

## Supplementary Online Content

Chen LM, Epstein AM, Orav EJ, Filice CE, Samson LW, Joynt Maddox K. Association of practice-level social and medical risk with performance in the Medicare Physician Value-Based Payment Modifier Program. *JAMA*. doi:10.1001/jama.2017.9643

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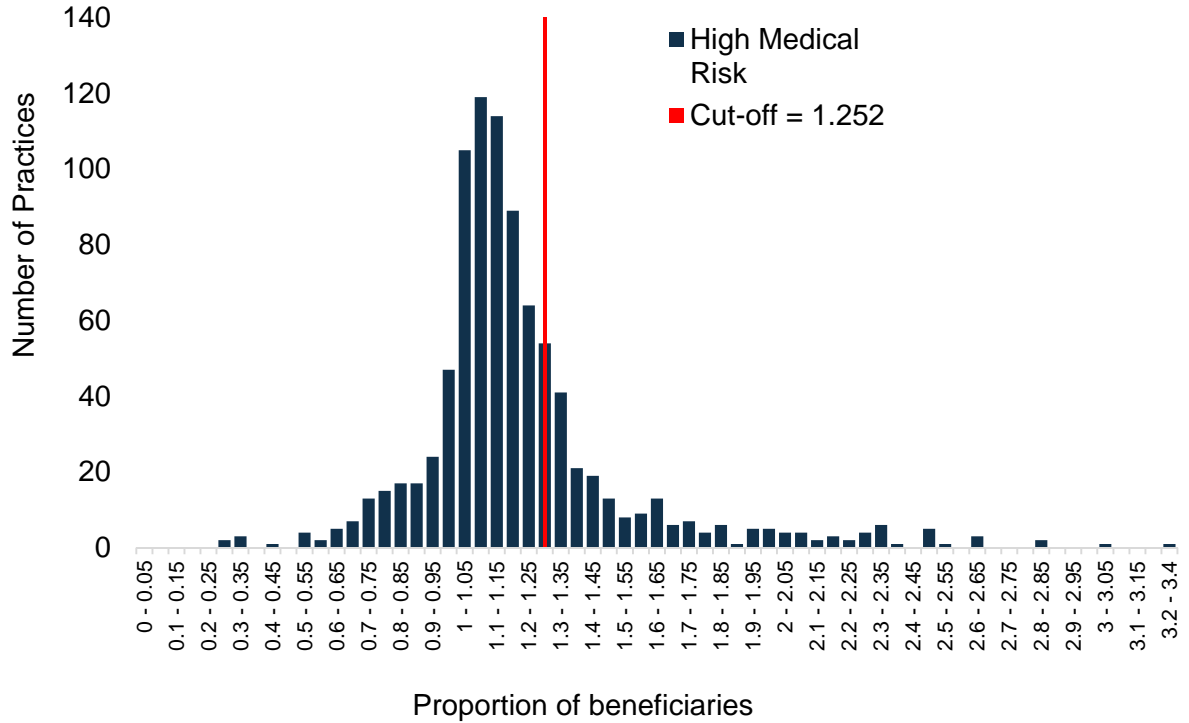
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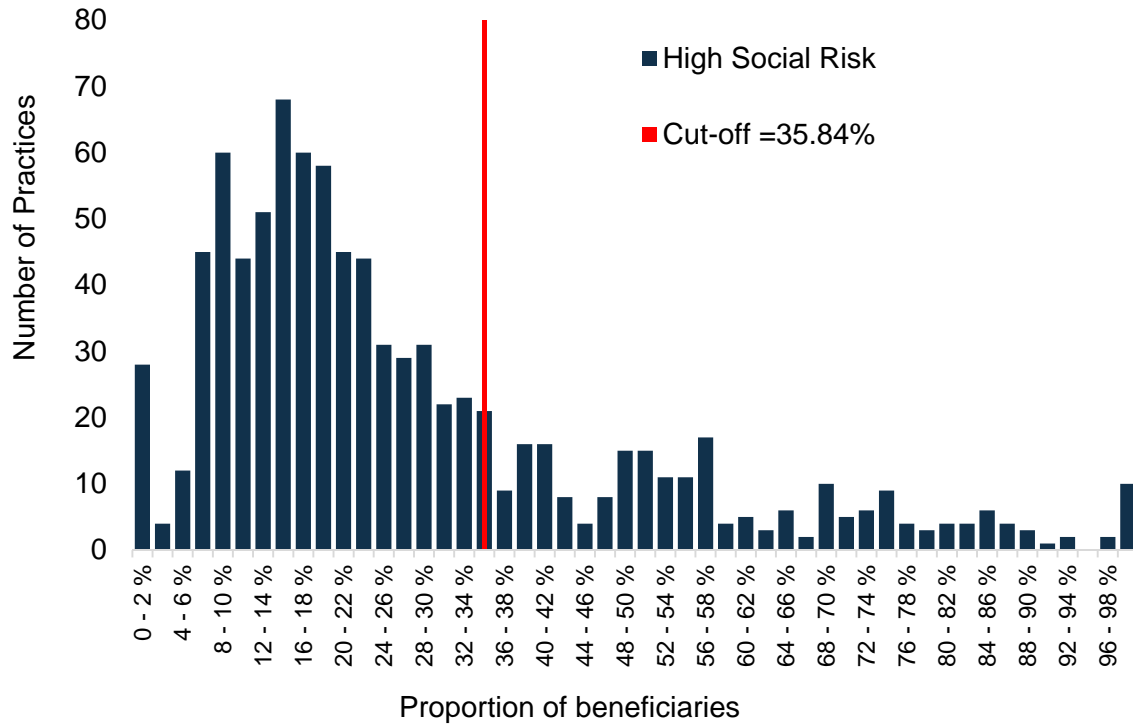
This supplementary material has been provided by the authors to give readers additional information about their work.

**eFigure 1. Distribution of the Average Medical Risk of Patients by Practice, 2013**



Note: Total number of practices is 899. Bin width is 0.05 (lower limit is equal to 0 and upper limit is less than 0.05, in intervals of 0.05). Practices above the cut-off point are high medical complexity practices.

