

The Quality of Medical Care Provided to Vulnerable Community-Dwelling Older Patients

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Background: Many people 65 years of age and older are at risk for functional decline and death. However, the resource-intensive medical care provided to this group has received little evaluation. Previous studies have focused on general medical conditions aimed at prolonging life, not on geriatric issues important for quality of life.

Objective: To measure the quality of medical care provided to vulnerable elders by evaluating the process of care using Assessing Care of Vulnerable Elders quality indicators (QIs).

Design: Observational cohort study.

Setting: Managed care organizations in the northeastern and southwestern United States.

Patients: Vulnerable older patients identified by a brief interview from a random sample of community-dwelling adults 65 years of age or older who were enrolled in 2 managed care organizations and received care between July 1998 and July 1999.

Measurements: Percentage of 207 QIs passed, overall and for

22 target conditions; by domain of care (prevention, diagnosis, treatment, and follow-up); and by general medical condition (for example, diabetes and heart failure) or geriatric condition (for example, falls and incontinence).

Results: Patients were eligible for 10 711 QIs, of which 55% were passed. There was no overall difference between managed care organizations. Wide variation in adherence was found among conditions, ranging from 9% for end-of-life care to 82% for stroke care. More treatment QIs were completed (81%) compared with other domains (follow-up, 63%; diagnosis, 46%; and prevention, 43%). Adherence to QIs was lower for geriatric conditions than for general medical conditions (31% vs. 52%; $P < 0.001$).

Conclusions: Care for vulnerable elders falls short of acceptable levels for a wide variety of conditions. Care for geriatric conditions is much less optimal than care for general medical conditions.

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See editorial comment on pp 784-786.

The quality of care among patients 65 years of age and older has not been extensively investigated, and most existing studies have focused on general adult medical conditions. This is surprising, considering that more than 40% of all medical expenditures are for persons 65 years of age and older (1). The most comprehensive study to date of quality of care among older patients evaluated 24 process indicators among U.S. Medicare beneficiaries in all 50 states between 1997 and 1999 (2). Care for acute myocardial infarction, heart failure, stroke, and pneumonia was evaluated by using inpatient medical records. Pneumonia, breast cancer, and diabetes indicators were evaluated by using survey and Medicare claims data. The investigators found that the percentage of patients receiving appropriate care varied widely by measure and state. Several other studies of older patients evaluated cardiovascular conditions, diabetes, or aspects of preventive care and medication use (3–10). No study, however, has assessed the quality of medical care provided for geriatric conditions that profoundly affect the lives of vulnerable older patients. Furthermore, surveys find that older persons often prioritize function and comfort over disease treatment and prolongation of life (11).

Quality-of-care measurement for older patients that examines only a few conditions and only indicators aimed at prolonging life yields an incomplete assessment because it ignores other conditions and aspects of care that are of equal or even greater importance to older patients. For this

reason, we developed a quality assessment system that assesses more conditions. Together, these conditions account for a majority of all of the care older patients receive (12) and include several “geriatric syndromes.” We used this quality assessment system to evaluate the care provided to a sample of vulnerable elders at increased risk for death or functional decline.

METHODS

The Assessing Care of Vulnerable Elders (ACOVE) project developed and applied a quality assessment system for vulnerable older persons. The assessment system aimed to develop quality indicators (QIs) that cover the spectrum of care for these patients. Indicators were implemented by using medical record abstraction and patient interview.

The ACOVE Quality-of-Care Assessment System

The ACOVE investigators developed a system of QIs to cover the most important conditions vulnerable elders encounter in all care venues. This system focused on processes (care behaviors) rather than outcomes for 2 reasons. First, although most agree that outcomes should be adjusted for risk when quality is measured, there is little consensus regarding the best severity measurement system (13). Second, measurement of processes of care is thought to be a more direct assessment of quality than measurement of outcomes (14). The process measures were selected to represent the various domains of care: screening

and prevention, diagnosis, treatment, and follow-up. The development of the assessment system was guided by a Policy Advisory Committee, which helped to direct the focus toward practical applications, and by a Clinical Committee, which provided clinical expertise for development and monitored the assembly of the QIs into a comprehensive system (15). The methods for selecting conditions and developing the QIs have been described in detail elsewhere (12, 16).

