

## Appendix. Primary Care Patient Safety Measures by Manuscript

Citation: Avery AJ, Dex GM, Mulvaney C, et al. Development of prescribing-safety indicators for GPs using the RAND Appropriateness Method. <i>Br J Gen Pract.</i> 2011;61(589):526-536. doi:10.3399/bjgp11X588501					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
AVE1	Medication management	Process	England	This measure assesses the proportion of patients with asthma, excluding those with a cardiac condition, who are prescribed a beta-blocker.	Medical record: EMR review
AVE2	Medication management	Process	England	This measure assesses the proportion of all patients, excluding those with Raynaud's disease, who are prescribed a short-acting nifedipine.	Medical record: EMR review
AVE3	Medication management	Process	England	This measure assesses the proportion of patients with renal impairment (CKD 3 or worse) who are prescribed digoxin at greater than 125µg daily.	Medical record: EMR review
AVE4	Medication management	Process	England	This measure assesses the proportion of patients with heart failure, who are in sinus rhythm, who are prescribed digoxin at greater than 125µg daily.	Medical record: EMR review
AVE5	Medication management	Process	England	This measure assesses the proportion of patients with heart failure who are prescribed diltiazem or verapamil.	Medical record: EMR review
AVE6	Medication management	Process	England	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.	Medical record: EMR review
AVE7	Medication management	Process	England	This measure assesses the proportion of patients with Parkinson's disease who are prescribed metoclopramide.	Medical record: EMR review
AVE8	Medication management	Process	England	This measure assesses the proportion of patients with Parkinson's disease who are prescribed prochlorperazine.	Medical record: EMR review
AVE9	Medication management	Process	England	This measure assesses the proportion of patients with with a history of convulsions who are prescribed mefloquine.	Medical record: EMR review

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AVE10	Medication management	Process	England	This measure assesses the proportion of female patients with a history of venous or arterial thromboembolism who are prescribed a combined hormonal contraceptive.	Medical record: EMR review
AVE11	Medication management	Process	England	This measure assesses the proportion of female patients with a history of breast cancer who are prescribed transdermal estrogens.	Medical record: EMR review
AVE12	Medication management	Process	England	This measure assesses the proportion of female patients with an intact uterus who are prescribed oral or transdermal estrogen without progesterone.	Medical record: EMR review
AVE13	Medication management	Process	England	This measure assesses the proportion of female patients older than 35yrs, who are current cigarette smokers, who are prescribed a combined hormonal contraceptive.	Medical record: EMR review
AVE14	Medication management	Process	England	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.	Medical record: EMR review
AVE15	Medication management	Process	England	This measure assesses the proportion of patients with a history of peptic ulcer who are prescribed a non-selective NSAID.	Medical record: EMR review
AVE16	Medication management	Process	England	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.	Medical record: EMR review
AVE17	Medication management	Process	England	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.	Medical record: EMR review
AVE18	Medication management	Process	England	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.	Medical record: EMR review
AVE19	Medication management	Process	England	This measure assesses the proportion of patients with heart failure who are prescribed an NSAID.	Medical record: EMR review

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AVE20	Medication management	Process	England	This measure assesses the proportion of patients with chronic renal failure (CKD3 or worse) who are prescribed an NSAID.	Medical record: EMR review
AVE21	Medication management	Process	England	This measure assesses the proportion of patients who are prescribed warfarin in combination with an oral NSAID.	Medical record: EMR review
AVE22	Medication management	Process	England	This measure assesses the proportion of patients receiving a nitrate or nicorandil who are prescribed a phosphodiesterase type-5 inhibitor (e.g. sildenafil).	Medical record: EMR review
AVE23	Medication management	Process	England	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.	Medical record: EMR review
AVE24	Medication management	Process	England	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).	Medical record: EMR review
AVE25	Medication management	Process	England	This measure assesses the proportion of patients receiving a beta-blocker who are prescribed verapamil.	Medical record: EMR review
AVE26	Medication management	Process	England	This measure assesses the proportion of patients with a history of allergy to penicillin who are prescribed a penicillin-containing preparation.	Medical record: EMR review
AVE27	Lab testing & monitoring	Process	England	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.	Medical record: EMR review
AVE28	Lab testing & monitoring	Process	England	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.	Medical record: EMR review

