for the Non-Emergent Coronary Artery Bypass Graft (CABG) measure is the total number of episodes from this episode group attributed to a clinician. |
| **Exclusions:** | The following episode-level exclusions apply:  (a) The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.  (b) No main clinician is attributed the episode.  (c) The beneficiary’s date of birth is missing.  (d) The beneficiary’s death date occurred before the episode ended.  (e) The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.  (f) The episode trigger claim was not performed in an ambulatory/office-based care, IP hospital, OP hospital, or ASC setting based on its place of service.  (g) The IP facility is not one that is paid under the Inpatient Prospective Payment System (IPPS) when an IP stay concurrent with the trigger is found.  Non-Emergent CABG episodes are also removed using exclusions specific to the Non-Emergent CABG measure that were developed with input from the measure-specific workgroup. The “Exclusions” and “Exclusions\_Details” tabs in the [Non-Emergent CABG Measure Codes List File](https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-episode-based-cost-measures-zip-file.zip) include the list of these exclusions as well as the codes used to define them. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Cardiac surgery |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | CABG is a major component of the management of advanced coronary artery disease (CAD), although its use has decreased since 2000. According to a 2016 study, an average of approximately 100,000 Medicare beneficiaries underwent CABG surgery annually between 2000 and 2012 with a steady decline in the number of procedures performed from 131,385 in 2000 to 71,086 in 2012 (McNeely et al., 2016). A 2011 study using Medicare outpatient hospital claims and the Healthcare Cost and Utilization Project’s Nationwide Inpatient Sample for data between 2001 and 2008 found that the annual CABG surgery rate in the United States decreased from about 17 per 10,000 adults in 2001 to about 11 per 10,000 adults in 2008 (Epstein et al., 2011). This decline is due in part to changes in patient populations and treatment options, including wider use of coronary stenting. Still, CABG remains a standard therapy and one of the most commonly used treatment options for CAD in patients with multi-vessel disease or diabetes (ElBardissi et al., 2012).   ElBardissi, Andrew W., Sary F. Aranki, Shubin Sheng, Sean M. O'Brien, Caprice C. Greenberg, and James S. Gammie. "Trends in Isolated Coronary Artery Bypass Grafting: An Analysis of the Society of Thoracic Surgeons Adult Cardiac Surgery Database." The Journal of Thoracic and Cardiovascular Surgery 143, no. 2 (2012): 273-81.  Epstein, Andrew J., Daniel Polsky, Feifei Yang, Lin Yang, and Peter W. Groeneveld. "Coronary Revascularization Trends in the United States, 2001-2008." JAMA 305, no. 17 (2011): 1769-76.  “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017  McNeely, Christian, Stephen Markwell, and Christina Vassileva. "Trends in Patient Characteristics and Outcomes of Coronary Artery Bypass Grafting in the 2000 to 2012 Medicare Population." The Annals Of Thoracic Surgery 102, no. 1 (2016): 132-38. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | As part of the second wave of measure development, the Cardiovascular Disease Management Clinical Subcommittee selected this measure for development during an in-person meeting in April 2018 and a corresponding smaller measure-specific workgroup provided detailed clinical input on its specifications throughout the summer of 2018. The Subcommittee chose this episode group to develop, using as a starting point the December 2016 Draft List of MACRA Episode Groups and Trigger Codes and an accompanying document on episode-based cost measure development for the Quality Payment Program (together, the “December 2016 posting”). The Cardiovascular Disease Management Clinical Subcommittee comprises 45 members affiliated with 30 specialty societies and were selected after a public call for nominations in February - March 2018. The workgroup comprises 14 members affiliated with 13 specialty societies.  The Cardiovascular Disease Management Clinical Subcommittee and workgroup provided input on every component of this measure through a variety of forums, including in-person meetings, webinars, and online polls. Members discussed and provided input on the selection an episode group for cost measure development, and the workgroup provided further input on: (i) episode triggers and sub-groups, (ii) episode window, (iii) service assignment rules, (iv) risk adjustors, and (v) exclusions.  In addition to the input of the Clinical Subcommittee and the measure-specific workgroup, a technical expert panel (TEP) was convened for meetings in August and December 2016, March and August 2017, and May 2018. The TEP provided high-level guidance on the concepts and direction of measure development, methods to best operationalize feedback from the patient and family committee, and actionable enhancements for feedback reports. The information gathered has been incorporated into the process and utilized by the Cardiovascular Disease Management Clinical Subcommittee during the first and second wave of episode-based cost measure development.  The measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 10-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other episode-based cost measures that underwent field testing. There were 78,221 episode-based cost measure field test reports that were distributed on the CMS Enterprise Portal. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the measure-specific workgroup members to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians (TIN-NPI) and clinician groups (TIN) across a range of case minimums.   * For TINs at a 10-episode case minimum, the mean reliability was 0.81. For TINs at a 20-episode case minimum, the mean reliability was 0.86. For TINs at a 30-episode case minimum, the mean reliability was 0.88. * For TIN-NPIs at a 10-episode case minimum, the mean reliability was 0.73. For TINs at a 20-episode case minimum, the mean reliability was 0.81. For TIN-NPIs at a 30-episode case minimum, the mean reliability was 0.85. |
