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Measuring the Quality of Care Provided to Community Dwelling Vulnerable Elders Dually Enrolled in Medicare and Medicaid

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Abstract

Context—Small studies suggest that the quality of healthcare provided to older patients needs improvement. However, measuring the quality of care for larger groups of older adults is difficult.

Objective—To measure the quality of care in a community-dwelling vulnerable geriatric population using administrative data to apply quality indicators (QIs) from the Assessing Care of Vulnerable Elders project.

Design, Setting, and Participants—Cohort study of community-dwelling dual enrollees in Medicare and Medicaid, age 75 years and older, living in 19 California counties in 1999 and 2000.

Main Outcome Measure—Measurement of care provided for 43 QIs by condition (eg, heart failure) and by intervention type (eg, medication use), and identification of care inaccessible to measurement by linked Medicare and Medicaid claims.

Results—A total of 43 out of 230 QIs were captured using linked claims data. The 100,528 patients triggered 930,753 QIs (9.3 QIs/person). The overall QI pass rate (ie, successful receipt of care) was 65%. QIs with the highest pass rates measured avoidance of adverse medications and appropriate medication use. Fewer than half of the QIs were passed for ischemic heart disease, stroke, and osteoporosis. Few QIs aimed at geriatric care could be measured and none assessed counseling, history taking, or information continuity.

Conclusions—The use of claims data-derived quality-of-care process measures is feasible for the vulnerable older population, but requires development of data elements focused on geriatric care. QIs that could be applied to the older patients included in this study identified several areas of care that need improvement.

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Keywords

long-term care; geriatrics; quality of care; process of care

Recent advances in methods of measuring quality of care for older patients have demonstrated deficits in care, particularly for conditions associated with aging—such as dementia and falls—that have escaped most prior measurement efforts.1 However, studies of older patients to date have used a limited number of measures of quality of care2 or have had limited scope.[1] Many evaluations of quality of care depend on patients having a medical insurance plan that contributes information, such as the Health Plan Employer Data and Information Set (HEDIS) to the National Committee for Quality Assurance (NCQA), to a measurement or accreditation program.[3] Most older patients are not part of any program for which there is quality-of-care measurement with feedback to clinicians.4

Evaluation of quality of care for older populations is limited largely because few indicators of the process of geriatric care have been measurable using administrative data. Medical records, compared with administrative data, can be used to measure a broader range of conditions.3 Yet, even the limited quality measurement achievable using administrative data requires assembling data from a variety of data sources; to date this has been unlikely to occur for the patient with Medicare who is not enrolled in a managed plan.[5] Methods to apply quality measures to larger, more representative samples of older patients are needed. Electronic health records (EHRs) promise to fill this void but still are not widely available.[6] Until EHRs are broadly used to collect information that can be translated into quality measurement, evaluation of care for large samples will depend on the linking of available administrative data.7 Although Part D Medicare will make linkage of medication information with core Medicare data feasible for most patients, further linkages to laboratory results and other detailed clinical data are further off.

In looking toward the next small step in quality measurement for older patients, we took advantage of a linkage of Medicare and Medicaid data and examined the quality of care delivered to older persons dually enrolled in Medicare and Medicaid in 19 counties in California, accounting for roughly half of the state's dually enrolled population. This study had 2 goals: (1) to assess the applicability of process of care measures developed as part of the Assessing Care of Vulnerable Elders (ACOVE) project1›8 that were adapted previously for use with administrative data,9 and (2) to measure the quality of care provided to a community-dwelling vulnerable older population. We evaluated the success of implementation by condition (eg, heart failure) and by type of intervention (eg, medication usage), determining areas of care poorly measured using claims-based data sources. Finally, we measured the provision of care in the study population using the quality indictors successfully adapted for use with administrative data.