**eFigure 2. Distribution of the Percentage of Dually Enrolled Patients by Practice, 2013**



Note: Total number of practices is 899. Bin width is 2% (lower limit is equal 0% and upper limit is less than 2%, in intervals of 2%). Practices above the cut-off point are high social risk practices.

## **eAppendix. Additional Information About the VM Program**

The VM Program tied performance on quality and costs of care to bonuses and penalties for large medical practices of 100 or more eligible professionals, beginning in 2015. Eligible medical practices that did not register for the Physician Quality Reporting System (PQRS) and report at least one measure, or elect the administrative claims reporting option, received an automatic penalty of -1% applied to 2015 payments. On the other hand, medical practices that met minimum reporting requirements could elect quality tiering, which meant that payment adjustments were tied to performance via a “value modifier” that resulted in a reward, penalty or neither (i.e., a neutral adjustment). For such medical practices, there was a maximum penalty of -1% and a maximum bonus of +2%\*adjustment factor. The adjustment factor ensures that across medical practices, penalties will equal bonuses; in 2015 the adjustment factor was +4.89, so the actual maximum bonus was nearly 10%. In subsequent years of the program, smaller medical practices will become eligible for the VM Program, quality tiering will become mandatory, and penalties will increase to -4% and bonuses to +4%\*adjustment factor.

In the first year of the VM Program, practices had to report on quality using one of three mechanisms, each with its own minimum reporting requirement: 1) the Group Practice Reporting Option web interface with 24 measures, 2) a qualified registry with at least three measures chosen from the more than 200 quality metrics offered, or 3) a standard claims-based panel with 14 measures. Additionally, for all practices, there were three mandatory, claims-based quality metrics: readmissions, admissions for acute ambulatory care sensitive conditions (ACSCs), and admissions for chronic ACSCs. The all-condition readmission measure, as specified by CMS, is risk-adjusted for age and a

number of clinical comorbidities. The ACSC measures are adjusted only for age and gender, although for chronic ACSCs all eligible cases must have the chronic condition of interest. For all measures, performance was reported as a z-score, representing the number of standard deviations from the peer group mean. The peer group for a given quality measure was all US practices with at least 20 eligible cases for the measure.

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**eTable 1. VM Measures and Domains**

<b>Measures</b>	<b>Domain</b>
<b>Calculated by CMS for all practices:</b>	
ACSC Acute Conditions Composite	Care Coordination
PQI-11 Bacterial Pneumonia**	Care Coordination
PQI-12 Urinary Tract Infection**	Care Coordination
PQI-10 Dehydration**	Care Coordination
ACSC Chronic Conditions Composite	Care Coordination
Diabetes (composite of 4 indicators)**	Care Coordination
PQI-5 Chronic Obstructive Pulmonary Disease (COPD) or Asthma**	Care Coordination
PQI-8 Heart Failure**	Care Coordination
All-Cause Hospital Readmissions	Care Coordination
<b>Administrative Claims-Based Quality Measures (elected by some practices)</b>	
Osteoporosis Management in Women $\geq 67$ Who Had a Fracture	Clinical Process/Effectiveness
Use of Spirometry Testing to Diagnose Chronic Obstructive Pulmonary Disease (COPD)	Clinical Process/Effectiveness
Dilated Eye Exam for Beneficiaries $\leq 75$ with Diabetes	Clinical Process/Effectiveness
HbA1c Testing for Beneficiaries $\leq 75$ with Diabetes	Clinical Process/Effectiveness
Nephropathy Screening Test or Evidence of Existing Nephropathy for Beneficiaries $\leq 75$ with Diabetes	Clinical Process/Effectiveness
Lipid Profile for Beneficiaries $\leq 75$ with Diabetes	Clinical Process/Effectiveness
Lipid Profile for Beneficiaries with Ischemic Vascular Disease (IVD)	Clinical Process/Effectiveness
Adherence to Statin Therapy for Beneficiaries with Coronary Artery Disease (CAD)	Clinical Process/Effectiveness
Antidepressant Treatment for Depression:	Clinical Process/Effectiveness
Acute Phase Treatment (at least 12 weeks)	Clinical Process/Effectiveness
1. Continuation Phase Treatment (at least 6 months)	Clinical Process/Effectiveness
2. Lipid Profile for Beneficiaries Who Started Lipid-Lowering Medications	Clinical Process/Effectiveness
Breast Cancer Screening for Women Ages 50–74	Clinical Process/Effectiveness
Use of High Risk Medications in the Elderly	Patient Safety
1. Patients Who Receive At Least One Drug to Be Avoided**	Patient Safety
2. Patients Who Receive At Least Two Different Drugs to Be Avoided**	Patient Safety
Lack of Monthly International Normalized Ratio (INR) Monitoring for Beneficiaries on Warfarin**	Patient Safety
Follow-Up After Hospitalization for Mental Illness	Care Coordination
1. Percentage of Patients Receiving Follow-Up Within 30 Days	Care Coordination
2. Percentage of Patients Receiving Follow-Up Within 7 Days	Care Coordination

