NATIONAL QUALITY FORUM

Memo

June 4, 2018

To: Consensus Standards Approval Committee (CSAC)

From: Ambulatory Care Patient Safety (ACPS) Project Team

Re: Discussion: Ambulatory Care Patient Safety Draft Report Findings

NQF will provide an informational update to the CSAC on the Ambulatory Care Patient Safety (ACPS) project at its June 4-5, 2018 meeting.

This memo includes a summary of the project, measures and themes identified, and responses to the public and member comments. Accompanying this memo is the draft report, which is available on the project webpage.

Background

Ambulatory care settings have high patient volume and potential for harm. Measurement of patient safety in ambulatory care settings is critical to promoting better care and experiences for patients and families. Yet, the current landscape of performance measures that can assess patient safety in ambulatory care is poorly understood.

The National Quality Forum (NQF), with funding from the Department of Health and Human Services (HHS), engaged an advisory group of experts to provide guidance for an environmental scan of existing ambulatory care patient safety measures and measure concepts to help lay a foundation for informing the future development of priority measures.

Methodology

The environmental scan involved a three-step approach, which includes a literature review, measure scan, and key informant interviews. NQF conducted a review of the literature that included a search strategy with inclusion and exclusion criteria for search terms as outlined in Appendix A.

NQF also conducted key informant interviews with experts who practice or research patient safety in ambulatory settings to provide input on important areas for measure development based on the findings of the environmental scan. The advisory group and key informants identified antibiotic overuse and opioid prescription patterns as some of the most important areas for future measurement. Both key informants and advisory group members acknowledged the barriers to measure development in ambulatory care. For example, there is a lack of standardized methods for data collection, poor interoperability between medical record systems, and a lack of funding for clinical informatics to support continuous quality improvement.

Measures and Measure Concepts Identified

The environmental scan identified 146 measures and 417 measure concepts that were potentially related to ambulatory care patient safety. After a closer review of the measures and measure concepts identified and based on feedback from the advisory group, NQF identified a final set of 55 measures and 297 concepts. (See Appendix B). Based on a literature review and input from the advisory group, measures and concepts were grouped into one of the following categories:

- medication management and safety;
- care transitions and handoffs;
- diagnostic safety;
- prevention of adverse events and complications; and
- safety culture.

Advisory group members noted that measurement topics around antibiotic overuse and opioid prescription patterns were important, and found that structural and outcome measures were lacking. Some barriers to measuring patient safety in ambulatory care settings include a lack of standardized methods for data collection, poor interoperability between electronic health record systems, and a lack of funding for clinical informatics to support continuous quality improvement.

CSAC Action Required

NQF is seeking the CSAC's input on the Ambulatory Safety Draft Report. Specifically for discussion during the CSAC meeting:

- What are the measurement areas with the greatest room for development in the short term (e.g., strong evidence base, data are available, and implementable in current practice)?

Comments and Their Disposition

NQF received eight comments from three organizations (including two member organizations) and individuals pertaining to the draft report. The majority of the comments included several line items to add or refine in the report including definition of terms and clarity on the scope of the project.

Comment Themes and Advisory Group Responses

The Advisory Group reviewed all of the submitted comments. Advisory group members focused their discussion on topic areas with the most significant and recurring issues.

Themed Comments

Theme 1 – Measurement of hypoglycemic events

Commenters noted that while hypoglycemia has been identified as one of the top priorities in the National Action Plan for Adverse Drug Event Prevention, there are currently no measures that capture patient-reported hypoglycemic events in the ambulatory setting. The commenter observed that the environmental scan identified one measure and one measure concept related

to this issue, but suggested that patient reports may be a better source for reliable information on hypoglycemic events, and urged development of measures in this area.

Theme 2 – Safety of ambulatory care for pediatric patients

A commenter emphasized that pediatric safety should be a critical component in efforts to improve safety in ambulatory care. The commenter noted several specific issues that have an impact on pediatric safety, including continuity of care, access to subspecialty care and therapies, developmental screening, adolescent privacy, care coordination and care transitions—particularly for high-risk diagnoses, patient/parent health literacy, ADHD, appropriate use of medications following therapy, use of codeine in children, and pediatric-specific EHR functionality.

Theme 3 – Need for caution in developing and implementing measures in the ambulatory setting

Several commenters highlighted the importance of developing and implementing measures for which there is clear evidence of linkages between processes or structures and relevant outcomes, and measures that are feasible to collect and report. Commenters reiterated that there are many challenges to measurement in the ambulatory setting, including limited evidence, and suggested that it may be particularly difficult to develop meaningful outcome measures at this time. The commenters also urged stakeholders to take measurement approaches that will be useful for performance improvement and that will not add unnecessary documentation burden.

Advisory Group Response

Advisory Group members agreed that it would be important to highlight pediatric-specific ambulatory measures in the draft report. Another Advisory Group member noted that instead of categorizing measures by age groups or diseases that it may also be meaningful to look at universal measurement themes that are not unique to one specific population or care setting. The Advisory Group noted they would like to provide additional input to the report on priority areas for measure development.

Next Steps

NQF finalized the report and submitted the final deliverable to HHS on June 1, 2018.

Appendix A: Methodology

NQF used the search terms outlined below and the search parameters in Table A1. Note that search words were combined with terms like “measure,” “measurement,” “survey,” “scale,” etc. in order to help identify relevant measures.

Search Terms

- Adverse
- Ambulatory care
- Ambulatory settings
- Ambulatory facilities
- Care coordination
- Diagnosis
- Diagnostic accuracy
- Error
- Harm
- Medication safety
- Outpatient
- Outpatient care
- Outpatient settings
- Outpatient facilities
- Patient safety culture
- Primary care
- Referrals
- Safety
- Safety culture
- Safety outcomes
- Transfer
- Transitions of care
- Test results

Table A1. Search Parameters

Included	Excluded
• Developed or published after 2000 OR originally published prior to 2000 and still current • Measures that include specifications that meet the operational definition of patient safety measures • Ambulatory care will include physicians', doctors', and nurse practitioners' offices, and clinics, including urgent care centers • Instruments, scales, survey tools, and surveys • International sources that were published in English	• Published before 2000 and not current • Care that occurs in specialized outpatient settings: physical, speech, and occupational therapy; home healthcare; hospice; community-based and other long-term care delivered outside of the home; ambulatory surgery centers; outpatient procedure settings including radiology, gastroenterology, and chemotherapy; and dialysis centers • Not available in English

Appendix B – Measure and Measure Concepts Inventory

Care Transitions and Handoffs

Measure Title	Measure Description	Measure Type	Source
Critical Information Communicated with Request for Referral (sent by primary care provider)	Percentage of patients with relevant clinical information communicated using the Continuity of Care Document (HL7 CCD). This is sent along with the request for referral to specialist.	Process	Chan KS, Weiner JP, Scholle SH, et al. *EHR-Based Care Coordination Performance Measures in Ambulatory Care.* Washington, DC; 2011. Available at http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2011/nov/1550_chan_ehr_based_care_coord_ib_v2.pdf. Last accessed March 2018.
Critical Information Communicated with Request for Referral (sent by received by specialist)	Percentage of patients with relevant clinical information communicated using the Continuity of Care Document (HL7 CCD) with request for referral to specialist.	Process	Chan KS, Weiner JP, Scholle SH, et al. *EHR-Based Care Coordination Performance Measures in Ambulatory Care.* Washington, DC; 2011. Available at http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2011/nov/1550_chan_ehr_based_care_coord_ib_v2.pdf. Last accessed March 2018.
Primary Care Communication About Referral to Patient and Family	Percentage of referred patients for whom the primary care clinician gave patient written information on reason for referral or consultation.	Process	Chan KS, Weiner JP, Scholle SH, et al. *EHR-Based Care Coordination Performance Measures in Ambulatory Care.* Washington, DC; 2011. Available at http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2011/nov/1550_chan_ehr_based_care_coord_ib_v2.pdf. Last accessed March 2018.
Specialist Communication of Results to Patient and Family	Percentage of patients seen by a specialist and provided with written results by the specialist.	Process	Chan KS, Weiner JP, Scholle SH, et al. *EHR-Based Care Coordination Performance Measures in Ambulatory Care.* Washington, DC; 2011. Available at http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2011/nov/1550_chan_ehr_based_care_coord_ib_v2.pdf. Last accessed March 2018.
Primary Care Physician Review of Specialist Report	Percentage of referred patients seen by the specialist for whom the primary care clinician reviewed the results of the specialist report.	Process	Chan KS, Weiner JP, Scholle SH, et al. *EHR-Based Care Coordination Performance Measures in Ambulatory Care.* Washington, DC; 2011. Available at http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2011/nov/1550_chan_ehr_based_care_coord_ib_v2.pdf. Last accessed March 2018.
Critical Information Communicated with Request for Referral (sent by primary care provider)	Percentage of patients with relevant clinical information communicated using the Continuity of Care Document (HL7 CCD). This is sent along with the request for referral to specialist.	Process	Chan KS, Weiner JP, Scholle SH, et al. *EHR-Based Care Coordination Performance Measures in Ambulatory Care.* Washington, DC; 2011. Available at http://www.commonwealthfund.org/~/media/files/publications/issue-brief/2011/nov/1550_chan_ehr_based_care_coord_ib_v2.pdf. Last accessed March 2018.
Venous Thromboembolism Diagnosis and Treatment	This measure is used to assess the percentage of patients age 18 years and older with any of these diagnosis – venous thromboembolism (VTE), deep venous thrombosis (DVT), or pulmonary embolism (PE) – indicating a complete list of medications was communicated to the next clinician of service when the patient is referred or transferred to another setting, service, practitioner or level of care within or outside the organization.	Process	AHRQ National Quality Measures Clearinghouse Inventory
Closing the Referral Loop: Receipt of Specialist Report	Percentage of patients with referrals, regardless of age, for which the referring provider receives a report from the provider to whom the patient was referred.	Process	CMS Measures Inventory
CG CAHPS: Supplemental Item Care Coordination	Enrollee experience related to the following:- Doctor seemed informed and up-to-date about care from other health providers- Doctor had your medical records- Doctor followed up about blood test, x-ray results- Got blood test, x-ray results as soon as you needed them- Doctor talked about prescription drugs you are taking- Got help you needed from doctor's office manage your care among different providers CAHPS Health Plan 5.0- Supplemental Items.	Patient Experience	CMS Measures Inventory
CG CAHPS: Supplemental Item Care Coordination	Percentage of provider had medical records during your visits. Percentage of provider's office followed up to give you results of test or X-ray. Percentage of patient needed help from your care team to manage care, tests, or treatment from different providers. Percentage of patient got help from your care team to manage care, tests, or treatment from different providers. Q66. Satisfaction with help from your care team to manage care, tests, or treatment from different providers.	Patient Experience	CMS Measures Inventory