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AVE29	Lab testing & monitoring	Process	England	This measure assesses the proportion of patients without a record of liver function being measured in the previous 9 months who are prescribed amiodarone.	Medical record: EMR review
AVE30	Lab testing & monitoring	Process	England	This measure assesses the proportion of patients without a record of thyroid function being measured in the previous 9 months who are prescribed amiodarone.	Medical record: EMR review
AVE31	Lab testing & monitoring	Process	England	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.	Medical record: EMR review
AVE32	Lab testing & monitoring	Process	England	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.	Medical record: EMR review
AVE33	Lab testing & monitoring	Process	England	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.	Medical record: EMR review
AVE34	Lab testing & monitoring	Process	England	This measure assesses the proportion of patients without a record of a full blood count within the previous 3 months who are prescribed methotrexate.	Medical record: EMR review
AVE35	Lab testing & monitoring	Process	England	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.	Medical record: EMR review

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<b>Citation: Beard AJ, Hofer TP, Downs JR, et al. Assessing Appropriateness of Lipid Management Among Patients With Diabetes Mellitus Moving From Target to Treatment. <i>Circ Cardiovasc Qual Outcomes</i>. 2013;6(1):66-74.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
BEA1	Medication management	Process	USA	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).	Medical record: EMR review, Pharmacy data
<b>Citation: Bedell SE, Jabbour S, Goldberg R, et al. Discrepancies in the use of medications: Their extent and predictors in an outpatient practice. <i>Arch Intern Med</i>. 2000;160(14):2129-2134. doi:10.1001/archinte.160.14.2129.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
BED1	Medication management	Process	USA	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.	Medical record: manual chart review, Patient survey/instrument
BED2	Medication management	Process	USA	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.	Medical record: manual chart review, Patient survey/instrument
BED3	Medication management	Process	USA	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.	Medical record: manual chart review, Patient survey/instrument
<b>Citation: 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. <i>Curr Med Res Opin</i>. 2010;26(8):1881-1891.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
BRI1	Sentinel events	Outcome	USA	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.	Medical record: EMR review

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<b>Citation: Bunde AW, Zaiken K. Impact of clinical pharmacists' recommendations on a proton pump inhibitor taper protocol in an ambulatory care practice. <i>J Manag Care Pharm JMCP</i>. 2013;19(4):325-333.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
BUN1	Medication management	Process	USA	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.	Medical record: EMR review, Administrative data
<b>Citation: Claes N. The Belgian Improvement Study on Oral Anticoagulation Therapy: a randomized clinical trial. <i>Eur Heart J</i>. 2005;26(20):2159-2165. doi:10.1093/eurheartj/ehi327.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
CLA1	Medication management	Outcome	Netherlands	This measure assesses the proportion of time during which International Normalised Ratio (INR) values fell within pre-determined ranges of a target.	Clinician survey/instrument
CLA2	Sentinel events	Outcome	Netherlands	This measure assesses the count of thromboembolic complications.	Clinician survey/instrument
CLA3	Sentinel events	Outcome	Netherlands	This measure assesses the number of hemorrhages as defined by the European Atrial Fibrillation Trial Study Group.	Clinician survey/instrument
<b>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. <i>BMC Pharmacol Toxicol</i>. 2012;12(1):5.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
DRE1	Medication management	Process	UK	This measure assesses the proportion of patients with previous peptic ulcer treated with low dose aspirin who are not prescribed gastro-intestinal prophylaxis.	Medical record: EMR review
DRE2	Medication management	Process	UK	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.	Medical record: EMR review