<b>Measures</b>	<b>Domain</b>
<b>GPRO Web Interface Quality Measures (elected by some practices)</b>	
Coronary Artery Disease (CAD): Composite (All or Nothing Scoring)	Clinical Process/Effectiveness
Coronary Artery Disease (CAD): Lipid Control	Clinical Process/Effectiveness
Coronary Artery Disease (CAD): Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy—Diabetes or Left Ventricular Systolic Dysfunction (LVSD) (LVEF < 40%)	Clinical Process/Effectiveness
Diabetes Mellitus (DM): Hemoglobin A1c Poor Control	Clinical Process/Effectiveness
Diabetes Mellitus (DM) Composite (All or Nothing Scoring)	Clinical Process/Effectiveness
Diabetes Mellitus (DM): High Blood Pressure Control	Clinical Process/Effectiveness
Diabetes Mellitus (DM): Low Density Lipoprotein (LDL-C) Control	Clinical Process/Effectiveness
Diabetes Mellitus (DM): Hemoglobin A1c Control (< 8%)	Clinical Process/Effectiveness
Diabetes Mellitus (DM): Daily Aspirin or Antiplatelet Medication Use for Patients with Diabetes and Ischemic Vascular Disease (IVD)	Clinical Process/Effectiveness
Diabetes Mellitus (DM): Tobacco Non-Use	Clinical Process/Effectiveness
Heart Failure (HF): Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction (LVSD)	Clinical Process/Effectiveness
Hypertension (HTN): Controlling High Blood Pressure	Clinical Process/Effectiveness
Ischemic Vascular Disease (IVD): Complete Lipid Panel and Low Density Lipoprotein (LDL-C) Control	Clinical Process/Effectiveness
Ischemic Vascular Disease (IVD): Use of Aspirin or Another Antithrombotic	Clinical Process/Effectiveness
Preventive Care and Screening: Breast Cancer Screening for Women Aged 40-69	Clinical Process/Effectiveness
Preventive Care and Screening: Colorectal Cancer Screening	Clinical Process/Effectiveness
Preventive Care and Screening: Pneumococcal Vaccination for Patients 65 Years and Older	Clinical Process/Effectiveness
Preventive Care and Screening: Influenza Immunization	Population/Public Health
Preventive Care and Screening: Body Mass Index (BMI) Screening and Follow-Up	Population/Public Health
Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention	Population/Public Health
Preventive Care and Screening: Screening for High Blood Pressure and Follow-Up Documented	Population/Public Health
Preventive Care and Screening: Screening for Clinical Depression and Follow-Up Plan	Population/Public Health
Medication Reconciliation: Reconciliation After Discharge from an Inpatient Facility	Patient Safety
Falls: Screening for Future Fall Risk	Patient Safety

<b>Measures</b>	<b>Domain</b>
<b>GPRO Registry Quality Measures (elected by some practices)</b>	
Diabetes Mellitus (DM): Hemoglobin A1c Poor Control	Clinical Process/Effectiveness
Diabetes Mellitus (DM): Low Density Lipoprotein (LDL-C) Control	Clinical Process/Effectiveness
Diabetes Mellitus (DM): High Blood Pressure Control	Clinical Process/Effectiveness
Heart Failure (HF): Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Left Ventricular Systolic Dysfunction (LVSD)	Clinical Process/Effectiveness
Coronary Artery Disease (CAD): Antiplatelet Therapy	Clinical Process/Effectiveness
Coronary Artery Disease (CAD): Beta-Blocker Therapy—Prior Myocardial Infarction (MI) or Left Ventricular Systolic Dysfunction (LVSD) (LVEF < 40%)	Clinical Process/Effectiveness
Heart Failure (HF): Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction (LVSD)	Clinical Process/Effectiveness
Major Depressive Disorder (MDD): Antidepressant Medication During Acute Phase for Patients with MDD	Clinical Process/Effectiveness
Primary Open-Angle Glaucoma (POAG): Optic Nerve Evaluation	Clinical Process/Effectiveness
Age-Related Macular Degeneration (AMD): Dilated Macular Examination	Clinical Process/Effectiveness
Diabetic Retinopathy: Documentation of Presence or Absence of Macular Edema and Level of Severity of Retinopathy	Clinical Process/Effectiveness
Diabetic Retinopathy: Communication with the Physician Managing Ongoing Diabetes Care	Clinical Process/Effectiveness
Aspirin at Arrival for Acute Myocardial Infarction (AMI)	Clinical Process/Effectiveness
Stroke and Stroke Rehabilitation: Deep Vein Thrombosis (DVT) Prophylaxis for Ischemic Stroke or Intracranial Hemorrhage	Clinical Process/Effectiveness
Stroke and Stroke Rehabilitation: Discharged on Antithrombotic Therapy	Clinical Process/Effectiveness
Stroke and Stroke Rehabilitation: Anticoagulant Therapy Prescribed for Atrial Fibrillation (AF) at Discharge	Clinical Process/Effectiveness
Stroke and Stroke Rehabilitation: Screening for Dysphagia	Clinical Process/Effectiveness
Stroke and Stroke Rehabilitation: Rehabilitation Services Ordered	Clinical Process/Effectiveness
Screening or Therapy for Osteoporosis for Women Aged 65 Years and Older	Clinical Process/Effectiveness
Osteoporosis: Management Following Fracture of Hip, Spine or Distal Radius for Men and Women Aged 50 Years and Older	Clinical Process/Effectiveness
Osteoporosis: Pharmacologic Therapy for Men and Women Aged 50 Years and Older	Clinical Process/Effectiveness
Coronary Artery Bypass Graft (CABG): Use of Internal Mammary Artery (IMA) in Patients with Isolated CABG Surgery	Clinical Process/Effectiveness
Coronary Artery Bypass Graft (CABG): Preoperative Beta-Blocker in Patients with Isolated CABG Surgery	Clinical Process/Effectiveness