Diagnostic Safety

Measure Title	Measure Description	Measure Type	Source
Mammography assessment category data collection	Percentage of patients undergoing screening mammograms whose assessment category [e.g., Mammography Quality Standards Act (MQSA), Breast Imaging Reporting and Data System (BI-RADS®), or FDA approved equivalent categories] is entered into an internal database that will, at a minimum, allow analysis of abnormal interpretation (recall) rate.	Structure	NQF-Not Endorsed; American Medical Association-Physician Consortium for Performance Improvement
Communication of suspicious findings from the diagnostic mammogram to the patient	Percentage of patients undergoing diagnostic mammograms that are classified as "suspicious" or "highly suggestive of malignancy" with documentation of direct communication of findings from the diagnostic mammogram to the patient within 5 business days of exam interpretation.	Process	NQF-Not Endorsed; American Medical Association-Physician Consortium for Performance Improvement
Communication of suspicious findings from the diagnostic mammogram to the practice managing ongoing care	Percentage of patients undergoing diagnostic mammograms that are classified as "suspicious" or "highly suggestive of malignancy" with documentation of direct communication of findings from the diagnostic mammogram to the practice that manages the patient's on-going care within 3 business days of exam interpretation.	Process	NQF-Not Endorsed; American Medical Association-Physician Consortium for Performance Improvement
Communication to Referring Physician of Patient's Potential Risk for Fracture for All Patients Undergoing Bone Scintigraphy	Percentage of patients, regardless of age, undergoing bone scintigraphy considered to be potentially at risk for fracture in a weight-bearing site for whom there is documentation of direct communication to the referring physician within 24 hours of completion of the imaging study.	Process	NQF-Not Endorsed; American Medical Association-Physician Consortium for Performance Improvement
BIRADS to Biopsies	Timely follow-up after abnormal mammogram.	Process	Los Angeles County Department of Health Services, San Francisco Health Network
Correlation With Existing Imaging Studies for All Patients Undergoing Bone Scintigraphy	Percentage of final reports for all patients, regardless of age, undergoing bone scintigraphy that include physician documentation of correlation with existing relevant imaging studies (e.g., x-ray, MRI, CT) that were performed.	Process	NQF-Not Endorsed; American Medical Association-Physician Consortium for Performance Improvement
Basal Cell Carcinoma (BCC)/Squamous Cell Carcinoma: Biopsy Reporting Time - Pathologist to Clinician	Percentage of biopsies with a diagnosis of cutaneous Basal Cell Carcinoma (BCC) and Squamous Cell Carcinoma (SCC) (including in situ disease) in which the pathologist communicates results to the clinician within 7 days of biopsy date.	Process	CMS Measures Inventory
Biopsy: Reporting Time – Clinician to Patient	Percentage of patients with skin biopsy specimens with a diagnosis of cutaneous basal or squamous cell carcinoma (including in situ disease) who are notified of their final biopsy pathology findings within less than or equal to 14 days from the time the biopsy was performed.	Process	CMS Measures Inventory
Non-Melanoma Skin Cancer (NMSC): Biopsy Reporting Time - Clinician	Length of time taken from when a biopsy is performed to when a patient is notified by the biopsying physician that he or she has cutaneous basal or squamous cell carcinoma (including in situ disease). This measure evaluates the reporting time between the biopsying clinician and patient.	Process	CMS Measures Inventory
Cancer Detection Rate	The percentage of screening mammograms interpreted as positive (BIRADS 0, 4 or 5) that had a tissue diagnosis of cancer with 12 months.	Outcome	NQF-Not Endorsed; American College of Radiology
Diagnostic Mammography Positive Predictive Value 2 (PPV2 - Biopsy Recommended)	Percentage of diagnostic mammograms recommended for biopsy or surgical consult (BIRADS 4 or 5) that result in a tissue diagnosis of cancer within 12 months. The measure is to be reported annually based on aggregated patient data for mammograms performed 12 to 24 months prior to the reporting date to allow a 12 month follow up.	Outcome	NQF-Not Endorsed; American College of Radiology
Screening Mammography Positive Predictive Value 2 (PPV2 - Biopsy Recommended)	Percentage of screening mammograms with abnormal interpretation (BIRADS 0, 4 or 5) that result in a tissue diagnosis of cancer within 12 months. The measure is to be reported annually based on aggregated patient data for mammograms performed 12 to 24 months prior to the reporting date to allow a 12 month follow up.	Outcome	NQF-Not Endorsed; American College of Radiology
Diagnosis and Treatment of Ischemic Stroke	This measure is used to assess the percentage of patients age 18 years and older initially presenting with transient ischemic attack (TIA) who are admitted to the hospital, observation unit or expedited outpatient TIA clinic with documentation of clinical TIA symptoms within the last 24 hours.	Outcome	AHRQ National Quality Measures Clearinghouse Inventory

Medication Management and Safety

Measure Title	Measure Description	Measure Type	Source
Adoption of Medication e-Prescribing	Documents whether provider has adopted a qualified e-Prescribing system and the extent of use in the ambulatory setting.	Structure	NQF-Not Endorsed; Centers for Medicare & Medicaid Services
Documentation of allergies and adverse reactions in the outpatient record	Percentage of patients having documentation of allergies and adverse reactions in the medical record.	Process	National Committee for Quality Assurance (NCQA)
Documentation of Current Medications in the Medical Record	Percentage of visits for patients aged 18 years and older for which the eligible professional attests to documenting a list of current medications using all immediate resources available on the date of the encounter. This list must include ALL known prescriptions, over-the-counters, herbals, and vitamin/mineral/dietary (nutritional) supplements AND must contain the medications' name, dosage, frequency and route of administration	Process	NQF-Endorsed; Centers for Medicare & Medicaid Services
Diabetes Medication Dosing (DOS)	The percentage of patients who were dispensed a dose higher than the daily recommended dose for the following therapeutic categories of oral hypoglycemics: biguanides, sulfonlyureas and thiazolidinediones. The measure is comprised of three measure rates which are reported separately for each therapeutic category. The rates include: – Dosing for Biguanides – Dosing for Sulfonylureas – Dosing for Thiazolidinediones The full detailed measure specifications have also been submitted as a separate attachment.	Process	NQF-Not Endorsed; NCQA
Medication Change	For visits at which there was a medication change,* the percentage of visits where all medications prescribed by the provider were reconciled.	Process	Keogh C, Kachalia A, Fiumara K, et al. Ambulatory Medication Reconciliation: Using a Collaborative Approach to Process Improvement at an Academic Medical Center. *Jt Comm J Qual Patient Saf*. 2016;42(4):186-194.
Medication Change - Active	For visits at which there was a medication change,* the % of medications prescribed by the provider on the patient's medication list that were reconciled.	Process	Keogh C, Kachalia A, Fiumara K, et al. Ambulatory Medication Reconciliation: Using a Collaborative Approach to Process Improvement at an Academic Medical Center. *Jt Comm J Qual Patient Saf.* 2016;42(4):186-194.
Medication Reconciliation Post-Discharge	The percentage of discharges for patients 18 years of age and older for whom the discharge medication list was reconciled with the current medication list in the outpatient medical record by a prescribing practitioner, clinical pharmacist or registered nurse.	Process	AHRQ National Quality Measures Clearinghouse Inventory
Medication reconciliation post-discharge: percentage of discharges from January 1 to December 1 of the measurement year for members 18 years of age and older for whom medications were reconciled the date of discharge through 30 days after discharge (31 total days).	This measure is used to assess the percentage of discharges from January 1 to December 1 of the measurement year for members 18 years of age and older for whom medications were reconciled the date of discharge through 30 days after discharge (31 total days).	Process	AHRQ National Quality Measures Clearinghouse Inventory
Use of Opioids at High Dosage in Persons Without Cancer	The proportion (XX out of 1,000) of individuals without cancer receiving prescriptions for opioids with a daily dosage greater than 120mg morphine equivalent dose (MED) for 90 consecutive days or longer.	Process	NQF-Endorsed; PQA
Use of Opioids from Multiple Providers and at High Dosage in Persons Without Cancer	The proportion (XX out of 1,000) of individuals without cancer receiving prescriptions for opioids with a daily dosage greater than 120mg morphine equivalent dose (MED) for 90 consecutive days or longer, AND who received opioid prescriptions from four (4) or more prescribers AND four (4) or more pharmacies.	Process	NQF-Endorsed; PQA
Use of Opioids from Multiple Providers in Persons Without Cancer	The proportion (XX out of 1,000) of individuals without cancer receiving prescriptions for opioids from four (4) or more prescribers AND four (4) or more pharmacies.	Process	NQF-Endorsed; PQA

Measure Title	Measure Description	Measure Type	Source
Overuse Of Opioid Containing Medications For Primary Headache Disorders	Percentage of patients aged 12 years and older diagnosed with primary headache disorder and taking opioid containing medication who were assessed for opioid containing medication overuse within the 12-month measurement period and treated or referred for treatment if identified as overusing opioid containing medication.	Process	CMS Measures Inventory
Tuberculosis Test Prior to First Course Biologic Therapy	Percentage of patients 18 years and older with a diagnosis of rheumatoid arthritis that are newly prescribed a biologic therapy during the measurement period and whose medical record indicates tuberculosis testing in the 12 months preceding the biologic prescription.	Process	Yazdany J, Bansback N, Clowse M, et al. Rheumatology informatics system for effectiveness: a national informatics-enabled registry for quality improvement. *Arthritis Care Res (Hoboken)*. 2016;68(12):1866-1873.
INR for Individuals Taking Warfarin and Interacting Anti-Infective Medications	Percentage of episodes with an International Normalized Ratio (INR) test performed three to seven days after a newly started interacting anti-infective medication for individuals receiving warfarin.	Process	NQF-Endorsed; Centers for Medicare & Medicaid Services
INR Monitoring for Individuals on Warfarin	Percentage of individuals 18 years of age and older with at least 56 days of warfarin therapy who receive an International Normalized Ratio (INR) test during each 56-day interval with warfarin.	Process	NQF-Endorsed; Centers for Medicare & Medicaid Services
Annual Monitoring for Patients on Persistent Medications (MPM)	This measure assesses the percentage of patients 18 years of age and older who received a least 180 treatment days of ambulatory medication therapy for a select therapeutic agent during the measurement year and at least one therapeutic monitoring event for the therapeutic agent in the measurement year. Report the following three rates and a total rate: - Rate 1: Annual Monitoring for patients on angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARB): At least one serum potassium and a serum creatinine therapeutic monitoring test in the measurement year. - Rate 2: Annual monitoring for patients on digoxin: At least one serum potassium, one serum creatinine and a serum digoxin therapeutic monitoring test in the measurement year. - Rate 3: Annual monitoring for patients on diuretics: At least one serum potassium and a serum creatinine therapeutic monitoring test in the measurement year. - Total rate (the sum of the three numerators divided by the sum of the three denominators)	Process	NQF-Endorsed; NCQA
EHR with EDI prescribing used in encounters where a prescribing event occurred.	Of all patient encounters within the past month that used an electronic health record (EHR) with electronic data interchange (EDI) where a prescribing event occurred, how many used EDI for the prescribing event.	Process	NQF-OPUS Database; City of New York Department of Health and Mental Hygiene
Wrong-Patient Retract-and-Reorder (Wrong Patient-RAR) Measure	A Wrong-Patient Retract-and-Reorder (Wrong Patient-RAR) event occurs when an order is placed on a patient within an EHR, is retracted within 10 minutes, and then the same clinician places the same order on a different patient within the next 10 minutes. A Wrong-Patient Retract-and-Reorder rate is calculated by dividing Wrong Patient-RAR events by total orders examined.	Outcome	NQF-Endorsed; New York-Presbyterian Hospital

Prevention of Adverse Events and Complications

Measure Title	Measure Description	Measure Type	Source
Pressure Ulcer Prevention and Treatment Protocol: Outpatient	This measure is used to assess the percentage of outpatients with pressure ulcer(s) whose medical record contains documentation of a comprehensive patient assessment and thorough wound evaluation that includes the following: – History and physical – Wound description/staging – Etiology of pressure – Nutritional status – Bacterial colonization/infection – Psychosocial needs (anxiety, depression, worries)	Process	Institute for Clinical Systems Improvement