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DRE3	Medication management	Process	UK	This measure assesses the proportion of patients with stage 3 chronic kidney disease who are prescribed an oral nonsteroidal anti-inflammatory.	Medical record: EMR review
DRE4	Medication management	Process	UK	This measure assesses the proportion of patients with stage 4 or 5 chronic kidney disease who are prescribed an oral nonsteroidal anti-inflammatory.	Medical record: EMR review
DRE5	Medication management	Process	UK	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.	Medical record: EMR review
DRE6	Medication management	Process	UK	This measure assesses the proportion of patients treated with low dose aspirin who are prescribed an oral COX II selective NSAID.	Medical record: EMR review
DRE7	Medication management	Process	UK	This measure assesses the proportion of patients aged > 40yrs and with cardiovascular disease risk > 20% who are prescribed a COX II selective NSAID.	Medical record: EMR review
DRE8	Medication management	Process	UK	This measure assesses the proportion of patients with a history of vascular events who are prescribed a COX II selective NSAID.	Medical record: EMR review
DRE9	Lab testing & monitoring	Process	UK	This measure assesses the proportion of patients treated with a potassium sparing diuretic who don't have urine and electrolytes checked before treatment start.	Medical record: EMR review
DRE10	Lab testing & monitoring	Process	UK	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.	Medical record: EMR review
DRE11	Lab testing & monitoring	Process	UK	This measure assesses the proportion of patients treated with a loop diuretic who don't have urine and electrolytes checked before treatment start.	Medical record: EMR review
DRE12	Lab testing & monitoring	Process	UK	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.	Medical record: EMR review

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DRE13	Lab testing & monitoring	Process	UK	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.	Medical record: EMR review
DRE14	Medication management	Process	UK	This measure assesses the proportion of patients treated with stage 4 or 5 chronic kidney disease who are prescribed a thiazide diuretic.	Medical record: EMR review
DRE15	Medication management	Process	UK	This measure assesses the proportion of patients with a history of gout and treated with a thiazide diuretic who are not prescribed allopurinol.	Medical record: EMR review
DRE16	Medication management	Process	UK	This measure assesses the proportion of patients treated with stage 4 or 5 chronic kidney disease who are prescribed an aldosterone antagonist.	Medical record: EMR review
DRE17	Lab testing & monitoring	Process	UK	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.	Medical record: EMR review
DRE18	Medication management	Process	UK	This measure assesses the proportion of patients treated with warfarin who are prescribed a macrolide.	Medical record: EMR review
DRE19	Medication management	Process	UK	This measure assesses the proportion of patients treated with warfarin who are prescribed a sulphonamide.	Medical record: EMR review
DRE20	Medication management	Process	UK	This measure assesses the proportion of patients treated with warfarin who are prescribed an azole antifungal.	Medical record: EMR review
DRE21	Medication management	Process	UK	This measure assesses the proportion of patients treated with warfarin who are prescribed metronidazole.	Medical record: EMR review
DRE22	Medication management	Process	UK	This measure assesses the proportion of patients treated with warfarin who are prescribed chloramphenicol.	Medical record: EMR review
DRE23	Medication management	Process	UK	This measure assesses the proportion of patients treated with warfarin who are prescribed isoniazid.	Medical record: EMR review
DRE24	Medication management	Process	UK	This measure assesses the proportion of patients treated with warfarin who are prescribed rifampin.	Medical record: EMR review

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DRE25	Medication management	Process	UK	This measure assesses the proportion of patients treated with warfarin who are prescribed griseofulvin.	Medical record: EMR review
DRE26	Medication management	Process	UK	This measure assesses the proportion of patients with atrial fibrillation who are prescribed warfarin despite CHADS2 score = 0.	Medical record: EMR review
DRE27	Medication management	Process	UK	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.	Medical record: EMR review
DRE28	Medication management	Process	UK	This measure assesses the proportion of patients treated with a beta-blocker who are prescribed verapamil or diltiazem.	Medical record: EMR review
DRE29	Medication management	Process	UK	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.	Medical record: EMR review
DRE30	Medication management	Process	UK	This measure assesses the proportion of patients treated with active asthma without COPD who are prescribed a non-cardio-selective oral beta-blocker.	Medical record: EMR review
DRE31	Lab testing & monitoring	Process	UK	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.	Medical record: EMR review, Lab data
DRE32	Lab testing & monitoring	Process	UK	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.	Medical record: EMR review, Lab data
DRE33	Medication management	Process	UK	This measure assesses the proportion of patients treated with stage 4 or 5 chronic kidney disease who are prescribed metformin.	Medical record: EMR review
DRE34	Medication management	Process	UK	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.	Medical record: EMR review