| **In which setting was this measure tested?** | Hospital inpatient |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs for which they are directly responsible for, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be made through changes in clinical practice.   According to the literature and previous feedback received through stakeholder input activities, this measure represents an area where there are opportunities for improvement. Opportunities for improvement for CABG exist within two primary performance gaps: the reduction of readmissions and cost-effective post-acute care.   While the cost of CABG itself is significant, readmissions related to complications of the procedure and perioperative care reduce quality of life and increase costs. A study of CABG surgeries performed in California in 2009 found that more than 13 percent of patients were readmitted within 30 days (Li et al, 2012), with the most frequent reasons for readmission being heart failure and post-operative infections, accounting for 15.3 and 12.9 percent of readmissions, respectively. Studies in other US states have found similar readmission rates (Li et al, 2012). A 2015 study investigating causes for readmissions in an 11-hospital network in the US found that 68.7 percent of readmissions were classified as either clearly related or possibly related to the surgical procedure (Lancey et al., 2015). In this analysis, the mean hospital stay for clearly related readmissions was 15.5 days. The study also found readmission rates varied across hospitals from 6.1 percent to 18.0 percent; there was also variation in the likelihood of the readmission being related to the CABG procedure.   Hospital readmission rates can be used as an indicator of the quality of care during index hospitalizations. CABG accounted for 87 percent of the 30-day readmission rate (15.6 percent) for all cardiac procedures recorded in New York from 2005 to 2007 (Price et al., 2013). According to a 2010 study, each 30-day readmission for CABG resulted in additional costs up to $13,256. Although mortality rates have steadily declined in recent years, the readmission rates have remained steady or increased in some cases, possibly indicating insufficient coordination efforts between inpatient and outpatient care providers (Birkmeyer et al., 2010).   Post-acute care (PAC) also contributes to overall costs and cost variation with CABG surgery. Following a CABG procedure, patients may: (i) go without PAC services, (ii) receive only home health care services, (iii) receive home health and outpatient physical therapy, or (iv) be transferred to a skilled nursing facility (SNF). The type of PAC received will depend on the availability of PAC services (e.g., not all communities have SNFs), patients’ clinical and functional profiles (e.g., comorbidities and post-surgical rehabilitation needs), and patients’ residential environments (e.g., presence of informal care givers, presence of stairs in the home). Different PAC settings provide care at different levels of intensity, and they result in different costs to the Medicare program (Buntin et al., 2005). A 2017 study that examined PAC spending for FFS Medicare beneficiaries following CABG, colectomy, and total hip replacement from 2009 to 2012 found that at least half of FFS Medicare beneficiaries who underwent CABG went on to receive PAC services (Chen et al., 2017).   A 2017 study using 2009 to 2012 data on Medicare beneficiaries found that the average spending on PAC services was under $4,000 for hospitals in the bottom quintile of 90-day PAC episode spending and over $10,000 for the upper quintile. After patient-level risk adjustment and price-standardization, the majority of cost variation remained. This variation was more dependent on the type of PAC selected (i.e. inpatient rehabilitation and skilled nursing) rather than the intensity of care at a given PAC setting, such as the length of stay (Chen et al., 2017). These data point to the potential for improvement in care quality, patients’ quality of life, as well as Medicare cost savings.  This measure aims to address these example areas of opportunities for improvement. CABG remains one of the most commonly used treatment options for CAD in patients with multi-vessel disease or diabetes. As such, it affects nearly 100,000 Medicare beneficiaries and the use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. There is substantial variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 40,028 Non-Emergent CABG episodes for 40,028 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 10-episode case minimum.   * The mean risk-adjusted cost per episode was $42,286.86. The risk-adjusted cost at the 5th percentile was $31,391.97, compared to $62,171.26 at the 95th percentile. * For TINs, the mean measure score was $42,995.85. The score at the 5th percentile was $38,314.44, compared to $50,120.72 at the 95th percentile. * For TIN-NPIs, the mean measure score was $42,441.39. The score at the 5th percentile was $37,541.57, compared to $49,256.91 at the 95th percentile.   Birkmeyer, J.D., Gust, C., Baser, O., Dimick, J.B., Sutherland, J.M., and Skinner J.S. "Medicare Payments for Common Inpatient Procedures: Implications for Episode-Based Payment Bundling." Health Serv Res 45, no. 6 Pt 1 (2010): 1783-95.  Buntin, M. B., A. D. Garten, S. Paddock, D. Saliba, M. Totten, and J. J. Escarce. "How Much Is Postacute Care Use Affected by Its Availability?" [In eng]. Health Serv Res 40, no. 2 (Apr 2005): 413-34.  Chen, L. M., E. C. Norton, M. Banerjee, S. E. Regenbogen, A. H. Cain-Nielsen, and J. D. Birkmeyer. "Spending on Care after Surgery Driven by Choice of Care Settings Instead of Intensity of Services." [In eng]. Health Aff (Millwood) 36, no. 1 (Jan 01 2017): 83-90.  Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  Lancey, Robert, Paul Kurlansky, Michael Argenziano, Michael Coady, Robert Dunton, James Greelish, Edward Nast, et al. "Uniform Standards Do Not Apply to Readmission Following Coronary Artery Bypass Surgery: A Multi-Institutional Study." The Journal Of Thoracic And Cardiovascular Surgery 149, no. 3 (2015): 850-7.e.  Li, Zhongmin, Ehrin J. Amstrong, Joseph P. Parker, Beate Danielsen, and Patrick S. Romano. "Hospital Variation in Readmission after Coronary Artery Bypass Surgery in California." Circulation: Cardiovascular Quality and Outcomes (2012).  Price, Jonathan D., Jamie L. Romeiser, Jeffrey M. Gnerre, A. Laurie W. Shroyer, and Todd K. Rosengart. "Risk Analysis for Readmission after Coronary Artery Bypass Surgery: Developing a Strategy to Reduce Readmissions." Journal of the American College of Surgeons 216, no. 3 (2013): 412-19. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:  •Devising an appropriate risk adjustment model for episode-based cost measures  •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** | Section 101(f) of MACRA |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-148: Medicare Spending Per Beneficiary (MSPB) clinician measure**