Measure Title	Measure Description	Measure Type	Source
Pressure ulcer prevention and treatment protocol: percentage of outpatients with a pressure ulcer(s) with documentation in the medical record that education was provided to patient, family and/or caregiver regarding the treatment, progression, and prevention of pressure ulcers	This measure is used to assess the percentage of outpatients with a pressure ulcer(s) with documentation in the medical record that education was provided to patient, family and/or caregiver regarding the treatment, progression, and prevention of pressure ulcers.	Process	AHRQ National Quality Measures Clearinghouse Inventory
Ambulatory care sensitive conditions: age-standardized acute care hospitalization rate for conditions where appropriate ambulatory care prevents or reduces the need for admission to the hospital, per 100,000 population younger than age 75 years.	This measure is used to assess the age-standardized acute care hospitalization rate for conditions where appropriate ambulatory care prevents or reduces the need for admission to the hospital, per 100,000 population under age 75 years.	Outcome	AHRQ National Quality Measures Clearinghouse Inventory
Potentially avoidable complications (PACs) in COPD patients	Percent of adult population aged 18 years and above who were diagnosed with COPD and were followed for one-year and had one or more of the following potentially avoidable complications (PACs): hospitalization or emergency room visit related to COPD and their associated professional services; Professional services related to the following conditions: pneumonia, lung complications, respiratory failure, respiratory insufficiency, tracheostomy, mechanical ventilation, minor lung procedures, bronchiectasis, empyema, lung abscess, phlebitis, deep vein thrombosis, pulmonary embolism, acute exacerbation of COPD, asthma, Syncope, Dizziness, Hypotension, diabetic emergency with Hypo- or Hyperglycemia, Stroke, Septicemia, Meningitis, Hepatitis, Adverse effects of drugs, overdose, poisoning, Complications of medical care, surgery, implanted device, grafts, Cardiac dysrhythmias, AMI, Coronary thrombolysis, Acute Renal Failure, Urinary tract infections, Decubitus ulcer, gangrene, arterial thrombosis, gastritis, ulcer, GI hemorrhage, fracture neck femur, falls, skin and wound care, traction, splints or osteomyelitis, antiemetics, antiarrhythmic agents, inotropic agents and vasopressors, antifungals, antiseptics, other topical agents, pulmonary hypertension drugs, drugs for poisoning.	Outcome	NQF-Not Endorsed; Health Care Incentives Improvement Institute
Proportion of Adult Asthma patients that have Potentially Avoidable Complications (PACs).	Percent of adult population aged 18 years and above who were diagnosed with Asthma and were followed for one-year and had one or more of the following potentially avoidable complications (PACs): hospitalization or emergency room visit related to Asthma and their associated professional services; Professional services related to the following conditions: Pneumonia, Lung complications, Respiratory failure, Respiratory insufficiency, Tracheostomy, Mechanical ventilation, Minor lung procedures, Bronchiectasis, Empyema, Lung abscess, Bronchitis, Pulmonary embolism, Acute exacerbation of Asthma, Diabetic emergency with Hypo- or Hyperglycemia, Syncope, coma, hypotension, dizziness, Stroke, Septicemia, meningitis, other infections, Adverse effects of drug overdose, poisoning, Complications of medical care, Surgery, implanted device, grafts, Cardiac dysrhythmias, AMI, coronary thrombolysis, Acute renal failure, Decubitus ulcer, gangrene, arterial thrombosis, Phlebitis, DVT, skin and wound care, Traction, splints, osteomyleitis, Infectious arthritis, Gastritis, ulcer, GI hemorrhage, GI infection, Antiemetics, antiarrhythmic agents, inotropic agents and vasopressors, Antifungals, Antiseptics, other topical agents, Pulmonary hypertension drugs, Drugs for poisoning.	Outcome	NQF-Not Endorsed; Health Care Incentives Improvement Institute

Measure Title	Measure Description	Measure Type	Source
Proportion of Diabetes patients that have Potentially Avoidable Complications (PACs).	Percent of adult population aged 18 years and above who were diagnosed with Diabetes and were followed for one-year and had one or more of the following potentially avoidable complications (PACs): hospitalization or emergency room visit related to diabetes and their associated professional services; Professional services related to the following conditions: Diabetic Emergency, Hypo- Hyper-glycemia, Subarachnoid and Intracerebral hemorrhage (Stroke, CVA), Syncope, Hypotension, Dizziness, Septicemia, Meningitis, Other Infections, Urinary Tract Infections, Visual loss, Blindness, Surgery for retinal tear, detachment, Acute Eye Infections, Acute Myocardial Infarction, Coronary thrombolysis, Acute Renal Failure, Pneumonia, lung complications, Tracheostomy, Mechanical ventilation, minor lung procedures, Gastritis, ulcer, GI hemorrhage, Acute post-hemorrhagic anemia, Decubitus Ulcer, Gangrene, Arterial Thrombosis, Phlebitis, DVT, pulmonary embolism, Embolectomy, Skin and wound care, traction, splints, osteomyleitis, infectious arthritis , Fracture neck femur, Falls, traction, splints, osteomyleitis, infectious arthritis , Adverse effects of drugs, overdose, poisoning, Complications of medical care, surgery, implanted device, grafts, antiemetics, ophthalmic anti-infectives and anti-inflammatories, ophthalmic steroid preparations, inotropic agents and vasopressors, thrombolytics, antibiotics, antifungals, antiseptics, other topical agents, drugs for poisoning, pulmonary hypertension drugs, agents for hypertensive emergencies.	Outcome	NQF-Not Endorsed; Health Care Incentives Improvement Institute
Proportion of patients with a chronic condition that have a potentially avoidable complication during a calendar year.	Percent of adult population aged 18+ years who were identified as having at least one of the following six chronic conditions: Asthma, Chronic Obstructive Pulmonary Disease (COPD), Coronary Artery Disease (CAD), Heart Failure (HF), Hypertension (HTN), or Diabetes Mellitus (DM), were followed for at least one-year, and had one or more potentially avoidable complications (PACs) during the most recent 12 months.	Outcome	NQF-Endorsed; Altarum Institute
Proportion of Patients with Arrhythmias (ARR) that have a Potentially Avoidable Complication (during the episode time window)	Percent of adult population aged 18 + years with arrhythmias (ARR) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_ARRBLK_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to ARR.	Outcome	NQF-Not Endorsed; Altarum Institute
Proportion of Patients with Coronary Artery Disease (CAD) that have a Potentially Avoidable Complication (during the episode time window)	Percent of adult population aged 18 + years with coronary artery disease (CAD) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_CAD_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to CAD.	Outcome	NQF-Not Endorsed; Altarum Institute
Proportion of Patients with Heart Failure (HF) that have a Potentially Avoidable Complication (during the episode time window)	Percent of adult population aged 18 + years with heart failure (HF) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_HF_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to HF.	Outcome	NQF-Not Endorsed; Altarum Institute
Proportion of Patients with Hypertension (HTN) that have a Potentially Avoidable Complication (during the episode time window)	Percent of adult population aged 18 + years with hypertension (HTN) who are followed for at least one-year and have one or more potentially avoidable complications (PACs) during the most recent 12 months. Please reference attached document labeled NQF_HTN_all_codes_risk_adjustment_01.25.17.xls, in the tabs labeled PACs I-9 and PAC I-10 for a list of code definitions of PACs relevant to HTN.	Outcome	NQF-Not Endorsed; Altarum Institute

Measure Title	Measure Description	Measure Type	Source
Proportion of Patients with Pneumonia that have a Potentially Avoidable Complication (during the episode time window)	Brief Description of Measure: Percent of adult population aged 18+ years with Community Acquired Pneumonia who are followed for one-month, and have one or more potentially avoidable complication (PAC) during the episode time window.	Outcome	NQF-Endorsed; Health Care Incentives Improvement Institute
Proportion of Pediatric Asthma patients that have Potentially Avoidable Complications (PACs).	Percent of pediatric population aged 2-17 years who were diagnosed with Asthma and were followed for one-year and had one or more of the following potentially avoidable complications (PACs): hospitalization or emergency room visit related to Asthma and their associated professional services; Professional services related to the following conditions: Pneumonia, Lung complications, Respiratory failure, Respiratory insufficiency, Tracheostomy, Mechanical ventilation, Minor lung procedures, Bronchiectasis, Empyema, Lung abscess, Bronchitis, Pulmonary embolism, Acute exacerbation of Asthma, Diabetic emergency with Hypo- or Hyperglycemia, Syncope, coma, hypotension, dizziness, Stroke, Septicemia, meningitis, other infections, Adverse effects of drug overdose, poisoning, Complications of medical care, Surgery, implanted device, grafts, Cardiac dysrhythmias, AMI, coronary thrombolysis, Acute renal failure, Decubitus ulcer, gangrene, arterial thrombosis, Phlebitis, DVT, skin and wound care, Traction, splints, osteomyleitis, Infectious arthritis, Gastritis, ulcer, GI hemorrhage, GI infection, Antiemetics, antiarrhythmic agents, inotropic agents and vasopressors, Antifungals, Antiseptics, other topical agents, Pulmonary hypertension drugs, Drugs for poisoning.	Outcome	NQF-Not Endorsed; Health Care Incentives Improvement Institute
Diabetes, Short-Term Complication Rate (pediatric)	Admission rate for diabetes short term complications in children ages 6 to 17, per 100,000 population (area level rate)	Outcome	NQF-Not Endorsed; Wisconsin Department of Employee Trust Funds an Agency for Healthcare Research and Quality

Measure Concept Inventory

NQF staff compiled a list of relevant measure concepts related to ambulatory care patient safety from the literature review (e.g., peer-reviewed articles, grey literature, etc.). In addition to the complied list below, a list of measure concepts from a systematic review of safety measures in adult primary care are included in this inventory and are marked with an asterisk.[a] The aforementioned list presents a wide spectrum of measure concepts from various peer-reviewed journals categorized by safety dimension, measure type, study country, and data sources.

Care Transitions and Handoffs

Measure Title	Measure Description	Measure Type	Source
Ambulatory Care Experiences Survey (ACES) measure of care coordination	Patient Survey: In the last 12 months… (Screen) …are there other doctors or nurses in your personal doctor's office who you have seen for any of your visits? If response is yes or missing: 1) …how often did you feel that these other doctors or nurses had all the information they needed to provide your care? Asked of all respondents: 2) …how often did your personal doctor seem informed and up-to-date about the care you received from specialist doctors? 3) …when your personal doctor sent you for a blood test, x-ray, or other test, did someone from your doctor's office follow up to give you the test results?	Patient Experience	Safran DG, Karp M, Coltin K, et al. Measuring patients' experiences with individual primary care physicians. results of a statewide demonstration project. *J Gen Intern Med*. 2006; 21(1):13-21.
N/A	There are locally agreed written protocols for prescribing across the primary-secondary care interface including hospital initiated prescribing	Structure	Shield T, Campbell S, Rogers A, et al. Quality indicators for primary care mental health services. *Qual Saf Health Care*. 2003;12:100-107.