METHODS

The ACOVE project developed and implemented a set of quality indicators (QIs) that focus on process of care for clinical conditions important in the care of vulnerable older patients. Details of the methods of selecting conditions and developing quality indicators have been described elsewhere.10–12 QIs were developed using systematic reviews of the medical literature followed by deliberations by panels of clinical experts using formal consensus methods to assess the validity of the QIs. This process resulted in 236 QIs covering 22 clinical areas across the continuum of care, including prevention, diagnosis, treatment, and follow-up. Each quality indicator contains an “IF” clause that defines the patient who is eligible to receive the care, and a “THEN” clause that describes what care is recommended (eg, “If a vulnerable

elder has had a myocardial infarction, then he or she should be offered a beta-blocker"). A second panel of experts adapted the QIs to apply to patients age 75 years and older, limiting the number of QIs to 230.

This study implemented a subset of the ACOVE QIs that were adapted for use with administrative data. In a prior evaluation, QIs implemented using administrative data were compared with QIs measured using medical records in a sample of 399 persons age 65 and older enrolled in 2 managed Medicare plans. In that study, of the 236 original ACOVE QIs, 182 QIs could be measured using medical records or administrative data, and of these 37 (20%) to both medical records and administrative data. Among these 37 QIs, overall agreement between administrative data and medical records was 94%. Administrative data could evaluate only 2 of 48 QIs specific to geriatric conditions.[9]

In the current study, we assessed the applicability of the ACOVE QIs to the dually enrolled population using linked Medicare and Medicaid claims. We used 43 QIs that could be scored based on these administrative data alone. We identified these QIs, by starting with the full ACOVE set and considering whether each QI could be implemented using the linked claims data. Thirty-two QIs were omitted because these data could not identify the eligible patient sample (the "IF" part of the QI), and 78 because the care process (the "THEN" part) could not be measured. For an additional 77 QIs, neither the IF nor THEN parts of the QI could be implemented. Four QIs from the original ACOVE set were excluded in the ACOVE-2 revision (see Appendix Table 1 which is available on the *Medical Care* website, www.lww-medicalcare.com) and 2 were dropped as duplicative. QIs were operationalized as close to their original formulation as possible, but in many cases, elements of QIs could not be implemented, meaning that they were limited in scope compared with those implemented using medical record review. For example, a QI that previously specified a level of systolic heart failure (eg, "left ventricular ejection fraction less than 40%," where ejection fraction is the percent of blood expelled from the heart during each contraction) was modified to be triggered if any heart failure was reported because ejection fraction is unavailable in administrative data. Where possible, we identified these limitations due to administrative data (Appendix Table 1). Furthermore, QIs used in this study could only consider administrative data documentation of receipt of care. In contrast, the original ACOVE study used medical records to measure care and gave credit for a care process that was offered (even if refused) or if a justification for not providing care was documented.[12] Lastly, in ACOVE, specific QIs were excluded for patients with advanced dementia or poor prognosis13; this could not be accomplished using administrative data alone.

Study Sample

We assessed the care of individuals dually enrolled in Medicare and Medicaid over a 2-year period (1999–2000) in 19 California counties. Because the QIs were defined for persons living in a community setting, we excluded individuals who were most likely long-term nursing home residents, defined as residing in a nursing home for at least 5 out of the last 6 months of 1998. The sample was further restricted to individuals who were age 75 years or older as of January 1, 1999.

Administrative Data Abstraction

We used linked Medicare and Medicaid data from the California Center for Long Term Care Integration (CLTCI), a collaborative effort between the USC School of Gerontology and the UCLA Division of Geriatrics sponsored by the California Department of Health Services, Office of Long Term Care, with the goal of assisting the state and counties of California in their efforts to integrate funding and access to health care and supportive services for their aged, blind, and disabled citizens.[14] The CLTCI data archive contains Medicaid eligibility data

and line item claims (excluding mental health provider visits) for aged, blind, and disabled persons enrolled between 1996 and 2000 in California's Medicaid program in 19 counties (Alameda, Contra Costa, Fresno, Lassen, Marin, Nevada, Orange, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Sonoma, Tulare, and Yolo). Medicare eligibility data and line item claims were available for the subset of Medicaid (called Medi-Cal in California) enrollees enrolled in Medicare.