**Measure Information**

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| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-148 |
| **Title** | Medicare Spending Per Beneficiary (MSPB) clinician measure |
| **Program** | Merit-Based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | Measure currently used in a CMS program, but the measure is undergoing substantial change |
| **Range of years(s) this measure has been used by CMS Program(s):** | Merit-based Incentive Payment System-Cost (2017-2018) |
| **Measure Description:** | MSPB is a payment-standardized, risk-adjusted cost measure focused on clinicians (TIN-NPIs) / clinician groups (TINs) providing care at acute inpatient hospitals. The measure is an average of risk-adjusted costs across all episodes. Each MSPB episode has a window spanning from three days prior to the index inpatient admission through 30 days after discharge. The measure attributes all Medicare Parts A and B costs occurring in the episode window, with some exclusions, to the clinician(s) responsible for care, as identified for medical MS-DRGs through the use of an E&M threshold and for surgical MS-DRGs by identification of the physician performing the core procedure of the stay. |
| **Numerator:** | The numerator for the re-evaluated MSPB clinician measure is the sum of the ratio of payment-standardized observed to expected MSPB episode costs for all MSPB episodes for the TIN-NPI or TIN. The sum of the ratios is then multiplied by the national average payment-standardized observed episode cost, to convert the ratio to a dollar amount. |
| **Denominator:** | The denominator for the re-evaluated MSPB clinician measure is the total number of MSPB episodes attributed to a TIN-NPI or TIN. |
| **Exclusions:** | The MSPB measure assesses costs during episodes of care initiated by acute inpatient hospital stays. Episodes for a beneficiary are excluded from the MSPB measure if they meet any of the following conditions:  • the beneficiary was not continuously enrolled in both Medicare Parts A and B from 90 days before episode start date through 30 days after discharge.  • the beneficiary’s death occurred during the episode  • the beneficiary is enrolled in a Medicare Advantage plan or Medicare is the secondary payer at any time during the episode window or 90-day lookback period.  • the index admission for the episode did not occur in neither a subsection (d) hospital paid under the Inpatient Prospective Payment System (IPPS) nor an acute hospital in Maryland.  • the discharge of the index admission occurred in the last 30 days of the measurement period  • the index admission for the episode is involved in an acute-to-acute hospital transfer (i.e., the admission ends in a hospital transfer or begins because of a hospital transfer)  • the index admission inpatient claim indicates a $0 actual payment or a $0 standardized payment  After applying the exclusions outlined above, all remaining episodes are included in the calculation of the MSPB measure. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Other (enter in Comments at far bottom of this screen) |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Patient-focused episode of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | CMS and Acumen, LLC are undertaking a re-evaluation of the MSPB clinician measure. The Blueprint for the CMS Measure Management System (V 14.0, August 2018) provides a basis for measure re-evaluation. This document describes a “CMS ad hoc review” as a “limited examination of the measure based on new information” (CMS 2017). This new information can come from a variety of sources including ongoing surveillance of the scientific literature or from stakeholders. In this case, the motivation for CMS and Acumen to pursue re-evaluation is to address stakeholder feedback received via public comment in 2016. As discussed further in the State of Development Details section, stakeholders expressed a desire for the measure to be more actionable for clinicians and more statistically reliable.   As background to this re-evaluated measure, a version of the MSPB measure has been part of the Merit-based Incentive Payment System (MIPS) cost performance category since the 2017 MIPS performance period. Prior to this current use in MIPS, CMS used a version of the MSPB measure in the Value Modifier Program and reported it in annual Quality and Resource Use Reports (QRURs) until MACRA ended the Value Modifier Program. The MSPB clinician measure is an important means of measuring Medicare spending. Health expenditures continue to increase in the United States. According to the National Health Expenditure Accounts, total health care spending is estimated to have increased by 4.6 percent in 2017, reaching $3.5 trillion (CMS, 2018). Medicare spending grew more slowly in 2017 than in the previous two years due to slowed growth in spending for both Medicare FFS and Medicare Advantage. Nonetheless, spending for Medicare, which is still predominantly paid on a fee-for-service (FFS) basis, still grew by 3.6 percent, reaching $672.1 billion (CMS, 2018). In 2016, Medicare FFS paid $183 billion for approximately 10 million Medicare inpatient admissions and 200 million outpatient services, which reflects a 2.3 percent increase in hospital spending per FFS beneficiary between 2015 and 2016 (MedPAC, 2018). In the United States, Medicare is the largest single purchaser of health care, and successfully establishing payment models under MIPS can have significant impacts on reducing costs and making care more affordable (MedPAC, 2017).   “Blueprint for the CMS Measures Management System. Version 14.0.” US Centers for Medicare & Medicaid Services, August 2018.  “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017.  “Report to the Congress: Medicare Payment Policy.” MedPAC, 2018. |