Diagnostic Safety

Measure Title	Measure Description	Measure Type	Source
N/A	Web-based decision support tools and online reference materials are available to all providers to aid differential diagnosis.	Structure	Singh H, Graber ML, and Hofer TP. Measures to Improve Diagnostic Safety in Clinical Practice. *J Patient Saf*. 2016; epub.
Biopsy Follow-Up	Percentage of new patients whose biopsy results have been reviewed and communicated to the primary care/referring physician and patient by the performing physician.	Structure	CMS Quality Measures Inventory
Communication of Changes in Patient Care: Percentage of Healthcare Professionals Who Affirm That in Their Unit or Area Information Affecting a Patient Diagnosis is Always Communicated Clearly and Rapidly to All Professionals Involved in the Care of That Patient	This measure is used to determine the percentage of healthcare professionals who affirm that in their unit or area information affecting a patient's diagnosis is always communicated clearly and rapidly to all professionals involved in the care of that patient.	Process	AHRQ National Quality Measures Clearinghouse Inventory
N/A	Patients are given information about their condition, treatments, medication (including side effects) and coping strategies	Process	Shield T, Campbell S, Rogers A, et al. Quality indicators for primary care mental health services. *Qual Saf Health Care*. 2003;12:100-107.
Care Coordination: Pending Diagnostic Test Results	Care Coordination related to Pending Diagnostic Test Results is a nurse-sensitive process measure aimed at capturing the percentage of times pending diagnostic test results are documented as being provided to the patient and family in the ambulatory setting as well as the percentage of times that education was documented as being administered to the patient or family related to the pending diagnostic test results.	Process	Martinez K, Battaglia R, Start R, et al. Nursing-sensitive indicators in ambulatory care. *Nurs Econ*. 2015;33(1):59-63.
N/A	Proportion of abnormal diagnostic test results returned but not acted upon within an appropriate time window.*	Process	Singh H, Graber ML, and Hofer TP. Measures to improve diagnostic safety in clinical practice. *J Patient Saf*. 2016; epub.
N/A	Proportion of clinical providers who identify a surrogate to review diagnostic test results while on vacation or when leaving employment.*	Process	Singh H, Graber ML, and Hofer TP. Measures to improve diagnostic safety in clinical practice. *J Patient Saf*. 2016; epub.
N/A	The measure assesses the proportion of testing process errors related to communication including errors in communication with: patients, other providers sharing patient care, and/or errors in communication between the whole healthcare team.*	Process	Hickner J, Graham DG, Elder NC, et al. Testing process errors and their harms and consequences reported from family medicine practices: a study of the American Academy of Family Physicians National Research Network. *Qual Saf Health Care*. 2008;17(3):194-200. doi:10.1136/qshc.2006.021915.

[a]Hatoun J, Chan JA, Yaksic E, et al. A systematic review of patient safety measures in adult primary care. *Am J Med Qual*. 2017;32(3):237-245.

Measure Title	Measure Description	Measure Type	Source
N/A	The measure assesses the proportion of testing process errors related to notifying the patient of results including: failure to notify patient of test result, failure to notify patient test result in a timely fashion, failure to notify patient of test result in a sensitive manner, test results given to wrong patient, informed patient about same result more than once, incorrect test results given to patient, and/or notifying patients of investigation results (not otherwise specified).*	Process	Hickner J, Graham DG, Elder NC, et al. Testing process errors and their harms and consequences reported from family medicine practices: a study of the American Academy of Family Physicians National Research Network. *Qual Saf Health Care*. 2008;17(3):194-200. doi:10.1136/qshc.2006.021915.
N/A	The measure assesses the proportion of testing process errors related to treatments including medication errors.*	Process	Hickner J, Graham DG, Elder NC, et al. Testing process errors and their harms and consequences reported from family medicine practices: a study of the American Academy of Family Physicians National Research Network. *Qual Saf Health Care*. 2008;17(3):194-200. doi:10.1136/qshc.2006.021915.
N/A	This measure assesses the proportion of alerts for abnormal radiologic findings, flagged as requiring action by staff radiologists that had documented response to the alert in the EMR.*	Process	Singh H, Thomas EJ, Mani S, et al. Timely follow-up of abnormal diagnostic imaging test results in an outpatient setting: are electronic medical records achieving their potential? *Arch Intern Med*. 2009;169(17):1578-1586.
N/A	This measure assesses the proportion of alerts for abnormal radiologic findings, flagged as requiring action by staff radiologists that were acknowledged within two weeks.*	Process	Singh H, Thomas EJ, Mani S, et al. Timely follow-up of abnormal diagnostic imaging test results in an outpatient setting: are electronic medical records achieving their potential? *Arch Intern Med*. 2009;169(17):1578-1586.
N/A	This measure assesses the proportion of testing process errors related to clinician responding to the results including: responded incorrectly to test results, failure to notice or respond to abnormal test results, failure to notice will respond to abnormal test results in a timely manner, inappropriately responded to incomplete test results, failure to notice or respond to normal test results, failure to notice or respond to normal test results in a timely manner, and/or responding to investigation results (not otherwise specified).*	Process	Hickner J, Graham DG, Elder NC, et al. Testing process errors and their harms and consequences reported from family medicine practices: a study of the American Academy of Family Physicians National Research Network. *Qual Saf Health Care*. 2008;17(3):194-200. doi:10.1136/qshc.2006.021915.
N/A	This measure assesses the proportion of testing process errors related to reporting results to the clinician including: failure to report test results in a timely manner, failure to report correct results (wrong values on report), results never received my office, incorrect interpretation of results by facility or laboratory, previous results, images and specimens could not be found for comparison, Incorrect/incomplete information on reports, failure to report test results to provide a requesting test, and/or errors in reporting investigations to office (not otherwise specified).*	Process	Hickner J, Graham DG, Elder NC, et al. Testing process errors and their harms and consequences reported from family medicine practices: a study of the American Academy of Family Physicians National Research Network. *Qual Saf Health Care*. 2008;17(3):194-200. doi:10.1136/qshc.2006.021915.
N/A	This measure assesses the proportion of testing process errors related to test implementation including: requested test not done (including specimen not drawn, image not booked), specimen improperly collected or stored/old or in adequate specimen, specimen lost, specimen/patient sent to wrong facility, delay in obtaining specimen, wrong specimen obtained, stat or urgent test not processed or scheduled urgently, wrong test performed rescheduled, right test performed wrongly, failure to instruct patient how to prepare for investigation, test done but results lost, failure to alter medications for diagnostic procedure, and/or errors in implementing investigations (not otherwise specified).*	Process	Hickner J, Graham DG, Elder NC, et al. Testing process errors and their harms and consequences reported from family medicine practices: a study of the American Academy of Family Physicians National Research Network. *Qual Saf Health Care*. 2008;17(3):194-200. doi:10.1136/qshc.2006.021915.
N/A	This measure assesses the proportion of testing process errors related to test ordering including: needed test not ordered, wrong test ordered, unnecessary tests ordered, ordered tested wrong time, contra-indicated test ordered, wrong test/patient name recorded in law, test not entered into log; not border misinterpreted, incomplete or a loud illegible lab order slip, and/or errors in ordering investigations (not otherwise specified).*	Process	Hickner J, Graham DG, Elder NC, et al. Testing process errors and their harms and consequences reported from family medicine practices: a study of the American Academy of Family Physicians National Research Network. *Qual Saf Health Care*. 2008;17(3):194-200. doi:10.1136/qshc.2006.021915.

Medication Management and Safety

Measure Title	Measure Description	Measure Type	Source
N/A	Percentage of health plans that include access to MAT in their contracts with providers.	Structure	Centers for Medicare & Medicaid Services
N/A	Institute reporting requirement for opioid-related adverse drug events (ADEs); compare data year-to-year.	Structure	Centers for Medicare & Medicaid Services
Drug orders (Methotrexate)	Clinical decision support provides pended orders for folic acid whenever methotrexate is prescribed.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.

Measure Title	Measure Description	Measure Type	Source
Drug orders and weight (Hydroxychloroquine)	Clinical decision support provides suggested dosing based on patient's most recent weight.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Orders for Immunosuppressants and antibiotics	Enables identification of patients receiving "high-risk" drugs such as cyclophosphamide or rituximab.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Drug orders and lab results (Methotrexate, leflunomide)	Flags labs that are meaningfully abnormal or reflect a trend as opposed to "above the upper limit of normal."	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Orders for NSAID and acid reducer	Incorporates data regarding risk factors from problem list and clinical notes to identify high-risk patients.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Drug orders and ophthalmology procedures or results	Incorporates data regarding risk factors from problem list and clinical notes to identify high-risk patients.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Rituximab and Lab Results for Hepatitis B tests	Incorporates hepatitis test results from clinical notes.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017; 37:1603-1610.
Orders for Immunosuppressants and antibiotics	Incorporates information from allergies and clinical notes to assist in selection of appropriate prophylactic antibiotic.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Drug Orders (cyclosphosphamide, lefunomide, or other teratogenic drug)	Incorporates information from problem list and medications to identify patients of child-bearing age at risk for pregnancy.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Orders for immunosuppressants, PPD and Quantiferon gold results, appropriate TB treatment	Incorporates information from scanned outside hospital records (regarding prior PPD, chest radiograph results, TB treatment).	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Rituximab and Lab Results for Hepatitis B tests	Incorporates information scanned from outside hospital records.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Drug orders and lab results (Methotrexate, leflunomide)	Incorporates information scanned from outside hospital results.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Orders for immunosuppressants, PPD and Quantiferon gold results, appropriate TB treatment	Incorporates PPD results from clinical notes.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Drug orders and opthalmology procedures or results (Hydroxychloroquine)	Real-time clinical decision support provides pended ophthalmology referral after 5 years of use or sooner for high-risk patients.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Rituximab and Lab Results for Hepatitis B tests	Real-time clinical decision support provides pended order for lab test or prophylactic antibiotic when patient with a missing or positive hepatitis B is prescribed rituximab.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Orders for NSAID and acid reducer	Real-time clinical decision support provides pended order for prophylactic acid reducer when high-risk patient receives NSAID.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Orders for Immunosuppressants and antibiotics	Real-time clinical decision support provides pended order for prophylactic antibiotic when patient receives immunosuppressant.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Drug Orders (cyclosphosphamide, lefunomide, or other teratogenic drug)	Real-time clinical decision support suggests possible contraceptive options.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
Drug orders and lab results (Methotrexate, leflunomide)	Real-time triggers when patient has missed labs for >5 months.	Structure	Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rhematol Int*. 2017;37:1603-1610.
N/A	Patients on repeat maintenance drugs are offered regular reviews of their medication including monitoring for possible side effects and interactions with other drugs.	Structure	Shield T, Campbell S, Rogers A, et al. Quality indicators for primary care mental health services. *Qual Saf Health Care*. 2003;12:100-107.
N/A	There are written protocols and mechanisms in place for monitoring prescribing of psychotropic drugs.	Structure	Shield T, Campbell S, Rogers A, et al. Quality indicators for primary care mental health services. *Qual Saf Health Care*. 2003;12:100-107.
N/A	Details of currently prescribed maintenance drugs are prominently recorded in the medical record.	Structure	Shield T, Campbell S, Rogers A, et al. Quality indicators for primary care mental health services. *Qual Saf Health Care*. 2003;12:100-107.
N/A	Percentage participating in CMS-endorsed training on pain management.	Structure	Centers for Medicare & Medicaid Services
Appropriate follow-up	Proportion of new opioid prescriptions where patients have a clinical encounter with VA within 4 weeks. This metric is for opioid naive patients receiving their initial prescription.	Process	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
N/A	For incidences in which naloxone is administered to beneficiaries, what percentage of those beneficiaries were receiving Extended release/long-acting opioids.	Process	Centers for Medicare & Medicaid Services