Administrative data elements to determine QI eligibility and performance were derived from demographic data and diagnostic (ICD-9CM), procedural (ICD-9CM, CPT), and medication (NDC) codes reported in the Medicaid and Medicare eligibility files and the fee-for-service claims. For purposes of our analyses, prevalent medical diagnoses during the 1999–2000 study period were defined as conditions present at any time during a 3-year look back period (1996–1998). Incident diagnoses occurred during the study period, but were not present during the look back period. Coding choices for diagnoses, procedures, and medications are available upon request.

Measuring Performance

A patient was eligible for a QI if information from the claims data satisfied the "IF" part of the QI. A score of 1 was assigned to the process measure if the patient received the recommended care described in the "THEN" part of the QI as documented in the claims data. Otherwise, a score of 0 was assigned because the patient did not receive the recommended care. Process measures covered the 24-month study period. Certain "annual" measures (eg, annual electrolyte measurement if receiving a diuretic) were defined as covering only the first 12-month period. Patients were not eligible for process measures if there was inadequate time between the date of the QI being triggered and the defined follow-up period. QIs were classified by condition (eg, heart failure) and by care process type (eg, surgery, medication, test, etc.). For many care processes—particularly those calling for prescription of a medication—contraindications to the care process could be identified based on the administrative data [eg, renal insufficiency for angiotensin converting enzyme inhibitor (ACEI) use or bradycardia for β blocker use]. However, these contraindications commonly define a broader set of clinical circumstances than a physician would use to avoid these medications. Therefore, we used a "postexclusion" methodology to most closely approximate clinical care: If a patient was eligible for a QI and also had a contraindication (eg, patient with diabetes and proteinuria also had renal insufficiency), then first we evaluated whether the QI was satisfied. If it was satisfied (ie, patient receiving an ACEI), then the patient passed the QI. If the care process was not received, then the QI was excluded due to the contraindication. QI descriptions are presented in Appendix Table 1.

Eligibility and Performance

We tallied the number of QIs triggered by at least 1 patient for each condition and intervention type. Performance on each QI (eg, the QI pass rate) was computed by summing the scores (1 or 0) for all persons eligible for that QI and dividing by the total number of eligible persons for that QI (and multiplied by 100). Performance by condition and intervention groups is computed similarly.

RESULTS

Implementation of QIs With Administrative Data

We evaluated the number of QIs that could be coded using administrative data among all ACOVE-2 QIs, by condition group (eg, stroke or congestive heart failure; see Appendix Table 2 which can also be found on the *Medical Care* website) and by intervention type (eg, medication use or physical examination; see Appendix Table 3). A total of 43 out of 230 QIs

could be coded. Some clinical conditions were better captured than others. Heart failure, ischemic heart disease, and medication use had the most QIs coded. No QIs could be defined for use with administrative data for 11 conditions: end-of-life, falls and mobility problems, hearing loss, hospitalization, malnutrition, osteoarthritis, pain management, pneumonia, pressure ulcers, preventive care, and urinary incontinence.

QIs were classified into 15 types of interventions (see Appendix Table 3 which can also be found on the *Medical Care* website). Most of the QIs (34 of 44) captured by administrative data were clustered in 3 types of interventions: medication use (22 of 60), laboratory tests (8 of 12), and simple nonlaboratory tests (5 of 10). In contrast, 8 types of interventions—assistive device (6 QIs), counseling (17 QIs), dietary advice (4 QIs), exercise (6 QIs), history (32 QIs), information continuity (19 QIs), nursing procedures (5 QIs), and surgery (5 QIs)—had no QIs captured by the administrative data. Complex procedure (11 QIs) and physical examination (23 QIs) each had only a single QI captured.