| **What is the NQF status of the measure?** | Never Submitted |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | During earlier public comment periods, stakeholders highlighted certain aspects of the measure that could potentially be refined (CMS, 2015). In particular, stakeholders raised concerns regarding the costs attributed to them through the measure, noting that all-cost measures can convey limited actionable information given that clinicians attributed episodes for these measures may not have had the opportunity to influence the costs included in the measures. Stakeholders also noted that the attribution logic does not appropriately account for team-based care in the hospital setting. They were also concerned that risk adjustment may not be able to completely compensate for the inclusion of services that are clinically unrelated to the cause of the index admission. These concerns suggested that revisions to the measure should focus on attribution and service assignment. These comments directly shaped the refinements to the measure.  The TEP convened in August 2017 and May 2018 to discuss potential refinements informed by earlier stakeholder feedback and to provide high-level guidance about refinements to the MSPB measure. In addition, the TEP recommended creation of an expert workgroup, the MSPB Service Refinement Workgroup, to provide detailed clinical input on service exclusion rules. The expert workgroup convened during summer 2018 to develop the list of service exclusions. The TEP comprises 19 members representing a diverse range of perspectives, including clinicians, healthcare providers, academia, and patient advocacy organizations. The expert workgroup, the MSPB Service Refinement Workgroup, comprises 25 clinicians representing a wide range of types of clinicians who may be attributed the re-evaluated MSPB clinician measure.  In terms of refinements to attribution, the TEP expressed support for the use of an E&M threshold to identify the clinician responsible for care provided during an episode with a medical DRG, and for the development of a method to identify the clinician performing the core procedure for an episode with a surgical DRG. The TEP also expressed support for TIN-level attribution. In terms of service assignment, the MSPB Service Refinement Workgroup provided input on a list of service exclusions at the MDC level to apply to the measure. The TEP and the expert workgroup further reviewed the measure refinements along with feedback received through field testing during a webinar held in November 2018.  The re-evaluated MSPB clinician measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 35-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians and clinician groups were able to access a field test report with details of their performance on this measure and any of the other cost measures that underwent field testing. A total of 148,382 MSPB clinician field test reports were available during field testing. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the TEP and the MSPB Service Refinement Workgroup to consider when providing further input on the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), constructed using episodes ending between January 1, 2017 and December 31, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians (TIN-NPI) and clinician groups (TIN) across a range of case minimums.   * For TINs at a 20-episode case minimum, the mean reliability was 0.70. For TINs at a 30-episode case minimum, the mean reliability was 0.75. For TINs at a 35-episode case minimum, the mean reliability was 0.77. For TINs at a 40-episode case minimum, the mean reliability was 0.79. * For TIN-NPIs at a 20-episode case minimum, the mean reliability was 0.62. For TIN-NPIs at a 30-episode case minimum, the mean reliability was 0.67.For TIN-NPIs at a 35-episode case minimum, the mean reliability was 0.69. For TIN-NPIs at a 40-episode case minimum, the mean reliability was 0.71. |
| **In which setting was this measure tested?** | Ambulatory surgery center, Ambulatory/office-based care, Community hospitals, Emergency department, Hospital outpatient department (HOD), Home health, Hospital inpatient, Hospital/acute care facility, Inpatient psychiatric facility, Inpatient rehabilitation facility, IP units within acute care hospitals, Long-term care hospital, Post-acute care facility(s) |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | From a conceptual standpoint, episode-based cost measures that capture spending for the treatment of particular conditions or delivery of specific procedures by design limit attribution to the particular types of clinicians that deliver such care. In contrast, all-cost measures such as MSPB will tend to be attributed to more clinicians, given that they are more general measures that do not require the treatment of a specific condition or delivery of a particular procedure. This makes all-cost measures important as a means to enhance the coverage of patients and as a result clinician coverage as well. This is because as more patients are covered by a measure, more clinicians are likely to meet the minimum number of cases to be scored on the measure.   Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs for which they are directly responsible, as well as the total cost of their patient’s care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be achieved through changes in clinical practice. As noted in the background section, Medicare FFS spending on inpatient care has continued to rise over time. Additionally, although inpatient hospital spending has declined as a share of total Medicare spending from a figure of 31% in 2006, it still represents an important contributor to overall costs, accounting for 22% of total Medicare spending in 2015 (MedPAC, 2017). Inpatient hospital services represented the second largest Medicare spending category in 2015 (MedPAC, 2017). Given that the inpatient hospital setting is such an important contributor to overall Medicare spending, gauging the efficacy of this spending requires measuring the cost performance of clinicians providing care at hospitals, as well as the quality of outcomes. Research by MedPAC suggests that overall hospital quality metrics have been improving. For example, one report notes that from 2012 to 2016, both mortality and readmissions at IPPS hospitals declined (MedPAC, 2017). The MSPB clinician measure can provide valuable context for such progress in quality, by clarifying the simultaneous movement in the average costs of hospital admissions. By risk-adjusting episode costs, the MSPB measure provides more actionable information to clinicians and policymakers than a simple trend in overall spending, since the latter does not account for patients’ severity of illness or other factors that can affect the costs of an admission.  This is supported by our analysis into the variation in spending per episode that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) using episodes ending between January 1, 2017 and December 31, 2017. There were 5,650,726 MSPB clinician episodes for 3,903,989 beneficiaries. The TIN-NPI and TIN-level measure scores as well as episode and beneficiary counts were calculated for clinicians and clinician groups who met a 35 episode case minimum.   * The mean risk-adjusted cost per episode was $18,599.86. The risk-adjusted cost at the 5th percentile was $9,058.54, compared to $37,576.84 at the 95th percentile. * For TINs, the mean measure score was $18,830.39. The score at the 5th percentile was $16,194.90 compared to $21,910.62 at the 95th percentile. * For TIN-NPIs, the mean measure score was $19,358.11. The score at the 5th percentile was $16,543.88 compared to $22,486.73 at the 95th percentile.   “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017.  Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:   •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | No |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** |  |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |

# **MUC2018-149: Total Per Capita Cost**

**Measure Information**

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| **Characteristic** | **Submitted Information** |
| **Key** | MUC2018-149 |
| **Title** | Total Per Capita Cost |
| **Program** | Merit-Based Incentive Payment System |
| **Workgroup** | Clinician |
| **What is the history or background for including this measure on the 2018 MUC list?** | Measure currently used in a CMS program, but the measure is undergoing substantial change |
| **Range of years(s) this measure has been used by CMS Program(s):** | Merit-based Incentive Payment System-Cost (2017-2018) |
| **Measure Description:** | The Total Per Capita Cost (TPCC) measure is a payment-standardized, risk-adjusted, and specialty-adjusted cost measure focused on clinicians/clinician groups performing primary care services. The measure is an average of per capita costs (with the previously mentioned adjustments applied) across all attributed beneficiaries. The measure includes all Medicare Parts A and B costs across all attributed beneficiaries. |
| **Numerator:** | The numerator for the measure is the sum of the risk-adjusted, specialty-adjusted, payment-standardized Medicare Part A and Part B costs across all beneficiaries attributed to a TIN or TIN-NPI during the measurement period. An episode is a month (4-week block) associated with a beneficiary during the measurement period that is attributable to a clinician. |
| **Denominator:** | The denominator for the measure is the number of all Medicare beneficiaries attributed to a TIN or TIN-NPI during the measurement period. |
| **Exclusions:** | Clinicians are excluded from the population measured if they meet any of the following service category exclusion criteria:  • They performed at least one major 90-day global surgery in the calendar years overlapping the measurement period; and 15 percent or more of their candidate events had a 10-day or 90-day global surgery with the same beneficiary and were performed by the same clinician within +/- 180 days of the candidate event. • They performed at least one anesthesia service in the calendar years overlapping the measurement period; and 5 percent or more of their candidate events had an anesthesia service provided to the same beneficiary and were performed by the same clinician within +/- 180 days of the candidate event.  • A clinician performed at least one therapeutic radiation service in the calendar years overlapping the measurement period; and 5 percent or more of a clinician’s candidate events had a therapeutic radiation service provided to the same beneficiary and were performed by the same clinician within +/- 180 days of the candidate event..  • A clinician performed at least one chemotherapy service in the calendar years overlapping the measurement period; and 10 percent or more of a clinician’s candidate events had a chemotherapy service provided to the same beneficiary and were performed by the same clinician within +/- 180 days of the candidate event  After field testing, the list of clinicians to whom the re-evaluated TPCC measure can be attributed was refined. The refined list comprises HCFA specialties that could reasonably be responsible for providing primary care; broadly this includes primary care specialties and internal medicine sub-specialties that frequently manage chronic patients with significant conditions in their areas of specialty along with other medical comorbidities. Also included are non-physician clinicians who often provide primary care services. |
| **Measure type:** | Cost/Resource Use |
| **Is this measure similar to and/or competing with measure(s) already in a program?** | No |
| **What is the target population of the measure?** | Medicare Fee for Service |
| **What one area of specialty is the measure aimed to, or which specialty is most likely to report this measure?** | Other (enter in Comments at far bottom of this screen) |
| **What one healthcare priority applies to this measure?** | Make care affordable |