Measure Title	Measure Description	Measure Type	Source
N/A	For incidences in which naloxone is administered to beneficiaries, what percentage of those beneficiaries were receiving A concurrent benzodiazepine prescription.	Process	Centers for Medicare & Medicaid Services
N/A	For incidences in which naloxone is administered to beneficiaries, what percentage of those beneficiaries were receiving Opioid prescriptions exceeding the CDC guideline.	Process	Centers for Medicare & Medicaid Services
Cardiovascular - contraindicated use of calcium-channel blockers	Percent of patients with heart failure who were dispensed a potentially contraindicated calcium-channel blocker.	Process	Pharmacy Quality Alliance
N/A	Percentage of beneficiaries receiving an opioid prescription without other supportive therapies/treatments.	Process	Centers for Medicare & Medicaid Services
N/A	Percentage of naloxone prescriptions issued for beneficiaries receiving opioid prescriptions: Over a certain dose (e.g., exceeding CDC recommended guideline), etc.	Process	Centers for Medicare & Medicaid Services
N/A	Percentage of naloxone prescriptions issued for beneficiaries receiving opioid prescriptions: As a co-prescription with medication assisted treatment for opioid use disorder because these people may be vulnerable to overdose if they relapse.	Process	Centers for Medicare & Medicaid Services
N/A	Percentage of naloxone prescriptions issued for beneficiaries receiving opioid prescriptions: Over a certain period of time (e.g. over 90 days).	Process	Centers for Medicare & Medicaid Services
N/A	Percentage of opioid prescriptions exceeding 7 days of treatment.	Process	Centers for Medicare & Medicaid Services
N/A	Percentage of opioid prescriptions exceeding CDC guideline of 90 morphine milligram equivalents (MME) per day.	Process	Centers for Medicare & Medicaid Services
N/A	Percentage of opioid prescriptions issued vs. all opioid and non-opioid pain management medication prescriptions; vs. referrals to other treatment modalities.	Process	Centers for Medicare & Medicaid Services
N/A	Percentage of opioid prescriptions written for extended release/long-acting opioids.	Process	Centers for Medicare & Medicaid Services
N/A	Percentage of physicians treating a beneficiary diagnosed with opioid use disorder who prescribed one or more MAT medications.	Process	Centers for Medicare & Medicaid Services
N/A	Rate of naloxone administration to beneficiaries.	Process	Centers for Medicare & Medicaid Services
Concurrent Use of Opioids and Benzodiazepines	The percentage of adults with concurrent prescriptions for opioids and benzodiazepines.	Process	Pharmacy Quality Alliance
Triple Threat: Concurrent Use of Opioids, Benzodiazepines or Nonbenzodiazepine Sedative/Hypnotics, and Muscle Relaxants (MDT 7)	The percentage of adults with concurrent prescriptions for opioids, benzodiazepines or nonbenzodiazepine sedative/hypnotics, and muscle relaxants.	Process	Pharmacy Quality Alliance
Inappropriate Duplicate Therapy	The percentage of adults with prescriptions for duplicate therapies	Process	Pharmacy Quality Alliance
Antipsychotic Use in Children Under 5 Years Old	The percentage of children under age 5 using antipsychotic medications during the measurement period.	Process	Pharmacy Quality Alliance
Polypharmacy: Use of Multiple CNS-Active Agents or Anticholinergics in The Elderly	The percentage of older adults with prescriptions for 3 or more CNS- active agents or 2 or more anticholinergics.	Process	Pharmacy Quality Alliance
Diabetes Medication Dosing (DOS)	The percentage of patients who were dispensed a dose higher than the daily recommended dose for the following therapeutic categories of oral hypoglycemics: biguanides, sulfonlyureas, thiazolidinediones and DPP-IV inhibitors. Report each of the following rates separately: • Dosing for Biguanides • Dosing for Sulfonylureas • Dosing for Thiazolidinediones • Dosing for DPP-IV Inhibitors	Process	Pharmacy Quality Alliance
Diabetes - medication dosing	The percentage of patients who were dispensed a dose higher than the maximum recommended dose for each therapeutic category of oral hypoglycemics: biguanides, sulfonylureas and thiazolidinediones.	Process	Pharmacy Quality Alliance
Safety - duplication of therapy (separate measures: sulfonylureas, biguanide, TZD)	The percentage of patients who were dispensed two or more different medications in the same therapeutic class simultaneously.	Process	Pharmacy Quality Alliance
Use of Multiple Antipsychotic Medications	The percentage of patients with concurrent therapy of three or more distinct antipsychotic medications for more than 30 days during the measurement year.	Process	Pharmacy Quality Alliance
Safety - duplication of therapy (calcium-channel blocker)	The proportion of patients with cardiovascular disease who are experiencing therapeutic duplication with calcium-channel blockers.	Process	Pharmacy Quality Alliance

Measure Title	Measure Description	Measure Type	Source
Cardiovascular - avoidance of chronic NSAIDS in patients with heart failure	The proportion of patients with a documented diagnosis of heart failure that do not receive dispensings for an NSAID.	Process	Pharmacy Quality Alliance
Safety - duplication of therapy (ACEI / ARB)	The proportion of patients with cardiovascular disease who are experiencing therapeutic duplication for ACEI/ARB medications.	Process	Pharmacy Quality Alliance
Safety - duplication of therapy (beta-blocker)	The proportion of patients with cardiovascular disease who are experiencing therapeutic duplication for beta-blocker medication.	Process	Pharmacy Quality Alliance
Concurrent Use of Opioids and Benzodiazepines	This measure examines the percentage of individuals 18 years and older with concurrent use of prescription opioids and benzodiazepines.	Process	Pharmacy Quality Alliance
Safety - duplication of therapy (respiratory)	This measure summarizes the percentage of patients who fill 2 or more prescriptions for different medications within the same therapeutic category for 2 or more consecutive fills.	Process	Pharmacy Quality Alliance
Receipt of high-risk prescription drugs (NCQA)	The receipt of any outpatient prescription drug on the High-Risk Medications in the Elderly list.	Process	Lund BC, Carrel M, Gellad WF. Incidence-versus prevalence-based measures of inappropriate prescribing in the Veterans Health Administration. *J Am Geriatr Soc*. 2015;63(8):1601-1607.
Psychosocial treatments	Proportion of opioid therapy patients who receive any of the following treatments within the year: (1) Coping skills/stress management training; (2) Psychotherapy procedures.	Process	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
Other pharmacotherapies	Proportion of patients with an opioid prescription who also received any of the following within the year: (1) Nonopioid analgesics including nonsteroidal anti-inflammatory drugs and acetaminophen; (2) Tricyclic antidepressants; (3) Serotonin–norepinephrine reuptake inhibitors; (4) Anticonvulsants; and (5) Topical medications.	Process	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
Rehabilitation medicine	Proportion of opioid therapy patients who receive treatments to increase activity including: (1) physical therapy; (2) occupational therapy; (3) special populations therapy; (4) recreational therapy; (5) pain clinic; and (6) others.	Process	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
Complementary and alternative medicine treatments	Proportion of opioid therapy patients who receive treatments considered complementary and alternative therapies.	Process	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
Risky sedative coprescription	Proportion of patients with overlapping prescriptions for an outpatient opioid and a barbiturate, benzodiazepine, or carisoprodol.	Process	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
Acetaminophen overprescription	Proportion of patients with overlapping prescriptions that total more than 3 g/ day or more than 4 g/day of acetaminophen.	Process	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
Frequency of potential DDI's in health plan members served by medical groups	Frequency of potential DDI's in health plan members served by medical groups.	Process	Solberg LI, Hurley JS, Roberts MH, et al. Measuring patient safety in ambulatory care: potential for identifying medical group drug-drug interaction rates using claims data. *Am J Manag Care*. 2004;10(11):753-759.
Safety - drug-drug interactions (alert overridden)	Percentage of DDI interaction alerts (level one severity) that were overridden by the pharmacists and dispensed as written.	Process	Pharmacy Quality Alliance
Safety - drug-drug interactions (alert with change in medication)	Percentage of DDI interaction alerts (level one severity) that were responded to by pharmacists, with a different medication dispensed.	Process	Pharmacy Quality Alliance
Safety - drug-drug interactions (alert with no medication dispensed)	Percentage of DDI interaction alerts (level one severity) that were responded to by pharmacists, with no medication dispensed.	Process	Pharmacy Quality Alliance
Safety - drug-drug interactions (incidence)	The percentage of patients who received a prescription for a target medication during the measurement period and who were dispensed a concurrent prescription for a precipitant medication.	Process	Pharmacy Quality Alliance
MTM - Drug Therapy Problem Resolutions	The percentage of drug therapy problem recommendations resolved as a result MTM services.	Process	Pharmacy Quality Alliance
Provision of MTM Services Post Hospital Discharge	The percentage of high-risk patients that have been discharged from the hospital and that receive MTM from a pharmacist within 7 days (Quality Improvement Indicator-not intended for comparative purposes).	Process	Pharmacy Quality Alliance
MTM - Medication Therapy Problem Resolution (MDT 9)	Not given.	Process	Pharmacy Quality Alliance

Measure Title	Measure Description	Measure Type	Source
Care Coordination: Medication Reconciliation	Care Coordination related to Medication Reconciliation is a nurse-sensitive process measure aimed at capturing the percentage of times the medication reconciliation tool was documented as provided to the patient and family in the ambulatory setting as well as the percentage of times that education was documented as being administered to the patient or family related to the medication reconciliation process.	Process	Martinez K, Battaglia R, Start R, et al. Nursing-sensitive indicators in ambulatory care. *Nurs Econ*. 2015;33(1):59-63.
Medication Reconciliation - High risk patients making transition to ambulatory care with medication reconciliation at community pharmacy	Percent of high risk patients with a new prescription or renewal of a prescription for whom their medications were reconciled.	Process	Pharmacy Quality Alliance
QII: Medication Reconciliation Upon Admission to Long-Term Care (MDT 4)	The percentage admissions to LTC for which medication reconciliation was completed by a pharmacist within 3 days.	Process	Pharmacy Quality Alliance
Medication Reconciliation - evidence of a patient's personal medication list	The percentage of patient encounters where a patient's personal medication list is available.	Process	Pharmacy Quality Alliance
Medication Reconciliation - patient personal medication list portability	The percentage of patient encounters where the patient is provided a reconciled personal medication list compared to the number of patient encounters.	Process	Pharmacy Quality Alliance
Medication Reconciliation - personal medication list creation	The percentage of patients where a documented personal medication list was created among patients without a documented personal medication list.	Process	Pharmacy Quality Alliance
Medication Reconciliation - patient's personal medication list discrepancies resolved	The percentage of the patient's personal medication list discrepancies resolved per patient encounter compared to the patient's personal medication list discrepancies identified per patient encounter.	Process	Pharmacy Quality Alliance
Medication Reconciliation - patient's personal medication list comprehensive review and reconciliation	The proportion of pharmacist-patient encounters where a patient's personal medication list is reviewed, updated, and reconciled.	Process	Pharmacy Quality Alliance
Documentation of Current Medications in the Medical Record (0-18 yo) (variation on NQF 0419)	N/A	Process	PRIME Projects and Metrics Protocol. From the Alameda Health System
Misuse risk: Psychiatric at-risk SUD	Proportion of patients with a substance use disorders (SUD) diagnosis not in remission seen in a specialty SUD setting for SUD treatment AND with urine drugs screens (UDSs)/labs within every 90 days supply of the opioid.	Process	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
All patients receive UDSs/screens	Proportion of patients receiving an opioid prescription that received the following: (1) drug screen for nonopioid abusable substances; (2) drug screen for heroin/morphine; and (3) drug screen for nonmorphine opioid compounds.	Process	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
N/A	Comparison of number of Part D prescription drug events (PDEs) for buprenorphine-naloxone across calendar years (looking for an increase in PDEs year-to-year).	Process	Centers for Medicare & Medicaid Services
Safety - high-alert drug review (2 indicators)	#1 Percentage of high alert drug reviews conducted by a pharmacy when presented with a high alert drug prescription. #2 Percentage of patients receiving counseling when receiving a prescription for a high alert drug	Process	Pharmacy Quality Alliance
N/A	No drug is prescribed unless the health professional understands the potential efficacy and side effects.	Process	Shield T, Campbell S, Rogers A, et al. Quality indicators for primary care mental health services. *Qual Saf Health Care*. 2003;12:100-107.
Bowel Regimen with Opioid Therapy	Percentage of persons prescribed an opioid regimen with / without a bowel regimen.	Process	Pharmacy Quality Alliance
Absolutely contraindicated opioid prescriptions	Number of new opioid prescriptions that are for a high-dose opioid formulation.	Process	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
Medication management/pharmacy reconciliation	Proportion of opioid therapy patients with evidence of medication management or pharmacy reconciliation.	Process	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
Override rate for prescription drug alert	Override ratio; override ratio per 100 prescriptions, and override rate per 100 alerts.	Process	Cho I, Slight SP, Nanji KC, et al. The effect of provider characteristics on the responses to medication-related decision support alerts. *Int J Med Inform*. 2015;84(9):630-639.
Cardiovascular - INR monthly testing for patients on anticoagulants	Average percentage of monthly intervals in which patients having claims for warfarin do not receive an INR test during the measurement period.	Process	Pharmacy Quality Alliance
Bowel regimen	Proportion of patients with an outpatient opioid prescription who are prescribed a bowel regimen.	Process	Shield T, Campbell S, Rogers A, et al. Quality indicators for primary care mental health services. *Qual Saf Health Care*. 2003;12:100-107.