Cohort Demographics

A total of 100,528 geriatric patients dually enrolled in Medicaid and Medicare in the 19 counties were eligible for study inclusion. The mean age of the study cohort in January 1999 was age 81 years with 55% of the patients being age 80 years and older (Table 1). Seventy percent were women. No single racial/ethnic group predominated in the sample—45% were white non-Hispanic, 26% were Asian, 9% were black, 13% were Hispanic, and 7% were other or unknown race/ethnicity. Half of the patients were from 4 urban counties—San Diego, San Francisco, Santa Clara, and Alameda. Patients were sick: 9% died in the first year of the study and 19% died within the 2 study years. Chronic disease was prevalent, including atrial fibrillation (21%), cataracts (56%), depression (17%), dementia (23%), diabetes mellitus (37%), heart failure (39%), hypertension (78%), history of myocardial infarction (9%), and cerebrovascular disease (36%).

QI Performance for Patients in the Cohort

The 100,528 patients triggered 930,753 QIs (mean 9.3 QIs per person) and patients received the recommended care for 606,359 QIs. The overall pass rate for QIs was 65% (606,359 of 930,753). QIs that had the highest passing rates measured avoidance of troublesome medications and interactions. These included appropriate avoidance of the opiate analgesic meperidine, avoidance of type 1 antiarrythmic medications in patients with heart failure, and avoidance of chlorpropamide—a long acting diabetes medication that can lead to low blood sugar—in the care of diabetes. QIs with the lowest pass rates include dementia evaluation and cardiac procedures.

In general, ACEI and β-blocker medications were used in about half or less of the ischemic heart disease cases in which they were recommended, and less than half of patients with atrial fibrillation, a heart arrhythmia causing increased risk of stroke, were anticoagulated. The exception to this was patients who were diabetic, nearly all of who were prescribed ACEI medications. Most patients receiving warfarin, an oral anticoagulant, met a minimum standard for frequency of checking anticoagulation, and most patients receiving diuretics were followed up as recommended. However, patients newly started on ACEI medication were not. Three-quarters of patients were seen in follow-up within 6 weeks after a hospitalization, but timely eye examinations for diabetic patients happened only 51% of the time. Pharmacologic treatment for osteoporosis and depression occurred less than half the time. See Table 2 for individual QI performance.

Eight conditions included 3 or more scored QIs (Table 3). Mainly because they focused on not doing unsafe things, among conditions with at least 3 QIs, medication use QIs had the best

performance (83%), followed by heart failure (63%), and diabetes (56%). Fewer than half of the quality indicators were passed for ischemic heart disease, vision care, and depression. When classified by intervention type, for only 5 intervention types were there 3 or more quality indicators implemented using administrative data. Quality indicators for medication management were passed 75% of the time and about half of the time for follow-up, laboratory test, and referral QIs (Table 4).

DISCUSSION

Despite the existence of a large set of QIs for older community-dwelling patients and the availability of a wide variety of administrative data, including utilization information, procedure and diagnosis codes, pharmacy information, and inpatient claims, only 44 of 230 QIs could be implemented. No QIs could measure care concerning prescription of an assistive device, counseling, dietary advice, history taking, information continuity, nursing care, or an exercise intervention, and only 1 evaluated the physical examination. Despite increasing availability of administrative data, measurement of care for a comprehensive set of QIs for older patients still requires evaluation of patients' medical records, which is expensive.

Prior evaluation of care in a limited sample of patients showed that care provided to older patients was deficient, with fewer than one-third of recommended care processes for geriatric conditions being provided.[1] To comprehensively measure care provided to older patients in larger samples and a variety of venues, better methods of obtaining information are needed. EHRs should strive to include the data elements to permit measurement of older patients' care. Efforts to improve care for older patients are hampered by a limited number of available measurements that do not necessarily focus on the types of care most important for this group.