| **What one meaningful measure applies to this measure?** | Risk adjusted total cost of care |
| **Briefly describe the peer reviewed evidence justifying this measure:** | CMS and Acumen, LLC are undertaking a re-evaluation of the TPCC measure. The Blueprint for the CMS Measure Management System (V 14.0, August 2018) provides a basis for measure re-evaluation. This document describes a “CMS ad hoc review” as a “limited examination of the measure based on new information” (CMS 2018). This new information can come from a variety of sources including ongoing surveillance of the scientific literature or from stakeholders. In this case, the motivation for CMS and Acumen to pursue re-evaluation is to address stakeholder feedback received via public comment in 2016. As discussed further in the State of Development Details section, stakeholders expressed a desire for the measure to be more actionable for clinicians.  As background to this re-evaluated measure, a version of the TPCC measure has been part of the Merit-based Incentive Payment System (MIPS) cost performance category since the 2017 MIPS performance period. Prior to this current use in MIPS, CMS used a version of the TPCC measure in the Value Modifier Program and reported it in annual Quality and Resource Use Reports (QRURs) until MACRA ended the Value Modifier Program. The TPCC measure is an important means of measuring Medicare spending. Health expenditures continue to increase in the United States. According to the National Health Expenditure Accounts, total health care spending is estimated to have increased by 4.6 percent in 2017, reaching $3.5 trillion (CMS, 2018). Medicare spending grew more slowly in 2017 than in the previous two years due to slowed growth in spending for both Medicare FFS and Medicare Advantage. Nonetheless, spending for Medicare, which is still predominantly paid on a fee-for-service (FFS) basis, still grew by 3.6 percent, reaching $672.1 billion (CMS, 2018). Spending on services for physicians and other health professionals totaled $69.9 billion and accounted for 15 percent of Medicare FFS spending in 2016 (MedPAC, 2018). In the United States, Medicare is the largest single purchaser of health care, and successfully establishing payment models under MIPS can have significant impacts on reducing costs and making care more affordable (MedPAC, 2017).  Given the focus of the TPCC measure, it is also worth focusing more specifically on the importance of establishing successful payment models for primary care management. The American Academy of Family Physicians (AAFP) notes that numerous studies have found reductions to the total cost of care for patients in a Patient-Centered Medical Home (PCMH), brought about by the provision of primary care management services, and ranging from 4.4% to 11.2% for especially high-cost, elderly patients (AAFP, 2018). Primary care management can lead to such savings in various ways, including by improving the treatment of chronic conditions, obviating the need for high-cost hospital or emergency department services. Another impact that primary care management can have is directing patients to lower cost hospitals for the provision of necessary inpatient services. Given these potential linkages between primary care management and cost savings, it is critical to measure the costs of primary care management in a manner that captures broader healthcare costs influenced by primary care.   “Blueprint for the CMS Measures Management System. Version 14.0.” US Centers for Medicare & Medicaid Services, 2018.  “Data Book: Health Care Spending and the Medicare Program.” MedPAC, 2017.  “National Health Expenditure Projections, 2017-2026.” US Centers for Medicare & Medicaid Services, 2018.  “Report to the Congress: Medicare Payment Policy.” MedPAC, 2018.  “Valuation of Care Management Performed by Primary Care Services: An Issue Brief.” American Academy of Family Physicians, 2018. |
| **What is the NQF status of the measure?** | Failed Endorsement |
| **Evidence that the measure can be operationalized:** | This is a claims-based measure and will not require any additional submission of data. |
| **In what state of development is the measure?** | Fully Developed |
| **State of Development details:** | During earlier public comment periods, stakeholders highlighted certain aspects of the TPCC measure that could potentially be refined (CMS, 2016). For example, stakeholders believed that all-cost measures are not very actionable for many clinicians given that they may not have had the opportunity to influence many of the costs contained in them. In particular, they noted that the attribution logic of TPCC does not account for the timing of a clinician’s involvement in a patient’s care within the year, and does not account for the possibility of joint accountability for a patient’s outcomes. These comments directly shaped the refinements to the measure.  The TEP convened in August 2017 and May 2018 to discuss potential refinements informed by earlier stakeholder feedback and to provide high-level guidance about refinements to the TPCC measure. The TEP comprises 19 members representing a diverse range of perspectives, including clinicians, healthcare providers, academia, and patient advocacy organizations.  In terms of refinements, the TEP expressed support for developing a new attribution logic to more effectively identify primary care providers for the measure, for developing time windows to better account for the timing and patterns of care delivery, and for developing new attribution rules to allow for attribution of beneficiaries to multiple clinicians and clinician groups. The TEP further reviewed the measure refinements along with feedback received through field testing during a webinar held in November 2018. After field testing, the list of clinicians to whom the re-evaluated TPCC measure can be attributed was refined. The refined list comprises HCFA specialties that could reasonably be responsible for providing primary care; broadly this includes primary care specialties and internal medicine sub-specialties that frequently manage chronic patients with significant conditions in their areas of specialty along with other medical comorbidities. Also included are non-physician clinicians who often provide primary care services.  