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses NSAID dosing by calculating the total daily defined doses of NSAIDs divided by the number of patients standardized for age and level of morbidity, divided by number of days worked by the prescriber.*	Process	Fernández Urrusuno R, Pedregal González M, Torrecilla Rojas MA. Development of NSAIDs prescription indicators based on health outcomes. Eur J Clin Pharmacol. 2008;64(1):61-67. doi:10.1007/s00228-007-0384-3.
N/A	This measure assesses the change in average proton pump inhibitor (PPI) pills per month in the one month after a pharmacist's recommendation to taper the PPI as compared to the average PPI pills per month in the five months before, for any patient not requiring long- term PPI therapy.*	Process	Bundeff AW, Zaiken K. Impact of clinical pharmacists' recommendations on a proton pump inhibitor taper protocol in an ambulatory care practice. J Manag Care Pharm JMCP. 2013;19(4):325-333.
N/A	This measure assesses the proportion of all patients, excluding those with Raynaud's disease, who are prescribed a short-acting nifedipine.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588502
N/A	This measure assesses the proportion of female patients older than 35yrs, who are current cigarette smokers, who are prescribed a combined hormonal contraceptive.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588513
N/A	This measure assesses the proportion of female patients with a body mass index greater than or equal to 40 who are prescribed a combined hormonal contraceptive.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588514
N/A	This measure assesses the proportion of female patients with a history of breast cancer who are prescribed transdermal estrogens.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588511
N/A	This measure assesses the proportion of female patients with a history of venous or arterial thromboembolism who are prescribed a combined hormonal contraceptive.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588510
N/A	This measure assesses the proportion of female patients with an intact uterus who are prescribed oral or transdermal estrogen without progesterone.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588512
N/A	This measure assesses the proportion of patients aged > 40yrs and with cardiovascular disease risk > 20% who are prescribed a COX II selective NSAID.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients older than 50 years who are prescribed combined hormone replacement therapy for greater than or equal to five years.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients over 50 years old without a hysterectomy who are prescribed estrogens without cyclical progestogen.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients receiving a beta-blocker who are prescribed verapamil.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588525
N/A	This measure assesses the proportion of patients receiving a nitrate or nicorandil who are prescribed a phosphodiesterase type-5 inhibitor (e.g. sildenafil).*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588522

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of patients receiving an ACE inhibitor or angiotensin II receptor antagonist who are prescribed a potassium salt or potassium-sparing diuretic (excluding aldosterone antagonists, such as spironolactone).*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588524
N/A	This measure assesses the proportion of patients receiving simvastatin who are prescribed clarithromycin or erythromycin with no evidence of being advised to stop the simvastatin while taking the antibiotic.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588523
N/A	This measure assesses the proportion of patients treated with a beta-blocker who are prescribed verapamil or diltiazem.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with a strong opioid (morphine > 10 mg or equivalent) for > 4 weeks who are not prescribed a laxative.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with active asthma without COPD who are prescribed a non-cardio-selective oral beta-blocker.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with active asthma, defined by having a prescribed beta agonist inhaler in the last year, and without COPD, who are prescribed any oral beta blocker.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with an ACE-inhibitor or angiotensin receptor blocker (ARB) and a diuretic who are prescribed an oral nonsteroidal anti-inflammatory.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with digoxin and a calcium channel blocker (lercanidipine, nicardipine, nifedipine, diltiazem, verapamil) who are prescribed digoxin ≥ 250 mcg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with digoxin and amiodarone who are prescribed digoxin ≥ 250 mcg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with digoxin and chloroquine or hydroxychloroquine who are prescribed digoxin ≥ 250 mcg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with digoxin and ciclosporin who are prescribed digoxin ≥ 250 mcg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with digoxin and propafenone who are prescribed digoxin ≥ 250 mcg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with digoxin and quinine who are prescribed digoxin ≥ 250 mcg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of patients treated with low dose aspirin who are prescribed an oral COX II selective NSAID.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with methotrexate who are not given explicit dose instructions of weekly dosing.*	Process	Citation: Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with methotrexate who are prescribed more than one strength of methotrexate tablets.*	Process	Citation: Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with simvastatin and a fibrate (except fenofibrate) who are prescribed simvastatin > 10 mg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with simvastatin and amiodarone who are prescribed simvastatin > 20 mg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with simvastatin and an HIV protease inhibitor who are prescribed simvastatin > 10 mg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with simvastatin and ciclosporin who are prescribed simvastatin > 10 mg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with simvastatin and verapamil who are prescribed simvastatin > 10 mg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with stage 3, 4, or 5 chronic kidney disease (eGFR < 60) who are prescribed digoxin ≥ 250 mcg/day.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with stage 4 or 5 chronic kidney disease who are prescribed a sulphonylurea other than gliclazide or tolbutamide.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with stage 4 or 5 chronic kidney disease who are prescribed a thiazide diuretic.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with stage 4 or 5 chronic kidney disease who are prescribed an aldosterone antagonist.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of patients treated with stage 4 or 5 chronic kidney disease who are prescribed metformin.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with warfarin who are prescribed a macrolide.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with warfarin who are prescribed a slufonamide.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with warfarin who are prescribed an azole antifungal.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with warfarin who are prescribed chloramphenicol.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with warfarin who are prescribed griseofulvin.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with warfarin who are prescribed isoniazid.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with warfarin who are prescribed metronidazole.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with warfarin who are prescribed rifampin.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients who are prescribed warfarin in combination with an oral NSAID.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588521
N/A	This measure assesses the proportion of patients with a computer-coded diagnosis of peptic ulcer disease, who have not also had a prescription for a proton pump inhibitor (PPI) in the six months prior to data collection, and a computer record for one or more prescriptions for a non-selective NSAID in the six months prior.*	Process	Hemming K, Chilton PJ, Lilford RJ, Avery A, Sheikh A. Bayesian Cohort and Cross-Sectional Analyses of the PINCER Trial: A Pharmacist-Led Intervention to Reduce Medication Errors in Primary Care. Emmert-Streib F, ed. PLoS ONE. 2012;7(6):e38306. doi:10.1371/journal.pone.0038306.
N/A	This measure assesses the proportion of patients with a history of allergy to penicillin who are prescribed a penicillin-containing preparation.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588526

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of patients with a history of gout and treated with a thiazide diuretic who are not prescribed allopurinol.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with a history of peptic ulcer who are prescribed a non- selective NSAID, without co-prescription of an ulcer healing drug.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588516
N/A	This measure assesses the proportion of patients with a history of peptic ulcer who are prescribed a non- selective NSAID.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588515
N/A	This measure assesses the proportion of patients with a history of peptic ulcer who are prescribed an NSAID, without co-prescription of an ulcer healing drug.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588518
N/A	This measure assesses the proportion of patients with a history of vascular events who are prescribed a COX II selective NSAID.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with an estimated 10 year cardiovascular disease risk greater than or equal to 20% who are prescribed combined contraceptives.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with asthma, excluding those with a cardiac condition, who are prescribed a beta-blocker.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588501
N/A	This measure assesses the proportion of patients with asthma, who are not also using an inhaled corticosteroid, who are prescribed a long-acting beta-2 agonist inhaler.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588506
N/A	This measure assesses the proportion of patients with atrial fibrillation who are prescribed warfarin despite CHADS2 score = 0.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with chronic heart failure who are prescribed a class 1 or 3 antiarrhythmics except amiodarone.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with chronic heart failure who are prescribed a glitazone.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with chronic heart failure who are prescribed a tricyclic antidepressant.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of patients with chronic heart failure who are prescribed antifungals that are not itraconazole (e.g. ketoconazole, fluconazole).*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with chronic heart failure who are prescribed any oral NSAID.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with chronic heart failure who are prescribed disulfiram.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with chronic heart failure who are prescribed itraconazole.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with chronic heart failure who are prescribed minoxidil.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with chronic heart failure who are prescribed tadalafil.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with chronic heart failure who are prescribed verapamil or diltiazem.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with chronic renal failure (CKD3 or worse) who are prescribed an NSAID.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588520
N/A	This measure assesses the proportion of patients with diabetes, without diagnosed ischemic heart disease, who receive high-dose statins (atorvastatin ≥40 mg/dL, rosuvastatin ≥10 mg/dL, and simvastatin >40 mg/dL).*	Process	Beard AJ, Hofer TP, Downs JR, et al. Assessing Appropriateness of Lipid Management Among Patients With Diabetes Mellitus Moving From Target to Treatment. Circ Cardiovasc Qual Outcomes. 2013;6(1):66-74.
N/A	This measure assesses the proportion of patients with heart failure who are prescribed an NSAID.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588519
N/A	This measure assesses the proportion of patients with heart failure who are prescribed diltiazem or verapamil.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588505
N/A	This measure assesses the proportion of patients with heart failure, who are in sinus rhythm, who are prescribed digoxin at greater than 125µg daily.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588504

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of patients with low trauma fracture that are treated with an oral corticosteroid for ≥ 12 weeks who are not prescribed bone protection (a bisphosphonate, calcitriol or hormone replacement therapy).*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with Parkinson's disease who are prescribed metoclopramide.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588507
N/A	This measure assesses the proportion of patients with Parkinson's disease who are prescribed prochlorperazine.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588508
N/A	This measure assesses the proportion of patients with previous peptic ulcer treated with a nonsteroidal anti-inflammatory for > 12 weeks who are not prescribed gastro-intestinal prophylaxis.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with previous peptic ulcer treated with low dose aspirin who are not prescribed gastro-intestinal prophylaxis.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with previous vascular disease or events who are prescribed any hormone replacement therapy.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with renal impairment (CKD 3 or worse) who are prescribed digoxin at greater than 125µg daily.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588503
N/A	This measure assesses the proportion of patients with stage 3 chronic kidney disease who are prescribed an oral nonsteroidal anti-inflammatory.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with stage 4 or 5 chronic kidney disease who are prescribed an oral nonsteroidal anti-inflammatory.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients with a history of convulsions who are prescribed mefloquine.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588509
N/A	This measure assesses the proportion of patients without a record of a full blood count within the previous 3 months who are prescribed methotrexate.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588534
N/A	This measure assesses the proportion of patients without a record of a lithium level being measured within the previous 6 months who are prescribed lithium.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588533
N/A	This measure assesses the proportion of patients without a record of an International Normalized Ratio (INR) having been measured within the previous 12 weeks (excluding patients who self-monitor) who are prescribed warfarin.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588528