Even recognizing the limitations of the set of implemented QIs, the QIs that *can* be measured using administrative data confirm prior chart-based findings and show that care for this large sample of vulnerable seniors needs improvement. For instance, among patients with diabetes, only 42% had a glycosylated hemoglobin (a measure of blood sugar control) checked and half received an eye examination during a 1-year period. Patients with a new heart failure diagnosis were unlikely to receive the recommended elements of a diagnostic evaluation and less than half of the time received medications shown to be effective in extending life in this condition. However, the latter findings for heart failure must take into account that the QI specifies impaired heart function, but that the severity of heart failure, as measured by ejection fraction, cannot be measured for these patients and that up to 50% of patients age 75 years and older may have heart failure with preserved systolic function.[15–17] Other areas of care that can be identified as needing improvement based on administrative data include treatment of newly diagnosed depression and treatment of osteoporosis. Although the measures presented in this article do not portray a comprehensive evaluation of care, they can be produced for large numbers of patients, and therefore can be used to target needed improvements and to serially measure care to track changes with intervention.

The current study reports quality performance that seems worse than prior work examining processes of care in a vulnerable managed Medicare sample9 and an older Medicare population, 18 but comparable to a third study of Medicare recipients.19 Compared with the administrative data evaluation of the 396 patients in the original ACOVE cohort, overall quality of care was lower in the current study (65% vs. 83%).[9] However, only 3 conditions in the original study had 100 or more QIs triggered—diabetes (n = 203, 48%), hypertension (n = 194, 93%), and medication use (n = 1333, 91%)—and of these 3 conditions, only performance in hypertension seems different than in the current study. In contrast, in the national study of 24 QIs by Jencks et al,18 2 QIs measuring care for diabetes are measured in a similar fashion to the current study. Performance on annual Hemoglobin-A_1c measurements (65%) and eye examinations (70%)

among California Medicare recipients was better than the performance measured in our population during roughly the same period. However, Asch et al[19] showed performance similar to ours on these diabetes measures in a similar cohort of fee-for-service Medicare recipients. Standardized quality indicator definitions are needed.

National efforts to measure the quality of care are gaining traction. Medicare has initiatives to measure the quality of care in hospitals and nursing homes.[20–22] The modification of Medicare that introduced a national Medicare drug benefit also required the measurement of quality of care in a number of urban markets.[23] Medicare and private insurers are introducing pay-for-performance inducements to improve quality of care in which quality is based on process of care measurements.[24] Although most quality monitoring efforts are based on administrative data, for instance whether a simple laboratory test was performed or a vaccination was received, some initiatives involve more complex data such as test results. Although a number of states have access to linked Medicare and Medicaid data, the creation of such databases is uncommon. Creating infrastructure for such efforts would be an important step toward monitoring quality of care. As industry standards for clinical data reporting develop, QIs derived from administrative data offer a way to measure quality across entire populations using widely available, routinely collected information. One potential problem of using claims for “real time” quality reporting is the time lag between care provision and availability of complete paid claims data. However, a healthcare system that viewed quality as a priority would have little difficulty generating nearly real-time data. The potential for translating claims data into quality measurement will advance with the availability of Medicare Part D data. More than half of the quality indicators measured in this report rely, at least in part, on medication use data that could be available from this program.

The quality-of-care data reported here should also be considered within the context of care provided to the special population of dual eligible patients, a major focus for state and national policy makers. Unlike the Medicare-only population, the dual eligibles have comprehensive chronic care coverage. This group of patients is more costly than the general Medicare and Medicaid populations, but their dual eligibility presents an opportunity to coordinate and improve their care, and unlike the Medicare-only population, several demonstration projects have been implemented for doing so.[25] For example, we noted deficiencies in both mental health care and eye care, which may reflect systems issues in both coverage and access to specialists for this population. Although there has been considerable effort to develop models to comprehensively improve the care of dually enrolled individuals, evaluation of these efforts and of the quality of care provided to this group of patients has focused on mortality assessments, hospital and emergency room utilization, and satisfaction.[26–29] Process of care QIs, such as those presented in this article, supplement the predominantly outcome-oriented analysis that has been implemented for dual eligible patients. One advantage of process of care measures is that they often can be translated directly into quality improvement interventions because they represent “what clinicians do.” This study confirms prior work showing that process of care for geriatric conditions such as end-of-life care, falls, pressure ulcers, and urinary incontinence cannot be captured with administrative data alone.[9] Efforts to increase the availability of data elements focused on geriatric conditions is critical to measure care for dual eligible patients.