The re-evaluated TPCC measure was calculated using Medicare claims data and reported to clinicians and clinician groups who met a 20-episode case minimum as part of field testing from October 3 – November 5, 2018. During this period, clinicians were able to access a field test report with details of their performance on this and any of the other cost measures that underwent field testing. A total of 567,239 TPCC field test reports were available during field testing. At the same time, supplemental materials were posted publicly on the CMS website including a fact sheet, FAQ, draft cost measure methodology for each measure, draft measure codes list file for each measure, and a mock field test report. In conjunction, we hosted a national MACRA Cost Measures Field Testing Webinar on October 9 to provide an overview of field testing.  During field testing, all stakeholders were encouraged to provide feedback on the measure specifications, field test reports, and the any of the supplemental documentation. By the close of field testing, we received feedback from 67 stakeholders. The feedback that we received generally supported the level of clinician engagement and input throughout the development process. Clinicians and clinician groups who reviewed their measure results through field testing, as well as other stakeholders, provided recommendations about refinements to the measure specifications; this feedback was summarized for the TEP and considered when finalizing the measure specifications.  We conducted reliability testing of measures for clinicians (TIN-NPIs) and for clinician groups (TINs), and constructed using beneficiary months in the year-long measurement period between October 1, 2016 and September 30, 2017. Reliability refers to the extent to which a measure reflects true variation between clinicians’ risk-adjusted episode spending, as opposed to random variation. The reliability metric specifically captures how much of the variance in a measure is due to systematic differences in episode spending between clinicians, rather than differences in episode spending within a clinician’s set of episodes. A measure with high reliability suggests that the comparisons of performance across clinicians can be expected to better reflect systematic differences in actual performance.  Our testing results indicate that this measure is reliable for clinicians (TIN-NPI) and clinician groups (TIN) across a range of case minimums.   * For TINs at a 20-beneficiary case minimum, the mean reliability was 0.90. For TINs at a 30-beneficiary case minimum, the mean reliability was 0.91. For TINs at a 40-beneficiary case minimum, the mean reliability was 0.91. * For TIN-NPIs at a 20-beneficiary case minimum, the mean reliability was 0.87. For TIN-NPIs at a 30-beneficiary case minimum, the mean reliability was 0.88. For TIN-NPIs at a 40-beneficiary case minimum, the mean reliability was 0.89. |
| **In which setting was this measure tested?** | Ambulatory surgery center, Ambulatory/office-based care, Community hospitals, Emergency department, Hospital outpatient department (HOD), Home health, Hospital inpatient, Hospital/acute care facility, Inpatient psychiatric facility, Inpatient rehabilitation facility, IP units within acute care hospitals, Long-term care hospital, Post-acute care facility(s) |
| **At what level of analysis was the measure tested?** | Clinician, group |
| **What data sources are used for the measure?** | Claims |
| **How is the measure expected to be reported to the program?** | Administrative Claims |
| **Is this measure an eCQM?** | No |
| **If eCQM, enter Measure Authoring Tool (MAT) number:** | 0 |
| **If eCQM, does the measure have a Health Quality Measures Format (HQMF) specification in alignment with the latest HQMF standards?** | No |
| **Evidence of performance gap:** | From a conceptual standpoint, episode-based cost measures that capture spending for the treatment of particular conditions or delivery of specific procedures are by design oriented towards specialists. In contrast TPCC focuses on measuring the performance of clinicians delivering primary care services, which can include both primary care and specialty physicians. This is important since some primary care clinicians who may not be covered by the episode-based cost measures could have their cost performance captured by TPCC. In general, all-cost measures such as TPCC will tend to be attributed to more clinicians, given that they are more general measures that do not require the treatment of a specific condition or delivery a particular procedure. This makes all-cost measures important as a means to enhance the coverage of patients and as a result clinician coverage as well. This is because as more patients are covered by a measure, more clinicians are likely to meet the minimum number of cases to be scored on the measure.   Policymakers contend that an estimated 80 percent of overall health care costs are attributable to decisions made by clinicians (Fred, 2016). However, these same clinicians are often unaware of how their care decisions influence the overall costs of care. One of the goals for using cost measures is to help inform clinicians on the costs for which they are directly responsible, as well as the total cost of their patients’ care. A cost measure exhibits the opportunity for improvement if clinicians can exercise influence on a significant share of costs during the episode, or if lower spending and better care quality can be achieved through changes in clinical practice. Research shows that primary care management, such as practiced in the PCMH model, has brought about measurable reductions to the total cost of care by reducing utilization of high-cost services and in some cases, by directing patients to lower cost hospitals. Given that this effect has been observed in certain settings, a key question for policymakers would be whether primary care management can achieve such results in a variety of settings. A measure that captures the cost performance of primary care providers in a range of settings can thus help to confirm the benefits of primary care management. Also, since as noted above clinicians are often unaware of how their choices affect total costs of care, such a measure can help guide primary care providers to practices that reduce costs, while maintaining or improving quality.   