<b>Measures</b>	<b>Domain</b>
Urinary Incontinence: Assessment of Presence or Absence of Urinary Incontinence in Women Aged 65 Years and Older	Clinical Process/Effectiveness
Urinary Incontinence: Characterization of Urinary Incontinence in Women Aged 65 Years and Older	Clinical Process/Effectiveness
Chronic Obstructive Pulmonary Disease (COPD): Spirometry Evaluation	Clinical Process/Effectiveness
Chronic Obstructive Pulmonary Disease (COPD): Bronchodilator Therapy	Clinical Process/Effectiveness
Asthma: Pharmacologic Therapy for Persistent Asthma—Ambulatory Care Setting	Clinical Process/Effectiveness
Emergency Medicine: 12-Lead Electrocardiogram (ECG) Performed for Non-Traumatic Chest Pain	Clinical Process/Effectiveness
Emergency Medicine: 12-Lead Electrocardiogram (ECG) Performed for Syncope	Clinical Process/Effectiveness
Emergency Medicine: Community-Acquired Pneumonia (CAP): Vital Signs	Clinical Process/Effectiveness
Emergency Medicine: Community-Acquired Pneumonia (CAP): Empiric Antibiotic	Clinical Process/Effectiveness
Asthma: Assessment of Asthma Control—Ambulatory Care Setting	Clinical Process/Effectiveness
Hematology: Myelodysplastic Syndrome (MDS) and Acute Leukemias: Baseline Cytogenetic Testing Performed on Bone Marrow	Clinical Process/Effectiveness
Hematology: Myelodysplastic Syndrome (MDS): Documentation of Iron Stores in Patients Receiving Erythropoietin Therapy	Clinical Process/Effectiveness
Hematology: Multiple Myeloma: Treatment with Bisphosphonates	Clinical Process/Effectiveness
Hematology: Chronic Lymphocytic Leukemia (CLL): Baseline Flow Cytometry	Clinical Process/Effectiveness
Breast Cancer: Hormonal Therapy for Stage IC—IIIC Estrogen Receptor/Progesterone Receptor (ER/PR) Positive Breast Cancer	Clinical Process/Effectiveness
Colon Cancer: Chemotherapy for AJCC Stage III Colon Cancer Patients	Clinical Process/Effectiveness
Hepatitis C: Testing for Chronic Hepatitis C—Confirmation of Hepatitis C Viremia	Clinical Process/Effectiveness
Hepatitis C: Ribonucleic Acid (RNA) Testing Before Initiating Treatment	Clinical Process/Effectiveness
Hepatitis C: Hepatitis C Virus (HCV) Genotype Testing Prior to Treatment	Clinical Process/Effectiveness
Hepatitis C: Antiviral Treatment Prescribed	Clinical Process/Effectiveness
Hepatitis C: Hepatitis C Virus (HCV) Ribonucleic Acid (RNA) Testing at Week 12 of Treatment	Clinical Process/Effectiveness

<b>Measures</b>	<b>Domain</b>
Hepatitis C: Counseling Regarding Risk of Alcohol Consumption	Clinical Process/Effectiveness
Hepatitis C: Counseling Regarding Use of Contraception Prior to Antiviral Therapy	Clinical Process/Effectiveness
Acute Otitis Externa (AOE): Topical Therapy	Clinical Process/Effectiveness
Breast Cancer Resection Pathology Reporting: pT Category (Primary Tumor) and pN Category (Regional Lymph Nodes) with Histologic Grade	Clinical Process/Effectiveness
Colorectal Cancer Resection Pathology Reporting: pT Category (Primary Tumor) and pN Category (Regional Lymph Nodes) with Histologic Grade	Clinical Process/Effectiveness
Prostate Cancer: Adjuvant Hormonal Therapy for High Risk Prostate Cancer Patients	Clinical Process/Effectiveness
Adult Major Depressive Disorder (MDD): Comprehensive Depression Evaluation: Diagnosis and Severity	Clinical Process/Effectiveness
Adult Major Depressive Disorder (MDD): Suicide Risk Assessment	Clinical Process/Effectiveness
Rheumatoid Arthritis (RA): Disease Modifying Anti-Rheumatic Drug (DMARD) Therapy	Clinical Process/Effectiveness
Preventive Care and Screening: Pneumococcal Vaccination for Patients 65 Years and Older	Clinical Process/Effectiveness
Preventive Care and Screening: Breast Cancer Screening for Women Aged 40-69	Clinical Process/Effectiveness
Preventive Care and Screening: Colorectal Cancer Screening	Clinical Process/Effectiveness
Diabetes Mellitus (DM): Dilated Eye Exam	Clinical Process/Effectiveness
Coronary Artery Disease (CAD): Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy—Diabetes or Left Ventricular Systolic Dysfunction (LVSD) (LVEF < 40%)	Clinical Process/Effectiveness
Diabetes Mellitus (DM): Medical Attention for Nephropathy	Clinical Process/Effectiveness
Adult Kidney Disease: Laboratory Testing (Lipid Profile)	Clinical Process/Effectiveness
Adult Kidney Disease: Blood Pressure Management	Clinical Process/Effectiveness
Adult Kidney Disease: Patients On Erythropoiesis-Stimulating Agent (ESA)—Hemoglobin Level > 12.0 g/dL	Clinical Process/Effectiveness
Diabetes Mellitus (DM): Diabetic Foot and Ankle Care, Peripheral Neuropathy—Neurological Evaluation	Clinical Process/Effectiveness
Diabetes Mellitus (DM): Diabetic Foot and Ankle Care, Ulcer Prevention—Evaluation of Footwear	Clinical Process/Effectiveness
Melanoma: Continuity of Care—Recall System	Clinical Process/Effectiveness
Age-Related Macular Degeneration (AMD): Counseling on Antioxidant Supplement	Clinical Process/Effectiveness