Limitations

This is a retrospective study using administrative data. Eligibility for QIs and processes of care delivered may be under- or over-reported by the administrative data. We attempted to explicitly describe some of these limitations in Appendix 1. These include variable sensitivity for conditions (such as osteoporosis) and care processes, for which administrative data may under-identify such conditions or be unable to reliably measure certain aspects of care (eg,

vaccinations or obtaining end-of-life care preferences). In addition, patients trigger different clusters of QIs and patients triggering "more difficult" QIs will likely have lower quality scores; "weighting" QIs to account for variation in eligibility is an area of active research. The ACOVE QIs used here were designed to reflect care practices during the study period. Thus, the care profiled here represents the standard of care in 2000. Performance on dementia and depression QIs may be biased lower due to the absence of Medicaid claims for mental health provider services. Furthermore, results may not generalize to other regions or to patients who are not enrolled in both Medicaid and Medicare.

CONCLUSIONS

The use of administrative data-derived quality-of-care measures based on processes of care are feasible for the geriatric population. A noncomprehensive, relatively small set of QIs—reflecting general medical care rather than geriatric care—demonstrates that quality of care tends to be mediocre among vulnerable older patients dually enrolled in both Medicare and Medicaid. However, improving and integrating claims data and implementing EHRs has enormous potential for quality measurement for this group. Administrative data offer a bridge across the quality chasm, but we must develop the necessary data elements to measure the aspects of care important for older patients.

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TABLE 1

Demographic Characteristics of Community Dwelling Dual Medicare-Medicaid Enrollees in 19 California Counties, 1999–2000

N	100,528
Age, yr (%)	
75–79	45
80–84	28
85–89	17
>90	10
Age (mean; yr)	81
Gender (%)	
Male	30
Female	70
Race (%)	
White	45
Black	9
Latino	13
Asian	26
Other	7
Prevalent diseases (%)	
Atrial fibrillation	21
Cataract	56
Depression	17
Dementia	23
Diabetes	37
Heart failure	39
Hypertension	78
Myocardial infarction (history of)	9
Osteoarthritis	58
Osteoporosis	21
Stroke/cerebrovascular disease	36
Death (%)	
At 1 yr	9
At 2 yr	19
County of residence (%)	
Alameda	10
Contra Costa	4
Fresno	7
Lassen	0
Marin	1
Monterey	2
Nevada	0
Riverside	8

Sacramento	7
San Bernardino	9
San Diego	16
San Francisco	12
San Luis Obispo	1
San Mateo	4
Santa Clara	11
Santa Cruz	2
Sonoma	2
Tulare	4
Yolo	1

TABLE 2

Administrative Data-Based Quality Indicator Performance–Community-Based Population of Dual Eligible Enrollees Age 75 Years and Older