Another key opportunity presented by a cost performance measure for primary care is the opportunity to reward primary care providers for delivering value and to thereby improve patients’ access to primary care services. As noted by MedPAC, beneficiaries experience more difficulty accessing primary care than with accessing specialty care (MedPAC 2018). More specifically, 1.3 percent of the Medicare population reported a “big problem” finding a primary care doctor, while just 0.9 percent of this population reported such a problem in finding a specialist in 2017. Relatedly, among patients desiring to switch primary care providers, some patients felt that this was not an option due to long wait times or due to practices being closed to new patients. This may be related to another fact that MedPAC observes in the same report, which is that the Physician Fee Schedule’s orientation to discrete services with a clear beginning and end does not support primary care, with its need for ongoing care coordination for a group of patients. Given this, MedPAC recommended the establishment of a per beneficiary payment for primary care practitioners to replace the expired Primary Care Incentive Payment (PCIP) program. This program provided a 10 percent bonus on fee schedule payments for some E&M services delivered by primary care practitioners. While the establishment of such a revised payment policy for primary care management might be an optimal solution to increase the availability of primary care, it may take substantial time to implement. Given this, it is particularly important to utilize an existing measure of the cost performance of primary care clinicians to identify and provide financial incentives for good performance. Although the weight for the MIPS cost performance category is 0% for payment year 2019, in subsequent years, cost performance will affect payment, allowing for some financial reward for good performance in primary care delivery.  The re-evaluated TPCC measure aims to address these example areas of opportunities for improvement, and the use of this cost measure can provide clinicians with information to improve care outcomes and reduce future health care costs. This is supported by our analysis into the variation in spending that may be reduced through better clinical practices. There is substantial variation in spending that may be reduced through better clinical practices. We analyzed the measure’s performance gap for clinicians (TIN-NPIs) and for clinician groups (TINs) for beneficiary-months in the year-long measurement period between October 1, 2016 and September 30, 2017. There were 26,389,302 beneficiaries. The TIN-NPI and TIN-level measure scores as well as beneficiary counts were calculated for clinicians and clinician groups who met a 20 beneficiary case minimum.   * For TINs, the mean measure score was $766.21. The score at the 5th percentile was $507.21, compared to $1,045.94 at the 95th percentile. * For TIN-NPIs, the mean measure score was $819.13. The score at the 5th percentile was $532.68, compared to $1,195.24 at the 95th percentile.   Fred, Herbert L. “Cutting the Cost of Health Care: The Physician’s Role.” Texas Heart Institute Journal, vol. 43, no. 1, 2016, pp. 4 – 6.  “Report to the Congress: Medicare Payment Policy.” MedPAC, 2018. |
| **Unintended consequences:** | Stakeholders have expressed concerns that cost measures could potentially have risks or unintended consequences. During past stakeholder input activities, including Technical Expert Panels (TEPs) and public comment periods, stakeholders have highlighted the importance of considering potential incentives created by cost measures that could adversely affect beneficiaries and clinicians. For beneficiaries, these potential adverse effects may include: (i) reducing access to care, and (ii) stinting care. For clinicians, these adverse effects could include: (i) making unfair comparisons among certain types of clinicians in assessing cost measure performance, and (ii) rewarding lower costs without appropriately balancing performance on quality. Overall, by promoting lower spending, stakeholders have expressed concerns that cost measures could potentially create barriers to patients receiving clinically appropriate care. To mitigate the potential risks of such incentives, stakeholders and TEP members have highlighted the importance of the following:   •Aligning cost measures with indicators of quality  •Identifying benchmarks for comparison that are fair and appropriate for all eligible clinicians  •Potentially excluding certain types of patients from measure calculations |
| **Was this measure published on a previous year's Measures under Consideration list?** | Yes |
| **In what prior year(s) was this measure published?** | 2012 |
| **What were the MUC IDs for the measure in each year?** | 2012, M2147 |
| **List the NQF MAP workgroup(s) in each year:** | Clinician, 2012 |
| **What were the programs that NQF MAP reviewed the measure for in each year?** | 2012, Physician Feedback  2012, VBPM |
| **What was the NQF MAP recommendation in each year?** | 2012, Physician Feedback – Support Direction, not ready for implementation  2012, VBPM – Support Direction, not ready for implementation |
| **Why was the measure not recommended by the MAP workgroups in those year(s)?** | MAP’s recommendation noted that while it supported the direction, the measure was not ready for implementation. The recommendation was to submit for and obtain NQF endorsement. |
| **If this measure is being submitted to meet a statutory requirement, please list the corresponding statute:** |  |
| **Measure steward:** | Centers for Medicare & Medicaid Services |
| **Measure Steward Contact Information:** | Andress, Joel Center for Clinical Standards and Quality  410-786-5237  [joel.andress@cms.hhs.gov](mailto:joel.andress@cms.hhs.gov) |
| **Primary Submitter Contact Information:** | Mindanao, Maria  Acumen, LLC  650-558-8882  [macra-episode-based-cost-measures-info@acumenllc.com](mailto:macra-episode-based-cost-measures-info@acumenllc.com) |