<b>Measures</b>	<b>Domain</b>
Osteoarthritis (OA): Assessment for Use of Anti-Inflammatory or Analgesic Over-the-Counter (OTC) Medications	Clinical Process/Effectiveness
HIV/AIDS: CD4+ Cell Count or CD4+ Percentage	Clinical Process/Effectiveness
HIV/AIDS: Pneumocystis Jiroveci Pneumonia (PCP) Prophylaxis	Clinical Process/Effectiveness
HIV/AIDS: Adolescent and Adult Patients with HIV/AIDS Who Are Prescribed Potent Antiretroviral Therapy	Clinical Process/Effectiveness
HIV/AIDS: HIV RNA Control After Six Months of Potent Antiretroviral Therapy	Clinical Process/Effectiveness
Diabetes Mellitus (DM): Foot Exam	Clinical Process/Effectiveness
Coronary Artery Bypass Graft (CABG): Prolonged Intubation	Clinical Process/Effectiveness
Coronary Artery Bypass Graft (CABG): Deep Sternal Wound Infection Rate	Clinical Process/Effectiveness
Coronary Artery Bypass Graft (CABG): Stroke	Clinical Process/Effectiveness
Coronary Artery Bypass Graft (CABG): Postoperative Renal Failure	Clinical Process/Effectiveness
Coronary Artery Bypass Graft (CABG): Surgical Re-Exploration	Clinical Process/Effectiveness
Coronary Artery Bypass Graft (CABG): Antiplatelet Medications at Discharge	Clinical Process/Effectiveness
Coronary Artery Bypass Graft (CABG): Beta-Blockers Administered at Discharge	Clinical Process/Effectiveness
Coronary Artery Bypass Graft (CABG): Anti-Lipid Treatment at Discharge	Clinical Process/Effectiveness
Hemodialysis Vascular Access Decision-Making by Surgeon to Maximize Placement of Autogenous Arterial Venous (AV) Fistula	Clinical Process/Effectiveness
Rheumatoid Arthritis (RA): Tuberculosis Screening	Clinical Process/Effectiveness
Rheumatoid Arthritis (RA): Periodic Assessment of Disease Activity	Clinical Process/Effectiveness
Rheumatoid Arthritis (RA): Functional Status Assessment	Clinical Process/Effectiveness
Rheumatoid Arthritis (RA): Assessment and Classification of Disease Prognosis	Clinical Process/Effectiveness
Stroke and Stroke Rehabilitation: Thrombolytic Therapy	Clinical Process/Effectiveness
Cataracts: 20/40 or Better Visual Acuity within 90 Days Following Cataract Surgery	Clinical Process/Effectiveness
Oncology: Cancer Stage Documented	Clinical Process/Effectiveness
Radiology: Stenosis Measurement in Carotid Imaging Reports	Clinical Process/Effectiveness
Coronary Artery Disease (CAD): Lipid Control	Clinical Process/Effectiveness
Heart Failure (HF): Left Ventricular Ejection Fraction (LVEF) Assessment	Clinical Process/Effectiveness
Ischemic Vascular Disease (IVD): Blood Pressure Management	Clinical Process/Effectiveness
Ischemic Vascular Disease (IVD): Use of Aspirin or Another Antithrombotic	Clinical Process/Effectiveness

<b>Measures</b>	<b>Domain</b>
HIV/AIDS: Sexually Transmitted Disease Screening for Chlamydia and Gonorrhea	Clinical Process/Effectiveness
HIV/AIDS: Sexually Transmitted Disease Screening for Syphilis	Clinical Process/Effectiveness
Functional Communication Measure—Spoken Language Comprehension for Patients with Diagnosis of Late Effects of Cerebrovascular Disease (CVD)	Clinical Process/Effectiveness
Functional Communication Measure—Attention for Patients with Diagnosis of Late Effects of Cerebrovascular Disease (CVD)	Clinical Process/Effectiveness
Functional Communication Measure—Memory for Patients with Diagnosis of Late Effects of Cerebrovascular Disease (CVD)	Clinical Process/Effectiveness
Functional Communication Measure—Motor Speech for Patients with Diagnosis of Late Effects of Cerebrovascular Disease (CVD)	Clinical Process/Effectiveness
Functional Communication Measure—Reading for Patients with Diagnosis of Late Effects of Cerebrovascular Disease (CVD)	Clinical Process/Effectiveness
Functional Communication Measure—Spoken Language Expression for Patients with Diagnosis of Late Effects of Cerebrovascular Disease (CVD)	Clinical Process/Effectiveness
Functional Communication Measure—Writing for Patients with Diagnosis of Late Effects of Cerebrovascular Disease (CVD)	Clinical Process/Effectiveness
Functional Communication Measure—Swallowing for Patients with Diagnosis of Late Effects of Cerebrovascular Disease (CVD)	Clinical Process/Effectiveness
Heart Failure (HF): Left Ventricular Function (LVF) Testing	Clinical Process/Effectiveness
Asthma: Tobacco Use: Screening—Ambulatory Care Setting	Clinical Process/Effectiveness
Asthma: Tobacco Use: Intervention—Ambulatory Care Setting	Clinical Process/Effectiveness
Thoracic Surgery: Recording of Performance Status Prior to Lung or Esophageal Cancer Resection	Clinical Process/Effectiveness
Hypertension (HTN): Controlling High Blood Pressure	Clinical Process/Effectiveness
Ischemic Vascular Disease (IVD): Complete Lipid Panel and Low Density Lipoprotein (LDL-C) Control	Clinical Process/Effectiveness
Coronary Artery Disease (CAD): Symptom Management	Clinical Process/Effectiveness
Cardiac Rehabilitation Patient Referral from an Outpatient Setting	Clinical Process/Effectiveness
Hypertension (HTN): Blood Pressure Management	Clinical Process/Effectiveness
Chronic Wound Care: Use of Wound Surface Culture Technique in Patients with Chronic Skin Ulcers (Overuse Measure)	Clinical Process/Effectiveness
Chronic Wound Care: Use of Wet to Dry Dressings in Patients with Chronic Skin Ulcers (Overuse Measure)	Clinical Process/Effectiveness
Substance Use Disorders: Counseling Regarding Psychosocial and Pharmacologic Treatment Options for Alcohol Dependence	Clinical Process/Effectiveness
Substance Use Disorders: Screening for Depression Among Patients with Substance Abuse or Dependence	Clinical Process/Effectiveness
Barrett’s Esophagus	Clinical Process/Effectiveness