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DRE35	Medication management	Process	UK	This measure assesses the proportion of patients treated with stage 3, 4, or 5 chronic kidney disease (eGFR < 60) who are prescribed digoxin $\geq$ 250 mcg/day.	Medical record: EMR review
DRE36	Medication management	Process	UK	This measure assesses the proportion of patients treated with digoxin and amiodarone who are prescribed digoxin $\geq$ 250 mcg/day.	Medical record: EMR review
DRE37	Medication management	Process	UK	This measure assesses the proportion of patients treated with digoxin and propafenone who are prescribed digoxin $\geq$ 250 mcg/day.	Medical record: EMR review
DRE38	Medication management	Process	UK	This measure assesses the proportion of patients treated with digoxin and chloroquine or hydroxychloroquine who are prescribed digoxin $\geq$ 250 mcg/day.	Medical record: EMR review
DRE39	Medication management	Process	UK	This measure assesses the proportion of patients treated with digoxin and quinine who are prescribed digoxin $\geq$ 250 mcg/day.	Medical record: EMR review
DRE40	Medication management	Process	UK	This measure assesses the proportion of patients treated with digoxin and a calcium channel blocker (lercanidipine, nifedipine, diltiazem, verapamil) who are prescribed digoxin $\geq$ 250 mcg/day.	Medical record: EMR review
DRE41	Medication management	Process	UK	This measure assesses the proportion of patients treated with digoxin and ciclosporin who are prescribed digoxin $\geq$ 250 mcg/day.	Medical record: EMR review
DRE42	Lab testing & monitoring	Process	UK	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.	Medical record: EMR review, Lab data
DRE43	Lab testing & monitoring	Process	UK	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.	Medical record: EMR review, Lab data

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DRE44	Medication management	Process	UK	This measure assesses the proportion of patients with low trauma fracture that are treated with an oral corticosteroid for $\geq 12$ weeks who are not prescribed bone protection (a bisphosphonate, calcitriol or hormone replacement therapy).	Medical record: EMR review
DRE45	Medication management	Process	UK	This measure assesses the proportion of patients treated with methotrexate who are not given explicit dose instructions of weekly dosing.	Medical record: EMR review
DRE46	Medication management	Process	UK	This measure assesses the proportion of patients treated with methotrexate who are prescribed more than one strength of methotrexate tablets.	Medical record: EMR review
DRE47	Lab testing & monitoring	Process	UK	This measure assesses the proportion of patients treated with auranofin without a complete blood count in the last eight weeks.	Medical record: EMR review, Lab data
DRE48	Lab testing & monitoring	Process	UK	This measure assesses the proportion of patients treated with aurothiomalate without a complete blood count in the last eight weeks.	Medical record: EMR review, Lab data
DRE49	Lab testing & monitoring	Process	UK	This measure assesses the proportion of patients treated with leflunomide without a complete blood count in the last eight weeks.	Medical record: EMR review, Lab data
DRE50	Lab testing & monitoring	Process	UK	This measure assesses the proportion of patients treated with penicillamine without a complete blood count in the last 12 weeks.	Medical record: EMR review, Lab data
DRE51	Lab testing & monitoring	Process	UK	This measure assesses the proportion of patients treated with methotrexate without a complete blood count in the last 12 weeks.	Medical record: EMR review, Lab data
DRE52	Lab testing & monitoring	Process	UK	This measure assesses the proportion of patients treated with azathioprine without a complete blood count in the last 12 weeks.	Medical record: EMR review, Lab data
DRE53	Medication management	Process	UK	This measure assesses the proportion of patients with previous vascular disease or events who are prescribed any hormone replacement therapy.	Medical record: EMR review