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of patients without a record of an International Normalized Ratio (INR) having been measured within the previous 12 weeks who are prescribed warfarin.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588527
N/A	This measure assesses the proportion of patients without a record of liver function being measured in the previous 9 months who are prescribed amiodarone.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588529
N/A	This measure assesses the proportion of patients without a record of liver function having been measured within the previous 3 months who are prescribed methotrexate.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588535
N/A	This measure assesses the proportion of patients without a record of renal function and electrolytes being measured prior to starting therapy who are prescribed an ACE inhibitor or angiotensin II receptor antagonist.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588532
N/A	This measure assesses the proportion of patients without a record of renal function and electrolytes being measured prior to starting therapy who are prescribed an ACE inhibitor.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588531
N/A	This measure assesses the proportion of patients without a record of thyroid function being measured in the previous 9 months who are prescribed amiodarone.*	Process	Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. Br J Gen Pract. 2011;61(589):526-536. doi:10.3399/bjgp11X588530
N/A	This measure assesses the proportion of patients, with a computer-coded diagnosis of asthma, and computer record of one or more prescriptions for a beta-blocker (oral preparations or eye drops) in the six months prior.*	Process	Hemming K, Chilton PJ, Lilford RJ, Avery A, Sheikh A. Bayesian Cohort and Cross-Sectional Analyses of the PINCER Trial: A Pharmacist-Led Intervention to Reduce Medication Errors in Primary Care. Emmert-Streib F, ed. PLoS ONE. 2012;7(6):e38306. doi:10.1371/journal.pone.0038306.
N/A	This measure assesses the ratio of total daily defined doses for analgesics to the total daily defined doses of NSAIDs.*	Process	Fernández Urrusuno R, Pedregal González M, Torrecilla Rojas MA. Development of NSAIDs prescription indicators based on health outcomes. Eur J Clin Pharmacol. 2008;64(1):61-67. doi:10.1007/s00228-007-0384-3.
N/A	This measure assesses the ratio of total daily defined doses for gastro-protective drugs to the total daily defined doses of NSAIDs.*	Process	Fernández Urrusuno R, Pedregal González M, Torrecilla Rojas MA. Development of NSAIDs prescription indicators based on health outcomes. Eur J Clin Pharmacol. 2008;64(1):61-67. doi:10.1007/s00228-007-0384-3.
N/A	This measure assesses the proportion of HMO members with both a pharmacy fill for a base drug in the year of interest and a fill for a conflicting drug (as defined by study authors).*	Process	Solberg LI, Hurley JS, Roberts MH, et al. Measuring patient safety in ambulatory care: potential for identifying medical group drug-drug interaction rates using claims data. Am J Manag Care. 2004;10(11 Pt 1):753-759.
N/A	This measure assesses the proportion of patients prescribed a potassium wasting diuretic and digoxin that last had their urine and electrolytes checked before treatment start.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients prescribed a potassium wasting diuretic and digoxin that last had their urine and electrolytes checked more than 48 weeks ago.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients prescribed an ACE-inhibitor and an angiotensin receptor blocker (ARB) that have not had urine and electrolytes checked in the last 24 weeks.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of patients treated with a loop AND a thiazide diuretic or metolazone who don't have urine and electrolytes checked in the last 24 weeks.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with a loop diuretic who don't have urine and electrolytes checked before treatment start.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with a potassium sparing diuretic AND an ACE- inhibitor or ARB who don't have urine and electrolytes checked in the last 48 weeks.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with a potassium sparing diuretic who are prescribed a potassium supplement for greater than or equal to four weeks.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with a potassium sparing diuretic who don't have urine and electrolytes checked before treatment start.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with a potassium sparing diuretic who don't have urine and electrolytes checked in the last 48 weeks.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with amiodarone who did not have a thyroid function test in last nine months.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with and ACE-inhibitor or an angiotensin receptor blocker (ARB) who did not have urine and electrolytes checked before treatment start.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with auranofin without a complete blood count in the last eight weeks.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with aurothiomalate without a complete blood count in the last eight weeks.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with azathioprine without a complete blood count in the last 12 weeks.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of patients treated with leflunomide without a complete blood count in the last eight weeks.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with methotrexate without a complete blood count in the last 12 weeks.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of patients treated with penicillamine without a complete blood count in the last 12 weeks.*	Process	Dreischulte T, Grant AM, McCowan C, McAnaw JJ, Guthrie B. Quality and safety of medication use in primary care: consensus validation of a new set of explicit medication assessment criteria and prioritisation of topics for improvement. BMC Pharmacol Toxicol. 2012;12(1):5.
N/A	This measure assesses the proportion of medication discrepancies (when recorded medications are not the same as medications actually taken) that involve medications taken at an incorrect dosage.*	Process	Bedell SE, Jabbour S, Goldberg R, et al. Discrepancies in the use of medications: Their extent and predictors in an outpatient practice. Arch Intern Med. 2000;160(14):2129-2134. doi:10.1001/archinte.160.14.2129.
N/A	This measure assesses the proportion of medication discrepancies (when recorded medications are not the same as medications actually taken) that involve medications taken that were not in the medical record.*	Process	Bedell SE, Jabbour S, Goldberg R, et al. Discrepancies in the use of medications: Their extent and predictors in an outpatient practice. Arch Intern Med. 2000;160(14):2129-2134. doi:10.1001/archinte.160.14.2129.
N/A	This measure assesses the proportion of medication discrepancies (when recorded medications are not the same as medications actually taken) that involve not taking a recorded medication.*	Process	Bedell SE, Jabbour S, Goldberg R, et al. Discrepancies in the use of medications: Their extent and predictors in an outpatient practice. Arch Intern Med. 2000;160(14):2129-2134. doi:10.1001/archinte.160.14.2129.
N/A	This measure assesses the proportion of patients, who were prescribed and dispensed at least one prescription medication, with one or more of the following prescribing problems: drug-disease, drug- drug, drug-allergy, and/or drug-age contraindications, and/or excess dose or therapeutic duplication alerts identified by the drug knowledge database decision support system.*	Process	Tamblyn R, Huang A, Taylor L, et al. A Randomized Trial of the Effectiveness of On-demand versus Computer-triggered Drug Decision Support in Primary Care. J Am Med Inform Assoc. 2008;15(4):430-438. doi:10.1197/jamia.M2606.
N/A	The measure assesses the proportion of patient profiles in which allergy status is documented before dispensing the first prescription or medication order to the patient.*	Process	Nigam R, MacKinnon N, U D, et al. Development of Canadian Safety Indicators for Medication Use. Healthc Q. 2008;11(sp):47-53. doi:10.12927/hcq.2008.19649.
N/A	The measure assesses the proportion of prescription or medication orders for high-alert medications using an administering protocol.*	Process	Nigam R, MacKinnon N, U D, et al. Development of Canadian Safety Indicators for Medication Use. Healthc Q. 2008;11(sp):47-53. doi:10.12927/hcq.2008.19649.
N/A	The measure assesses the proportion of prescriptions or medication orders using potentially dangerous dose abbreviations.*	Process	Nigam R, MacKinnon N, U D, et al. Development of Canadian Safety Indicators for Medication Use. Healthc Q. 2008;11(sp):47-53. doi:10.12927/hcq.2008.19649.
N/A	The measure assesses the proportion of prescriptions or medication orders using potentially dangerous medication abbreviations.*	Process	Nigam R, MacKinnon N, U D, et al. Development of Canadian Safety Indicators for Medication Use. Healthc Q. 2008;11(sp):47-53. doi:10.12927/hcq.2008.19649.
N/A	The measure assesses the proportion of prescriptions or medication orders with "take as directed" as the only instruction for use.*	Process	Nigam R, MacKinnon N, U D, et al. Development of Canadian Safety Indicators for Medication Use. Healthc Q. 2008;11(sp):47-53. doi:10.12927/hcq.2008.19649.
N/A	The measure assesses the proportion of prescriptions or medication orders with incorrect leading and/or trailing zeros with decimal points.*	Process	Nigam R, MacKinnon N, U D, et al. Development of Canadian Safety Indicators for Medication Use. Healthc Q. 2008;11(sp):47-53. doi:10.12927/hcq.2008.19649.
N/A	This measure assesses the proportion of high alert prescription medications that are differentiated from other medications using flags, highlighting, or some other system.*	Process	Nigam R, MacKinnon N, U D, et al. Development of Canadian Safety Indicators for Medication Use. Healthc Q. 2008;11(sp):47-53. doi:10.12927/hcq.2008.19649.

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of patients, with a prescribed or scheduled medication, with a complete individual medication or medication list. A individual medication was defined as ‘‘complete’’ if the name, dose, frequency, and route of administration were documented. A medication list was defined as ‘‘complete’’ if all four components were documented for each individual medication in the medication list.*	Process	Nassaralla CL, Naessens JM, Chaudhry R, Hansen MA, Scheitel SM. Implementation of a medication reconciliation process in an ambulatory internal medicine clinic. Qual Saf Health Care. 2007;16(2):90-94. doi:10.1136/qshc.2006.021113.
N/A	This measure assesses the proportion of patients, with a prescribed or scheduled medication, with a correct individual medication or medication list. A medication list was defined as ‘‘correct’’ if there was no discrepancy in the name, dose and frequency between the current medication list documented in the EMR and the medications the patient was actually taking at home. An individual medication was defined as ‘‘correct’’ if there was no discrepancy in the name, dose and frequency of an individual medication item.*	Process	Nassaralla CL, Naessens JM, Chaudhry R, Hansen MA, Scheitel SM. Implementation of a medication reconciliation process in an ambulatory internal medicine clinic. Qual Saf Health Care. 2007;16(2):90-94. doi:10.1136/qshc.2006.021113.
N/A	This measure assesses the proportion of prescriptions or medication orders for high alert medications that are double-checked and documented (with initials) by a pharmacist before administration.*	Process	Nigam R, MacKinnon N, U D, et al. Development of Canadian Safety Indicators for Medication Use. Healthc Q. 2008;11(sp):47-53. doi:10.12927/hcq.2008.19649.
N/A	This measure assesses the proportion of time during which International Normalised Ratio (INR) values fell within pre-determined ranges of a target.*	Intermediate Outcome	Claes N. The Belgian Improvement Study on Oral Anticoagulation Therapy: a randomized clinical trial. Eur Heart J. 2005;26(20):2159-2165. doi:10.1093/eurheartj/ehi327.
N/A	This measure assesses the proportion of patients over 18yrs with a new diagnosis of hypertension, who were prescribed an antihypertensive medication, and who have an adverse event related to medication initiation by either ICD codes, chief complaint, CPT codes, prescription orders, labs, or vital signs.*	Outcome	Brixner DI, McAdam-Marx C, Ye X, Lau H, Munger MA. Assessment of time to follow-up visits in newly-treated hypertensive patients using an electronic medical record database. Curr Med Res Opin. 2010;26(8):1881-1891.
N/A	This measure assesses the count of thromboembolic complications.*	Outcome	Claes N. The Belgian Improvement Study on Oral Anticoagulation Therapy: a randomized clinical trial. Eur Heart J. 2005;26(20):2159-2165. doi:10.1093/eurheartj/ehi327.
N/A	This measure assesses the number of hemorrhages as defined by the European Atrial Fibrillation Trial Study Group.*	Outcome	Claes N. The Belgian Improvement Study on Oral Anticoagulation Therapy: a randomized clinical trial. Eur Heart J. 2005;26(20):2159-2165. doi:10.1093/eurheartj/ehi327.
Hospital Admission or ED Visit for Bleeding Events Associated with Anticoagulant Medications (MDT 1)	The rate of events among individuals receiving anticoagulant medications that have evidence of a hospitalization or emergency department visit related to a bleeding event.	Outcome	Pharmacy Quality Alliance
Serious Hypoglycemic Events Requiring Hospital Admission or ED Visit Associated with Anti-Diabetic Medications	The rate of events among individuals receiving anti-diabetes medications that have evidence of a hospitalization or emergency department visit related to a hypoglycemic event and expressed as number of events per member-months. This measure is used among plans with both prescription and medical claims/services, and a lower value is indicative of higher quality.	Outcome	Pharmacy Quality Alliance
Hospital, Emergency Department, and/or Urgent Care Utilization Related to Prescription Opioids (MDT 6)	The rate of events among individuals receiving prescription opioid medications that have evidence of opioid-related hospitalizations, ED visits, and/or urgent care visits.	Outcome	Pharmacy Quality Alliance
Readmission of Patients Provided MTM Services Post Hospital Discharge	The percentage of high-risk patients that received MTM from a pharmacist within 7 days post hospital discharge that are readmitted within 30 days of their discharge (Quality Improvement Indicator- not intended for comparative purposes).	Outcome	Pharmacy Quality Alliance
Serious adverse effects	Proportion of patients with evidence of a serious adverse effect that might be related to opioid therapy in the 6 months following an opioid prescription.	Outcome	Midboe AM, Lewis ET, Paik MC, et al. Measurement of adherence to clinical practice guidelines for opioid therapy for chronic pain. *Transl Behav Med.* 2012;2(1):57-64.
MTM - Patient Survey Following Comprehensive Medication Review (MDT 4)	Patient satisfaction/experience with Comprehensive Medication Review.	Patient Experience	Pharmacy Quality Alliance