<b>Measures</b>	<b>Domain</b>
Radical Prostatectomy Pathology Reporting	Clinical Process/Effectiveness
Immunohistochemical (IHC) Evaluation of Human Epidermal Growth Factor Receptor 2 Testing (HER2) for Breast Cancer Patients	Clinical Process/Effectiveness
Anticoagulation for Acute Pulmonary Embolus Patients	Clinical Process/Effectiveness
Ultrasound Determination of Pregnancy Location for Pregnant Patients with Abdominal Pain	Clinical Process/Effectiveness
Rh Immunoglobulin (Rhogam) for Rh-Negative Pregnant Women at Risk of Fetal Blood Exposure	Clinical Process/Effectiveness
Statin Therapy at Discharge after Lower Extremity Bypass (LEB)	Clinical Process/Effectiveness
Preoperative Diagnosis of Breast Cancer	Clinical Process/Effectiveness
Sentinel Lymph Node Biopsy for Invasive Breast Cancer	Clinical Process/Effectiveness
Epilepsy: Seizure Type(s) and Current Seizure Frequency(ies)	Clinical Process/Effectiveness
Epilepsy: Documentation of Etiology of Epilepsy or Epilepsy Syndrome	Clinical Process/Effectiveness
Epilepsy: Counseling for Women of Childbearing Potential with Epilepsy	Clinical Process/Effectiveness
Cataracts: Improvement in Patient's Visual Function within 90 Days Following Cataract Surgery	Clinical Process/Effectiveness
Adult Major Depressive Disorder (MDD): Coordination of Care of Patients with Specific Comorbid Conditions	Clinical Process/Effectiveness
Pediatric Kidney Disease: Adequacy of Volume Management	Clinical Process/Effectiveness
Pediatric Kidney Disease: End Stage Renal Disease (ESRD) Patients Receiving Dialysis: Hemoglobin Level	Clinical Process/Effectiveness
< 10 g/dL	
Urinary Incontinence: Plan of Care for Urinary Incontinence in Women Aged 65 Years and Older	Patient and Family Engagement
Osteoarthritis (OA): Function and Pain Assessment	Patient and Family Engagement
Oncology: Medical and Radiation—Pain Intensity Quantified	Patient and Family Engagement
Oncology: Medical and Radiation—Plan of Care for Pain	Patient and Family Engagement
Cataracts: Patient Satisfaction within 90 Days Following Cataract Surgery	Patient and Family Engagement
Preventive Care and Screening: Influenza Immunization	Population/Public Health
Preventive Care and Screening: Body Mass Index (BMI) Screening and Follow-Up	Population/Public Health
Preventive Care and Screening: Unhealthy Alcohol Use—Screening	Population/Public Health
Hepatitis C: Hepatitis A Vaccination in Patients with Hepatitis C Virus (HCV)	Population/Public Health
Hepatitis C: Hepatitis B Vaccination in Patients with Hepatitis C Virus (HCV)	Population/Public Health

<b>Measures</b>	<b>Domain</b>
Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention	Population/Public Health
Preventive Care and Screening: Screening for High Blood Pressure and Follow-Up Documented	Population/Public Health
Perioperative Care: Timing of Prophylactic Parenteral Antibiotic—Ordering Physician	Patient Safety
Perioperative Care: Selection of Prophylactic Antibiotic—First OR Second Generation Cephalosporin	Patient Safety
Perioperative Care: Discontinuation of Prophylactic Parenteral Antibiotics (Non-Cardiac Procedures)	Patient Safety
Perioperative Care: Venous Thromboembolism (VTE) Prophylaxis (When Indicated in ALL Patients)	Patient Safety
Perioperative Care: Timely Administration of Prophylactic Parenteral Antibiotics	Patient Safety
Discontinuation of Prophylactic Antibiotics (Cardiac Procedures)	Patient Safety
Medication Reconciliation: Reconciliation After Discharge from an Inpatient Facility	Patient Safety
Prevention of Catheter-Related Bloodstream Infections (CRBSI): Central Venous Catheter (CVC) Insertion Protocol	Patient Safety
Documentation of Current Medications in the Medical Record	Patient Safety
Radiology: Exposure Time Reported for Procedures Using Fluoroscopy	Patient Safety
Falls: Risk Assessment	Patient Safety
Oncology: Radiation Dose Limits to Normal Tissues	Patient Safety
Thoracic Surgery: Recording of Clinical Stage Prior to Lung Cancer or Esophageal Cancer Resection	Patient Safety
Elder Maltreatment Screen and Follow-Up Plan	Patient Safety
Cataracts: Complications Within 30 Days Following Cataract Surgery Requiring Additional Surgical Procedures	Patient Safety
Perioperative Temperature Management	Patient Safety
Thoracic Surgery: Pulmonary Function Tests Before Major Anatomic Lung Resection (Pneumonectomy, Lobectomy or Formal Segmentectomy)	Patient Safety
Image Confirmation of Successful Excision of Image-Localized Breast Lesion	Patient Safety
Atrial Fibrillation and Atrial Flutter: Chronic Anticoagulation Therapy	Patient Safety
Osteoporosis: Communication with the Physician Managing Ongoing Care Post-Fracture of Hip, Spine or Distal Radius for Men and Women Aged 50 Years and Older	Care Coordination
Advance Care Plan	Care Coordination

<b>Measures</b>	<b>Domain</b>
Adult Kidney Disease: Hemodialysis Adequacy: Solute	Care Coordination
Adult Kidney Disease: Peritoneal Dialysis Adequacy: Solute	Care Coordination
Acute Otitis Externa (AOE): Systemic Antimicrobial Therapy— Avoidance of Inappropriate Use	Care Coordination
Melanoma: Coordination of Care	Care Coordination
Primary Open-Angle Glaucoma (POAG): Reduction of Intraocular Pressure (IOP) by 15% OR Documentation of a Plan of Care	Care Coordination
Nuclear Medicine: Correlation with Existing Imaging Studies for All Patients Undergoing Bone Scintigraphy	Care Coordination
Falls: Plan of Care	Care Coordination
Rheumatoid Arthritis (RA): Glucocorticoid Management Functional Outcome Assessment	Care Coordination
Endoscopy & Polyp Surveillance: Colonoscopy Interval for Patients with a History of Adenomatous Polyps—Avoidance of Inappropriate Use	Care Coordination
Referral for Otologic Evaluation for Patients with Congenital or Traumatic Deformity of the Ear	Care Coordination
Functional Deficit: Change in Risk-Adjusted Functional Status for Patients with Knee Impairments	Care Coordination
Functional Deficit: Change in Risk-Adjusted Functional Status for Patients with Hip Impairments	Care Coordination
Functional Deficit: Change in Risk-Adjusted Functional Status for Patients with Lower Leg, Foot or Ankle Impairments	Care Coordination
Functional Deficit: Change in Risk-Adjusted Functional Status for Patients with Lumbar Spine Impairments	Care Coordination
Functional Deficit: Change in Risk-Adjusted Functional Status for Patients with Shoulder Impairments	Care Coordination
Functional Deficit: Change in Risk-Adjusted Functional Status for Patients with Elbow, Wrist or Hand Impairments	Care Coordination
Functional Deficit: Change in Risk-Adjusted Functional Status for Patients with Neck, Cranium, Mandible, Thoracic Spine, Ribs or Other General Orthopedic Impairments	Care Coordination
Radiology: Reminder System for Mammograms	Care Coordination
Surveillance After Endovascular Abdominal Aortic Aneurysm Repair Care Coordination (EVAR)	Care Coordination
Rate of Open Repair of Small or Moderate Non-Ruptured Abdominal Aortic Aneurysms (AAA) without Major Complications (Discharged to Home by Post-Operative Day #7)	Care Coordination