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DRE54	Medication management	Process	UK	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.	Medical record: EMR review
DRE55	Medication management	Process	UK	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.	Medical record: EMR review
DRE56	Medication management	Process	UK	This measure assesses the proportion of patients over 50 years old without a hysterectomy who are prescribed estrogens without cyclical progestogen.	Medical record: EMR review
DRE57	Lab testing & monitoring	Process	UK	This measure assesses the proportion of patients treated with amiodarone who did not have a thyroid function test in last nine months.	Medical record: EMR review, Lab data
DRE58	Medication management	Process	UK	This measure assesses the proportion of patients treated with simvastatin and an HIV protease inhibitor who are prescribed simvastatin > 10 mg/day.	Medical record: EMR review
DRE59	Medication management	Process	UK	This measure assesses the proportion of patients treated with simvastatin and ciclosporin who are prescribed simvastatin > 10 mg/day.	Medical record: EMR review
DRE60	Medication management	Process	UK	This measure assesses the proportion of patients treated with simvastatin and verapamil who are prescribed simvastatin > 10 mg/day.	Medical record: EMR review
DRE61	Medication management	Process	UK	This measure assesses the proportion of patients treated with simvastatin and a fibrate (except fenofibrate) who are prescribed simvastatin > 10 mg/day.	Medical record: EMR review
DRE62	Medication management	Process	UK	This measure assesses the proportion of patients treated with simvastatin and amiodarone who are prescribed simvastatin > 20 mg/day.	Medical record: EMR review
DRE63	Medication management	Process	UK	This measure assesses the proportion of patients with chronic heart failure who are prescribed a class 1 or 3 antiarrhythmics except amiodarone.	Medical record: EMR review

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DRE64	Medication management	Process	UK	This measure assesses the proportion of patients with chronic heart failure who are prescribed verapamil or diltiazem.	Medical record: EMR review
DRE65	Medication management	Process	UK	This measure assesses the proportion of patients with chronic heart failure who are prescribed minoxidil.	Medical record: EMR review
DRE66	Medication management	Process	UK	This measure assesses the proportion of patients with chronic heart failure who are prescribed any oral NSAID.	Medical record: EMR review
DRE67	Medication management	Process	UK	This measure assesses the proportion of patients with chronic heart failure who are prescribed a glitazone	Medical record: EMR review
DRE68	Medication management	Process	UK	This measure assesses the proportion of patients with chronic heart failure who are prescribed a tricyclic antidepressant.	Medical record: EMR review
DRE69	Medication management	Process	UK	This measure assesses the proportion of patients with chronic heart failure who are prescribed itraconazole.	Medical record: EMR review
DRE70	Medication management	Process	UK	This measure assesses the proportion of patients with chronic heart failure who are prescribed antifungals that are not itraconazole (e.g. ketoconazole, fluconazole).	Medical record: EMR review
DRE71	Medication management	Process	UK	This measure assesses the proportion of patients with chronic heart failure who are prescribed tadalafil.	Medical record: EMR review
DRE72	Medication management	Process	UK	This measure assesses the proportion of patients with chronic heart failure who are prescribed disulfiram.	Medical record: EMR review
<b>Citation: Fernández Urrusuno R, Pedregal González M, Torrecilla Rojas MA. Development of NSAIDs prescription indicators based on health outcomes. <i>Eur J Clin Pharmacol.</i> 2008;64(1):61-67. doi:10.1007/s00228-007-0384-3.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
FER1	Medication management	Process	Spain	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.	Administrative data
FER2	Medication management	Process	Spain	This measure assesses the ratio of total daily defined doses for analgesics to the total daily defined doses of NSAIDs.	Administrative data

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FER3	Medication management	Process	Spain	This measure assesses the ratio of total daily defined doses for gastro-protective drugs to the total daily defined doses of NSAIDs.	Administrative data
<b>Citation: Gaal S, van den Hombergh P, Verstappen W, Wensing M. Patient safety features are more present in larger primary care practices. <i>Health Policy</i>. 2010;97(1):87-91. doi:10.1016/j.healthpol.2010.03.007.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
GAA1	Facility Structures/Resources	Structure	Austria, Belgium, UK, France, Germany, Israel, Netherlands, Slovenia, Switzerland	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: car parking for disabled, ramp to main entrance, doors wide enough for wheel chair, enough seating, and an elevator (or on ground floor).	Clinician survey/instrument
GAA2	Care coordination	Structure	Austria, Belgium, UK, France, Germany, Israel, Netherlands, Slovenia, Switzerland	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.	Clinician survey/instrument
GAA3	Procedure and treatment	Structure	Austria, Belgium, UK, France, Germany, Israel, Netherlands, Slovenia, Switzerland	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.	Clinician survey/instrument