Eligible Patient Age 75 Yr and Older	QI Recommended Care Process	Contraindications and Exclusions	Total Eligible (#)	Passed (#)	Passed (%)
Patient discharged from hospital	Follow-up appointment within 6 wk	–	32,792	24,921	76.0
Patient with newly diagnosed dementia	Perform serum B12 & TSH level	–	8889	665	7.5
Patient with newly diagnosed dementia	Receive cholinesterase inhibitor	–	10,486	1387	13.2
Patient with dementia and new depression	Treat depression with pharmacologic therapy or mental health referral	–	1178	235	19.9
Patient with new depression diagnosis	Treat with pharmacologic therapy or mental health referral within 2 wk	–	3963	903	22.8
Patient newly treated with an antidepressant	Do not prescribe TCAs, MAOIs, benzodiazepines, or stimulants as 1st or 2nd line therapy	–	694	619	89.2
Patient with coronary artery disease newly started on a TCA	Perform an ECG within 3 mo before initiation	Pacemaker	70	30	42.9
Patient with depression changing from an SSRI to MAOI therapy	MAOI started a specified time after stopping SSRI	–	5	4	80.0
Patient with depression changing from a MAOI to SSRI therapy	SSRI started a specified time after stopping MAOI	–	34	11	32.4
Patient with diabetes	Perform a hemoglobin A1C at least every 12 mo	–	26,494	11,195	42.3
Patient with diabetes without renal insufficiency	Perform an annual test for proteinuria	Receiving ACEI, ARB	14,134	5068	35.9
Patient with diabetes	Eye examination every 2 yr	Blind	23,380	12,026	51.4
Patient with diabetes and proteinuria	Prescribe ACEI or ARB	ACEI, ARB exclusions	18,253	17,843	97.8
Patient with heart failure	Prescribe ACEI or ARB	ACEI, ARB exclusions	37,177	17,749	47.7
Patient with new heart failure	Perform chest x-ray, ECG, CBC, serum electrolytes, and TSH	–	11,226	3076	27.4
Patient with new heart failure	Evaluate left ventricular ejection fraction within 1 mo	–	11,226	1585	14.1
Patient with heart failure	Prescribe a β blocker	β blocker exclusions	14,927	3773	25.3
Patient with heart failure without atrial fibrillation	Do not prescribe 1st or 2nd generation calcium channel blocker	–	22,433	21,843	97.4
Patient with heart failure	Do not prescribe a type 1 antiarrhythmic	ICD in place	35,287	34,957	99.1
Patient with newly diagnosed hypertension	Perform ECG within 4 wk of diagnosis.	–	16,200	5760	35.6
Patient with hypertension and renal insufficiency or proteinuria	Prescribe ACEI or ARB	ACEI, ARB exclusions	16,515	6500	39.4
Patient with hypertension and asthma	Do not prescribe β blocker	–	15,834	12,321	77.8
Patient hospitalized for AMI	Perform assessment of LVEF within 3 d of hospital discharge	–	2580	1787	69.3
Patient with AMI or unstable angina	Perform stress test within 4 to 21 d	–	2802	530	18.9

Eligible Patient Age 75 Yr and Older	QI Recommended Care Process	Contraindications and Exclusions	Total Eligible (#)	Passed (#)	Passed (%)
Patient with AMI or unstable angina and persistent ischemia	Perform cardiac catheterization	–	5221	1628	31.2
Patient with known CAD and unknown lipids	Check lipids	–	13,321	4140	31.1
Patient with CAD and hypercholesterolemia	Prescribe cholesterol-lowering medication	–	36,363	17,308	47.6
Patient with history of AMI	Prescribe β blocker	β-blocker exclusions	5260	1949	37.1
Patient prescribed warfarin	Check INR within 4 d of initiating medication and every 6 wk thereafter	–	4218	3297	78.2
Patient prescribed thiazide or loop diuretic	Check electrolytes yearly	–	40,866	35,631	87.2
Patient with diabetes	Do not prescribe chlorpropamide	–	16,971	16,715	98.5
All patients	Do not prescribe medications with strong anticholinergic effects if alternatives are available	–	100,528	84,248	83.8
All patients	Do not prescribe barbiturate medications	Seizure disorder	95,639	92,387	96.6
All patients	Do not prescribe meperidine	–	100,528	100,340	99.8
Patient prescribed ACEI or ARB	Check serum potassium and creatinine within 4 wk of initiation	–	22,083	4779	21.6
Patient treated with warfarin, history of PUD or GI bleeding, AND treated with NSAIDS	Prescribe misoprostol or a proton pump inhibitor medication	–	37,136	8735	23.5
Female patient newly diagnosed with osteoporosis	Prescribe bisphosphonates, SERM, calcitonin, PTH or HRT within 3 mo	–	6678	2628	39.4
Atrial fibrillation in high risk patient	Prescribe anticoagulant	–	20,370	4693	23.0
All patients	Perform eye evaluation every 2 yr	–	76,804	37,118	48.3
Patient with open angle glaucoma	Perform comprehensive eye examination	–	11,430	3653	32.0
Patient with diabetes and proliferative retinopathy	Perform dilated eye examination every 4 mo	–	1487	319	21.5
Patient with macular degeneration	Perform dilated eye examination every 6 mo	–	2300	888	38.6
Patient had cataract surgery	Perform follow-up ocular examination within 3 mo	–	6971	1115	16.0