<b>Measures</b>	<b>Domain</b>
Rate of Endovascular Aneurysm Repair (EVAR) of Small or Moderate Non-Ruptured Abdominal Aortic Aneurysms (AAA) without Major Complications (Discharged to Home by Post-Operative Day #2)	Care Coordination
Rate of Carotid Endarterectomy (CEA) for Asymptomatic Patients without Major Complications (Discharged to Home by Post-Operative Day #2)	Care Coordination
Referral to Otologic Evaluation for Patients with Acute or Chronic Dizziness	Care Coordination
Biopsy Follow-Up	Care Coordination
Endoscopy/Polyp Surveillance: Appropriate Follow-Up Interval for Normal Colonoscopy in Average Risk Patients	Care Coordination
Participation by a Hospital, Physician or Other Clinician in a Systematic Clinical Database Registry that Includes Consensus Endorsed Quality	Care Coordination
Appropriate Treatment for Children with Upper Respiratory Infection (URI)	Efficient Use of Health Care Resources
Appropriate Testing for Children with Pharyngitis	Efficient Use of Health Care Resources
Prostate Cancer: Avoidance of Overuse of Bone Scan for Staging Low Risk Prostate Cancer Patients	Efficient Use of Health Care Resources
Antibiotic Treatment for Adults with Acute Bronchitis: Avoidance of Inappropriate Use	Efficient Use of Health Care Resources
Radiology: Inappropriate Use of ‘Probably Benign’ Assessment Category in Mammography Screening	Efficient Use of Health Care Resources
Melanoma: Overutilization of Imaging Studies in Melanoma	Efficient Use of Health Care Resources
Cardiac Stress Imaging Not Meeting Appropriate Use Criteria: Preoperative Evaluation in Low Risk Surgery Patients	Efficient Use of Health Care Resources
Cardiac Stress Imaging Not Meeting Appropriate Use Criteria: Routine Testing After Percutaneous Coronary Intervention (PCI)	Efficient Use of Health Care Resources
Cardiac Stress Imaging Not Meeting Appropriate Use Criteria: Testing in Asymptomatic, Low Risk Patients	Efficient Use of Health Care Resources
<b>Cost Measures (calculated for all practices)</b>	
All Beneficiaries	Total per capita costs
Costs for Beneficiaries with Specific Conditions	
Diabetes	Condition-specific per capita costs
COPD	Condition-specific per capita costs
Coronary Artery Disease	Condition-specific per capita costs
Heart Failure	Condition-specific per capita costs



**eTable 2. Value Modifier, 2015 Payment Year**

	<b>Low Quality</b>	<b>Average Quality</b>	<b>High Quality</b>
<b>Low Cost</b>	0.0%	+1.0x%	+2.0x%
<b>Average Cost</b>	-0.5%	0.0%	+1.0x%
<b>High Cost</b>	-1.0%	-0.5%	0.0%

Note: “X” is an upward payment adjustment factor, to ensure budget neutrality. For example, in 2015, the adjustment factor was 4.89, resulting in a maximum bonus of  $2.0 \times 4.89$  or 9.78%. Red indicates penalty, and green indicates bonus.

**eTable 3. Performance Regressions, Unadjusted**

Measures	Intercept			High social risk only			High medical risk only			Both high social risk and high medical risk					
	Beta	95% CI		Beta	95% CI		p-value	Beta	95% CI		p-value	Beta	95% CI		p-value
Clinical Process Effectiveness	0.19	0.10	0.28	-0.92	-1.22	-0.62	0.000	-0.44	-0.66	-0.21	0.000	-0.44	-0.70	-0.19	0.001
Population/Public Health	0.05	-0.07	0.16	-0.06	-0.53	0.40	0.786	-0.26	-0.61	0.10	0.157	0.03	-0.49	0.55	0.914
Patient Safety	0.42	0.34	0.50	-0.32	-0.60	-0.05	0.022	-0.19	-0.38	0.00	0.052	-0.34	-0.57	-0.12	0.003
Care Coordination	0.38	0.32	0.44	-0.33	-0.53	-0.13	0.001	-0.57	-0.72	-0.42	0.000	-0.91	-1.09	-0.74	0.000
Total per capita costs	-0.26	-0.44	-0.08	-0.92	-1.38	-0.46	0.000	2.19	1.78	2.61	0.000	1.21	0.79	1.64	0.000
Condition specific costs	-0.26	-0.38	-0.14	-0.46	-0.81	-0.12	0.009	1.76	1.47	2.05	0.000	1.08	0.77	1.38	0.000
Quality composite	0.18	0.09	0.28	-1.04	-1.37	-0.71	0.000	-0.73	-0.98	-0.49	0.000	-0.96	-1.24	-0.68	0.000
Cost composite	-0.18	-0.25	-0.10	-0.35	-0.55	-0.14	0.001	1.00	0.81	1.18	0.000	0.57	0.38	0.76	0.000

Note: ACSC=ambulatory care sensitive condition, HF=heart failure, DM=diabetes mellitus, COPD=chronic obstructive pulmonary disease, and CAD=coronary artery disease.