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GAA4	Sentinel events	Structure	Austria, Belgium, UK, France, Germany, Israel, Netherlands, Slovenia, Switzerland	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.	Clinician survey/instrument
GAA5	Care coordination	Structure	Austria, Belgium, UK, France, Germany, Israel, Netherlands, Slovenia, Switzerland	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.	Clinician survey/instrument
GAA6	Facility Structures/Resources	Structure	Austria, Belgium, UK, France, Germany, Israel, Netherlands, Slovenia, Switzerland	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).	Clinician survey/instrument
GAA7	Procedure and treatment	Process	Austria, Belgium, UK, France, Germany, Israel, Netherlands, Slovenia, Switzerland	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.	Clinician survey/instrument

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GAA8	Care coordination	Structure	Austria, Belgium, UK, France, Germany, Israel, Netherlands, Slovenia, Switzerland	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.	Clinician survey/instrument
GAA9	Facility Structures/Resources	Structure	Austria, Belgium, UK, France, Germany, Israel, Netherlands, Slovenia, Switzerland	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.	Clinician survey/instrument
GAA10	Care coordination	Structure	Austria, Belgium, UK, France, Germany, Israel, Netherlands, Slovenia, Switzerland	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.	Clinician survey/instrument
<b>Citation: 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: <i>J Patient Saf.</i> 2012;8(1):15-21. doi:10.1097/PTS.0b013e31823d047a.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
HAG1	Care coordination	Structure	USA	This measure assesses the "Overall Patient Safety Rating" item of the Medical Office Survey on Patient Safety.	Clinician survey/instrument
HAG2	Care coordination	Structure	USA	This measure assesses the average of the percent positive responses to a clinician survey across 12 safety culture dimensions.	Clinician survey/instrument

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<b>Citation: 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. <i>PLoS ONE</i>. 2012;7(6):e38306. doi:10.1371/journal.pone.0038306.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
HEM1	Medication management	Process	UK	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.	Medical record: EMR review
HEM2	Medication management	Process	UK	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.	Medical record: EMR review
<b>Citation: 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. <i>Qual Saf Health Care</i>. 2008;17(3):194-200. doi:10.1136/qshc.2006.021915.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
HIC1	Lab testing & monitoring	Process	USA	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).	Incident/occurrence report

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HIC2	Lab testing & monitoring	Process	USA	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).	Incident/occurrence report
HIC3	Lab testing & monitoring	Process	USA	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).	Incident/occurrence report

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HIC4	Lab testing & monitoring	Process	USA	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).	Incident/occurrence report
HIC5	Lab testing & monitoring	Process	USA	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).	Incident/occurrence report
HIC6	Lab testing & monitoring	Process	USA	The measure assesses the proportion of testing process errors related to treatments including medication errors.	Incident/occurrence report
HIC7	Lab testing & monitoring	Process	USA	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.	Incident/occurrence report
<b>Citation: Marsteller JA, Hsiao C-J, Underwood WS, Woodward P, Barr MS. A simple intervention promoting patient safety improvements in small internal medicine practices. <i>Qual Prim Care</i>. 2010;18(5):307-316.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
MAR1	Procedure and treatment	Process	USA	This measure assesses the proportion of observations where good handwashing techniques were practiced.	Clinician survey/instrument