Prevention of Adverse Events

Measure Title	Measure Description	Measure Type	Source
Respiratory - adverse event from inhaled corticosteroids	The percentage of non-immunocompromised patients who were dispensed an inhaled corticosteroid who were also dispensed oral antifungal therapy within 30 days.	Outcome	Pharmacy Quality Alliance
N/A	This measure assesses the proportion of incident reports with any event in a patient's medical care which did not go as intended and either harmed or could have harmed the patient.*	Outcome	Plews-Ogan ML, Nadkami MM, Forren S, et al. Patient Safety in the Ambulatory Setting. *J Gen Intern Med*. 2004;19(7):719-725. doi:10.1111/j.1525-1497.2004.30386.x.

Safety Culture

Measure Title	Measure Description	Measure Type	Source
Primary Care Patient Measure of Safety (PC PMOS) questionnaire	50-item questionnaire covering 15 domains of patient safety. The questionnaire measures factors contributing to safety from the patient perspective.	Patient Experience	Hernan AL, Giles SJ, Fuller J, et al. Patient and carer identified factors which contribute to safety incidents in primary care: a qualitative study. *BMJ Qual Saf.* 2015;24(9):583-593.
N/A	This measure assesses the “Hygiene” domain of patient safety by totaling positive responses from the European Practice Assessment observational study out of a subset of 5 questions related to: adequate disinfection of equipment, use of sterile instruments, adequate disposal of unused equipment, adequate use of protective equipment, and proper disposal of sharp and hazardous material.*	Structure	Gaal S, van den Hombergh P, Verstappen W, Wensing M. Patient safety features are more present in larger primary care practices. Health Policy. 2010;97(1):87-91. doi:10.1016/j.healthpol.2010.03.007.
N/A	This measure assesses the “Incident Reporting” domain of patient safety by totaling positive responses from the European Practice Assessment observational study out of a subset of 3 questions related to: having a critical incident register, analyzing critical incidents, and taking action on critical incidents.*	Structure	Gaal S, van den Hombergh P, Verstappen W, Wensing M. Patient safety features are more present in larger primary care practices. Health Policy. 2010;97(1):87-91. doi:10.1016/j.healthpol.2010.03.007.
N/A	This measure assesses the “Medical Record Keeping” domain of patient safety by totaling positive responses from the European Practice Assessment observational study out of a subset of 6 questions related to: privacy of medical records, electronic medical records, use of ICPC codes, requirements for usernames and passwords, having a firewall, and having a virus scan.*	Structure	Gaal S, van den Hombergh P, Verstappen W, Wensing M. Patient safety features are more present in larger primary care practices. Health Policy. 2010;97(1):87-91. doi:10.1016/j.healthpol.2010.03.007.
N/A	This measure assesses the “Medication Safety” domain of patient safety by totaling positive responses from the European Practice Assessment observational study out of a subset of 8 questions related to: having emergency drugs in stock, controlled drugs in a cupboard, a list of contents of doctor’s bags, an inventory of emergency drugs available, an explicit procedure for reviewing repeat prescribing, an explicit procedure for updating emergency drugs present, a procedure to review repeat medication, and electronic prescribing.*	Structure	Gaal S, van den Hombergh P, Verstappen W, Wensing M. Patient safety features are more present in larger primary care practices. Health Policy. 2010;97(1):87-91. doi:10.1016/j.healthpol.2010.03.007.
N/A	This measure assesses the “Organized Patient Feedback” domain of patient safety by totaling positive responses from the European Practice Assessment observational study out of a subset of 4 questions related to: having a suggestion box present and visible, having the patient complaint procedure available, and making practice information available to those in waiting room.*	Structure	Gaal S, van den Hombergh P, Verstappen W, Wensing M. Patient safety features are more present in larger primary care practices. Health Policy. 2010;97(1):87-91. doi:10.1016/j.healthpol.2010.03.007.
N/A	This measure assesses the “Organized Secondary Prevention Programs” domain of patient safety by totaling positive responses from the European Practice Assessment observational study out of a subset of 3 questions related to: organized secondary prevention programs for cardiovascular disease, diabetes mellitus, and congestive obstructive pulmonary disease.*	Structure	Gaal S, van den Hombergh P, Verstappen W, Wensing M. Patient safety features are more present in larger primary care practices. Health Policy. 2010;97(1):87-91. doi:10.1016/j.healthpol.2010.03.007.
N/A	This measure assesses the “Overall Patient Safety Rating” item of the Medical Office Survey on Patient Safety.*	Structure	Hagopian B, Singer ME, Curry-Smith AC, Nottingham K, Hickner J. Better Medical Office Safety Culture Is Not Associated With Better Scores on Quality Measures: *J Patient Saf*. 2012;8(1):15-21. doi:10.1097/PTS.0b013e31823d047a.
N/A	This measure assesses the “Professional Competence” domain of patient safety by totaling positive responses from the European Practice Assessment observational study out of a subset of 5 questions related to: additional training for providers at regular intervals, having a designated staff member for collapse/resuscitation, production of an annual report including quality matters, having QI targets sets, and having clinical guidelines in the practice (paper or electronic).*	Structure	Gaal S, van den Hombergh P, Verstappen W, Wensing M. Patient safety features are more present in larger primary care practices. Health Policy. 2010;97(1):87-91. doi:10.1016/j.healthpol.2010.03.007.

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the “Quality Improvement” domain of patient safety by totaling positive responses from the European Practice Assessment observational study out of a subset of 3 questions related to: having arrangements to improve care processes with other providers, an annual report with quality matters, and targets for improvement in the last year.*	Structure	Gaal S, van den Hombergh P, Verstappen W, Wensing M. Patient safety features are more present in larger primary care practices. Health Policy. 2010;97(1):87-91. doi:10.1016/j.healthpol.2010.03.007.
N/A	This measure assesses the “Safe Practice Building” domain of patient safety by totaling positive responses from the European Practice Assessment observational study out of a subset of 5 questions related to: care parking for disabled, ramp to main entrance, doors wide enough for wheel chair, enough seating, and an elevator (or on ground floor).*	Structure	Gaal S, van den Hombergh P, Verstappen W, Wensing M. Patient safety features are more present in larger primary care practices. Health Policy. 2010;97(1):87-91. doi:10.1016/j.healthpol.2010.03.007.
N/A	This measure assesses the "Telephonic Accessibility and Triage" domain of patient safety by totaling positive responses from the European Practice Assessment observational study out of a subset of 3 questions related to: having a separate line for emergency calls, making record of all telephonic advice by non GPs, or having a written protocol for clinical advice given to patients by non-GPs over the phone.*	Structure	Gaal S, van den Hombergh P, Verstappen W, Wensing M. Patient safety features are more present in larger primary care practices. Health Policy. 2010;97(1):87-91. doi:10.1016/j.healthpol.2010.03.007.
N/A	This measure assesses the average of the percent positive responses to a clinician survey across 12 safety culture dimensions.*	Structure	Hagopian B, Singer ME, Curry-Smith AC, Nottingham K, Hickner J. Better Medical Office Safety Culture Is Not Associated With Better Scores on Quality Measures: *J Patient Saf*. 2012;8(1):15-21. doi:10.1097/PTS.0b013e31823d047a.
N/A	This measure assesses the concept of "Detection of Quality and Safety Problems" by calculating a mean score using 5 indicators from a clinician survey.*	Structure	Szecsenyi J, Campbell S, Broge B, et al. Effectiveness of a quality-improvement program in improving management of primary care practices. *Can Med Assoc J*. 2011:cmaj – 110412.
N/A	This measure assesses the concept of "Quality Development and Quality Policy" by calculating a mean score using 7 indicators from a clinician survey.*	Structure	Szecsenyi J, Campbell S, Broge B, et al. Effectiveness of a quality-improvement program in improving management of primary care practices. *Can Med Assoc J*. 2011:cmaj – 110412.
N/A	This measure assesses the dimension of "Analysis of Critical Incidents" by calculating a mean score using 5 indicators from a clinician survey.*	Structure	Szecsenyi J, Campbell S, Broge B, et al. Effectiveness of a quality-improvement program in improving management of primary care practices. *Can Med Assoc J*. 2011:cmaj – 110412.
N/A	This measure assesses the dimension of "Complaint Management" by calculating a mean score using 6 indicators from a clinician survey.*	Structure	Szecsenyi J, Campbell S, Broge B, et al. Effectiveness of a quality-improvement program in improving management of primary care practices. *Can Med Assoc J*. 2011:cmaj – 110412.
N/A	This measure assesses the dimension of "Safety of Staff and Patients, Hygiene, Infection Control" by calculating a mean score using 12 indicators from a clinician survey.*	Structure	Szecsenyi J, Campbell S, Broge B, et al. Effectiveness of a quality-improvement program in improving management of primary care practices. *Can Med Assoc J*. 2011:cmaj – 110412.
N/A	This measure assesses the mean number of positive responses ("agree" or "strongly agree") to seven component questions from a safety climate survey.*	Structure	McGuire MJ, Noronha G, Samal L, Yeh H-C, Crocetti S, Kravet S. Patient Safety Perceptions of Primary Care Providers after Implementation of an Electronic Medical Record System. *J Gen Intern Med*. 2013;28(2):184-192. doi:10.1007/s11606-012-2153-y.
N/A	This measure assesses the proportion of observations that had a record of fire extinguisher inspection.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations using a sample medication log.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations using at least two ways to identify patients.*	Process	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of observations where a temperature log was maintained for refrigerators.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where cleaning and sterilization processes were appropriate.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where cleaning supplies were stored appropriately.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where fire extinguishers were present.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where good handwashing techniques were practiced.*	Process	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where hazardous waste materials were stored appropriately.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where hazardous waste receptacles are clearly labeled.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where medications and vaccines were stored properly.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where quality control processes performed.*	Process	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where refrigerators were appropriately labelled.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where sample medications were managed appropriately.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where sharps boxes were mounted, locked, and with safety covers.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where sharps were secured.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where staff were trained and assessed on equipment and procedures.*	Process	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.

Measure Title	Measure Description	Measure Type	Source
N/A	This measure assesses the proportion of observations where vaccine information sheets were provided.*	Process	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations where vaccine information was documented.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations with appropriate storage of medications.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations with labels for sample medications.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.
N/A	This measure assesses the proportion of observations that had a record of fire extinguisher inspection.*	Structure	Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. *Qual Prim Care*. 2010;18(5):307-316.