**eTable 4. Ordinary Least Squares Payment Regressions, Unadjusted**

**a. With interaction term**

Outcomes		Intercept			High medical risk				High social risk				Interaction			
		Beta	95% CI		Beta	95% CI		p-value	Beta	95% CI		p-value	Beta	95% CI		p-value
VM	Performance-based bonus	0.03	0.02	0.04	-0.03	-0.05	0.00	0.035	-0.02	-0.05	0.01	<b>0.216</b>	0.02	-0.03	0.06	<b>0.422</b>
	Neutral	0.76	0.72	0.80	-0.08	-0.17	0.00	<b>0.063</b>	-0.32	-0.42	-0.23	0.000	0.15	0.00	0.30	0.047
	Participation-based penalty	0.21	0.17	0.25	0.10	0.01	0.18	0.026	0.32	0.23	0.41	0.000	-0.17	-0.31	-0.02	0.023
	Performance-based penalty	0.00	-0.01	0.01	0.01	-0.01	0.03	<b>0.157</b>	0.02	0.00	0.04	<b>0.097</b>	0.00	-0.03	0.03	<b>0.970</b>

**b. With four groups**

Outcomes		Intercept (Low-risk)			High medical risk only				High social risk only				Both			
		n=547			n=128				n=102				n=122			
		Beta	95% CI		Beta	95% CI		p-value	Beta	95% CI		p-value	Beta	95% CI		p-value
VM	Performance-based bonus	0.03	0.02	0.04	-0.03	-0.05	0.00	0.035	-0.02	-0.05	0.01	<b>0.216</b>	-0.03	-0.05	0.00	0.038
	Neutral	0.76	0.72	0.80	-0.08	-0.17	0.00	<b>0.063</b>	-0.32	-0.42	-0.23	0.000	-0.25	-0.34	-0.17	0.000
	Participation-based penalty	0.21	0.17	0.25	0.10	0.01	0.18	0.026	0.32	0.23	0.41	0.000	0.25	0.16	0.34	0.000
	Performance-based penalty	0.00	-0.01	0.01	0.01	-0.01	0.03	<b>0.157</b>	0.02	0.00	0.04	<b>0.097</b>	0.03	0.01	0.05	0.002

Note: In the first table, the regressors are high social risk, high medical risk, and an interaction term. In the second table, the regressor is a categorical variable with four values (high social risk only, high medical risk only, both high social and high medical risk, and low-risk, which is the reference group). For both tables, practice-level OLS regressions were run separately for each line.

**eTable 5. Ordered Logistic Payment Regression, Unadjusted**

**a. With interaction term**

Outcomes		Intercept		High medical risk			High social risk			Interaction		
		Odds Ratio	95% CI	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value
VM	4 Ordered Levels			0.53	0.35 0.80	0.002	0.22	0.14 0.34	0.000	2.26	1.16 4.39	0.016

**b. With four groups**

Outcomes		Intercept (Low-risk)		High medical risk			High social risk			Both		
		n=547		n=128			n=102			n=122		
		Odds	95% CI	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value
VM	4 Ordered Levels			0.53	0.35 0.80	0.002	0.22	0.14 0.34	0.000	0.26	0.17 0.39	0.000

Note: The four outcomes are coded as follows: 1=performance-based penalty, 2=penalty for non-participation, 3=neutral, and 4=performance-based bonus.

**eTable 6. Ordinary Least Squares Payment Regressions, Unadjusted, With Simulated Performance-Based Payments**

**a. With interaction term**

Outcomes		Intercept			High medical risk			High social risk			Interaction					
		Beta	95% CI		Beta	95% CI		p-value	Beta	95% CI		p-value	Beta	95% CI		p-value
VM	Performance-based bonus	0.07	0.05	0.09	-0.07	-0.11	-0.03	0.002	-0.01	-0.05	0.04	<b>0.706</b>	0.03	-0.05	0.10	<b>0.485</b>
	Neutral	0.69	0.65	0.73	-0.17	-0.26	-0.08	0.000	-0.37	-0.47	-0.27	0.000	0.25	0.10	0.41	0.001
	Penalty for non-participation	0.21	0.17	0.25	0.10	0.01	0.18	0.026	0.32	0.23	0.41	0.000	-0.17	-0.31	-0.02	0.023
	Performance-based penalty	0.04	0.01	0.06	0.14	0.09	0.19	0.000	0.06	0.01	0.12	0.029	-0.11	-0.20	-0.02	0.011

**b. With four groups**

Outcomes		Intercept (Low-risk)			High medical risk			High social risk			Both					
		n=547			n=128			n=102			n=122					
		Beta	95% CI		Beta	95% CI		p-value	Beta	95% CI		p-value	Beta	95% CI		p-value
VM	Performance-based bonus	0.07	0.05	0.09	-0.07	-0.11	-0.03	0.002	-0.01	-0.05	0.04	<b>0.706</b>	-0.05	-0.09	-0.01	0.019
	Neutral	0.69	0.65	0.73	-0.17	-0.26	-0.08	0.000	-0.37	-0.47	-0.27	0.000	-0.29	-0.39	-0.20	0.000
	Penalty for non-participation	0.21	0.17	0.25	0.10	0.01	0.18	0.026	0.32	0.23	0.41	0.000	0.25	0.16	0.34	0.000
	Performance-based penalty	0.04	0.01	0.06	0.14	0.09	0.19	0.000	0.06	0.01	0.12	0.029	0.09	0.04	0.15	0.000

Note: In the first table, the regressors are high social risk, high medical risk, and an interaction term. In the second table, the regressor is a categorical variable with four values (high social risk only, high medical risk only, both high social and high medical risk, and low-risk, which is the reference group). For both tables, practice-level OLS regressions were run separately for each line.

**eTable 7. Ordered Logistic Payment Regression, Unadjusted, With Simulated Performance-Based Payments**

**a. With interaction term**

Outcomes		Intercept		High medical risk			High social risk			Interaction		
		Odds Ratio	95% CI	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value
VM	4 Ordered Levels			0.29	0.20 0.42	0.000	0.24	0.16 0.36	0.000	3.40	1.83 6.35	0.000

**b. Without interaction term**

Outcomes		Intercept (Low-risk)		High medical risk			High social risk			Both		
		n=547		n=128			n=102			n=122		
		Odds	95% CI	Odds	95% CI	p-value	Odds	95% CI	p-value	Odds	95% CI	p-value
VM	4 Ordered Levels			0.29	0.20 0.42	0.000	0.24	0.16 0.36	0.000	0.24	0.16 0.35	0.000

Note: The four outcomes are coded as follows: 1=performance-based penalty, 2=penalty for non-participation, 3=neutral, and 4=performance-based bonus.