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MAR2	Procedure and treatment	Process	USA	This measure assesses the proportion of observations using at least two ways to identify patients.	Clinician survey/instrument
MAR3	Procedure and treatment	Process	USA	This measure assesses the proportion of observations where staff were trained and assessed on equipment and procedures.	Clinician survey/instrument
MAR4	Procedure and treatment	Process	USA	This measure assesses the proportion of observations where quality control processes performed.	Clinician survey/instrument
MAR5	Facility Structures/Resources	Structure	USA	This measure assesses the proportion of observations where sharps were secured.	Clinician survey/instrument
MAR6	Facility Structures/Resources	Structure	USA	This measure assesses the proportion of observations where hazardous waste receptacles are clearly labeled.	Clinician survey/instrument
MAR7	Facility Structures/Resources	Structure	USA	This measure assesses the proportion of observations where sharps boxes were mounted, locked, and with safety covers.	Clinician survey/instrument
MAR8	Facility Structures/Resources	Structure	USA	This measure assesses the proportion of observations where hazardous waste materials were stored appropriately.	Clinician survey/instrument
MAR9	Facility Structures/Resources	Structure	USA	This measure assesses the proportion of observations where fire extinguishers were present.	Clinician survey/instrument
MAR10	Facility Structures/Resources	Structure	USA	This measure assesses the proportion of observations that had a record of fire extinguisher inspection.	Clinician survey/instrument
MAR11	Medication management	Structure	USA	This measure assesses the proportion of observations where a temperature log was maintained for refrigerators.	Clinician survey/instrument
MAR12	Facility Structures/Resources	Structure	USA	This measure assesses the proportion of observations where refrigerators were appropriately labelled.	Clinician survey/instrument
MAR13	Facility Structures/Resources	Structure	USA	This measure assesses the proportion of observations where cleaning supplies were stored appropriately.	Clinician survey/instrument

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MAR14	Facility Structures/Resources	Structure	USA	This measure assesses the proportion of observations where cleaning and sterilization processes were appropriate.	Clinician survey/instrument
MAR15	Medication management	Structure	USA	This measure assesses the proportion of observations where sample medications were managed appropriately.	Clinician survey/instrument
MAR16	Medication management	Structure	USA	This measure assesses the proportion of observations where medications and vaccines were stored properly.	Clinician survey/instrument
MAR17	Procedure and treatment	Structure	USA	This measure assesses the proportion of observations where vaccine information was documented.	Clinician survey/instrument
MAR18	Procedure and treatment	Process	USA	This measure assesses the proportion of observations where vaccine information sheets were provided.	Clinician survey/instrument
MAR19	Medication management	Structure	USA	This measure assesses the proportion of observations using a sample medication log.	Clinician survey/instrument
MAR20	Medication management	Structure	USA	This measure assesses the proportion of observations with labels for sample medications.	Clinician survey/instrument
MAR21	Medication management	Structure	USA	This measure assesses the proportion of observations with appropriate storage of medications.	Clinician survey/instrument
<b>Citation: 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. <i>J Gen Intern Med.</i> 2013;28(2):184-192. doi:10.1007/s11606-012-2153-y.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
MCG1	Care coordination	Structure	USA	This measure assesses the mean number of positive responses ("agree" or "strongly agree") to seven component questions from a safety climate survey.	Clinician survey/instrument

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Citation: Nassaralla CL, Naessens JM, Chaudhry R, Hansen MA, Scheitel SM. Implementation of a medication reconciliation process in an ambulatory internal medicine clinic. <i>Qual Saf Health Care</i> . 2007;16(2):90-94. doi:10.1136/qshc.2006.021113.					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
NAS1	Medication management	Process	USA	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.	Medical record: EMR review
NAS2	Medication management	Process	USA	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.	Medical record: EMR review, Patient survey/instrument
Citation: Nigam R, MacKinnon N, U D, et al. Development of Canadian Safety Indicators for Medication Use. <i>Healthc Q</i> . 2008;11(sp):47-53. doi:10.12927/hcq.2008.19649.					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
NIG1	Medication management	Process	Canada	The measure assesses the proportion of prescriptions or medication orders using potentially dangerous medication abbreviations.	Administrative data, Pharmacy data, Medical record: EMR review
NIG2	Medication management	Process	Canada	The measure assesses the proportion of prescriptions or medication orders using potentially dangerous dose abbreviations.	Administrative data, Pharmacy data, Medical record: EMR review
NIG3	Medication management	Process	Canada	The measure assesses the proportion of prescriptions or medication orders with "take as directed" as the only instruction for use.	Administrative data, Pharmacy data, Medical record: EMR review