ACEI indicates angiotensin converting enzyme inhibitor medication; AMI, acute myocardial infarction; ARB, angiotensin receptor blocker medication; B12, vitamin B12; CAD, coronary artery disease; CBC, complete blood count; ECG, electrocardiogram; ECT, electroconvulsive therapy; GI bleeding, gastrointestinal bleeding; HRT, hormone replacement therapy; CD, internal cardiac defibrillator; INR, international normalized ratio; LDL, low density lipoprotein; LVEF, left ventricular ejection fraction; MAOI, monamine oxidase inhibitor; NSAID, nonsteroidal antiinflammatory drug; PPI, proton pump Inhibitor; PTH, parathyroid hormone; PUD, peptic ulcer disease; SERM, selective estrogen receptor modulator; SSRI, selective serotonin reuptake inhibitor; TCA, tricyclic antidepressant; TSH, thyroid stimulating hormone.

Exclusions: β blocker, bradycardia, heart block, asthma, COPD, or β-Blocker intolerance; ACEI/ARB, renal artery stenosis, renal failure, hyperkalemia, angioedema, or ACEI/ARB intolerance.

TABLE 3

Summary QI Performance by Condition

Condition	No. QIs	Total Eligible (#)	Passed (#)	Passed (%)
Continuity of care	1	32,792	24,921	76
Dementia	3	20,553	2287	11
Depression	5	4766	1567	33
Diabetes mellitus	4	82,261	46,132	56
End-of-life	0	–	–	–
Falls and mobility problems	0	–	–	–
Hearing loss	0	–	–	–
Heart failure	6	132,276	82,983	63
Hospitalization	0	–	–	–
Hypertension	3	48,549	24,581	51
Ischemic heart disease	6	65,547	27,342	42
Malnutrition	0	–	–	–
Medication use	8	417,969	346,132	83
Osteoarthritis	0	–	–	–
Osteoporosis	1	6678	2628	39
Pain management	0	–	–	–
Pneumonia	0	–	–	–
Pressure ulcers	0	–	–	–
Preventive care	0	–	–	–
Stroke and atrial fibrillation	1	20,370	4693	23
Urinary incontinence	0	–	–	–
Vision care	5	98,992	43,093	44
Overall	43	930,753	606,359	65

TABLE 4

Summary QI Performance by Intervention Type

Intervention Type	No. QIs	Total Eligible (#)	Passed (#)	Passed (%)
Assistive device	0	–	–	–
Counseling	0	–	–	–
Dietary advice	0	–	–	–
Physical examination	1	11,430	3653	32
Follow up	4	43,550	27,243	63
History	0	–	–	–
Information continuity	0	–	–	–
Lab test	8	141,231	67,851	48
Medication	22	596,259	447,148	75
Nursing	0	–	–	–
Complex procedure	1	5221	1628	31
Referral	2	100,184	49,144	49
Surgery	0	–	–	–
Simple test	5	32,878	9692	29
Exercise, PT	0	–	–	–
Overall	43	930,753	606,359	65