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NIG4	Medication management	Process	Canada	The measure assesses the proportion of prescriptions or medication orders with incorrect leading and/or trailing zeros with decimal points.	Administrative data, Pharmacy data, Medical record: EMR review, Medical record: manual chart review
NIG5	Medication management	Process	Canada	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.	Medical record: EMR review, Medical record: manual chart review
NIG6	Medication management	Process	Canada	The measure assesses the proportion of prescription or medication orders for high-alert medications using an administering protocol.	Administrative data, Pharmacy data, Medical record: EMR review, Medical record: manual chart review
NIG7	Medication management	Process	Canada	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.	Administrative data, Pharmacy data, Medical record: EMR review, Medical record: manual chart review
NIG8	Medication management	Process	Canada	This measure assesses the proportion of high alert prescription medications that are differentiated from other medications using flags, highlighting, or some other system.	Administrative data, Pharmacy data, Medical record: EMR review, Medical record: manual chart review
<b>Citation: Plews-Ogan ML, Nadkarni MM, Forren S, et al. Patient Safety in the Ambulatory Setting. <i>J Gen Intern Med.</i> 2004;19(7):719-725. doi:10.1111/j.1525-1497.2004.30386.x.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
PLE1	Sentinel events	Outcome	USA	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.	Incident/occurrence report

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<b>Citation: 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? <i>Arch Intern Med.</i> 2009;169(17):1578-1586.</b>					
<b>Code</b>	<b>Safety Dimension</b>	<b>Measure Type</b>	<b>Study Country</b>	<b>Summary Statement</b>	<b>Data Sources</b>
SIN1	Lab testing & monitoring	process	USA	This measure assesses the proportion of alerts for abnormal radiologic findings, flagged as requiring action by staff radiologists, that were acknowledged within two weeks.	Medical record: EMR review
SIN2	Lab testing & monitoring	process	USA	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.	Medical record: EMR review
<b>Citation: 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. <i>Am J Manag Care.</i> 2004;10(11 Pt 1):753-759.</b>					
<b>Code</b>	<b>Safety Dimension</b>	<b>Measure Type</b>	<b>Study Country</b>	<b>Summary Statement</b>	<b>Data Sources</b>
SOL1	Sentinel events	Outcome	USA	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).	Administrative data, Pharmacy data
<b>Citation: Szecsenyi J, Campbell S, Broge B, et al. Effectiveness of a quality-improvement program in improving management of primary care practices. <i>Can Med Assoc J.</i> 2011;cmaj - 110412.</b>					
<b>Code</b>	<b>Safety Dimension</b>	<b>Measure Type</b>	<b>Study Country</b>	<b>Summary Statement</b>	<b>Data Sources</b>
SZE1	Facility Structures/Resources	Structure	Germany	This measure assesses the dimension of "Complaint Management" by calculating a mean score using 6 indicators from a clinician survey.	Clinician survey/instrument
SZE2	Sentinel events	Process	Germany	This measure assesses the dimension of "Analysis of Critical Incidents" by calculating a mean score using 5 indicators from a clinician survey.	Clinician survey/instrument
SZE3	Procedure and treatment	Structure	Germany	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.	Clinician survey/instrument

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SZE4	Procedure and treatment	Process	Germany	This measure assesses the concept of "Quality Development and Quality Policy" by calculating a mean score using 7 indicators from a clinician survey.	Clinician survey/instrument
SZE5	Procedure and treatment	Process	Germany	This measure assesses the concept of "Detection of Quality and Safety Problems" by calculating a mean score using 5 indicators from a clinician survey.	Clinician survey/instrument
<b>Citation: 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. <i>J Am Med Inform Assoc.</i> 2008;15(4):430-438. doi:10.1197/jamia.M2606.</b>					
Code	Safety Dimension	Measure Type	Study Country	Summary Statement	Data Sources
TAM1	Medication management	Outcome	Canada	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.	Administrative data, Pharmacy data, Medical record: EMR review, Computerized decision support database

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