In brief, the Clinical Committee used the criteria of prevalence, impact, effectiveness of prevention or treatment, need for quality improvement, feasibility of measurement, and “geriatric niche” in a formal group rating process to identify 22 target conditions for quality improvement (12). For each of the 22 conditions, we developed a set of evidence-based QIs for vulnerable elders using a combination of systematic reviews and expert judgment (16). Of 420 proposed QIs, the 2 expert panels, the Clinical Committee, and the American College of Physicians Task Force on Aging accepted 236 as valid indicators; these were assembled into the ACOVE QI set (17). The 236 QIs covered the domains of care as follows: Sixty-one (26%) focused on screening and prevention, 50 (21%) focused on diagnosis, 84 (36%) focused on treatment, and 41 (17%) focused on follow-up and continuity of care. Examples of ACOVE QIs for each condition are presented in Table 1.

Patients and Data Collection

Using the ACOVE QI set, we assessed care provided to seniors who were enrolled in 2 managed care organizations. These patients were defined as “vulnerable” on the basis of self-report or proxy report on a brief, 13-item screening survey (Vulnerable Elders-13 [VE-13] Survey [18]). Vulnerable elders, identified by this function-based survey, are community-dwelling persons 65 years of age and older who have 4 times the risk for functional decline or death over the next 2 years compared with individuals not identified as vulnerable (18). Each managed care organization, 1 in the northeastern United States and the other in the southwestern United States, had more than 20 000 elderly enrollees and contracted with a network of providers to deliver care. Eligibility criteria included continuous enrollment in the managed care organization for at least 13 months and no out-of-plan care or active treatment for malignant conditions (excluding nonmelanoma skin cancer) during this period. A random sample of 3207 community-dwelling elderly adults was drawn from eligible persons in each managed care organization by using a random-number generator. Vulnerable elders were identified by using the VE-13 Survey as part of a telephone interview. Patients who did not speak English were not eligible to participate. The RAND Institutional Review Board approved the study protocol.

Context

Many Americans 65 years of age and older are at risk for functional decline, yet we know little about the quality of care for geriatric conditions.

Contribution

This study used a 13-item survey about functional status to evaluate the care of 420 people 65 years of age and older whom the investigators identified as vulnerable to functional decline. Quality of care was highly variable from condition to condition but was generally better for general medical conditions, such as diabetes, than for geriatric conditions, such as incontinence.

Implications

Efforts to improve care for vulnerable elders should focus on the geriatric conditions that profoundly influence functional status.

—The Editors

Medical Record Review

Using administrative data, we identified all inpatient and outpatient medical care received by study participants during the 13-month period of 1 July 1998 to 31 July 1999. Medical records were requested from primary care and specialist providers (including eye care and mental health providers), acute care hospitals, skilled-nursing facilities, home health agencies, and facilities providing outpatient services (for example, physical therapy). Identifying information of patients and providers was removed from the medical records.

Trained nurses with previous experience in quality assessment performed medical record abstraction. Abstractors were provided with written abstraction guidelines and real-time consultation with a senior nurse reviewer. The abstractor considered all of a patient’s records when assessing whether he or she was eligible for and received the indicated care processes. In other words, information on eligibility for a QI could have been derived from 1 record (such as an outpatient note) while the care process was delivered and documented in another setting (for example, inpatient medical record). If the care process was performed in the defined time interval, care was scored as complying with the QI. The senior nurse reviewer also assessed each completed medical record abstraction. Physicians reviewed QIs that required a more detailed level of clinical assessment. Examples include whether the elements of a delirium evaluation had been completed or whether an adequate intervention was performed for hyperlipidemia. An ophthalmologist evaluated selected data elements addressing vision care. Ten percent of all records were reabstracted to evaluate reliability of the abstraction process. Exact agreement on QI eligibility and score was 95%. (For details of abstractor preparation and abstraction materials, see the Appendix, available at www.annals.org.)

Table 1. Examples of Assessing Care of Vulnerable Elders Quality Indicators*

Condition	Text of QI
Continuity and coordination of care	IF a vulnerable elder is discharged from a hospital to home or to a nursing home, and the transfer form or discharge summary indicates that a test result is pending, THEN the outpatient or nursing home medical record should include the test result within 6 weeks of hospital discharge. [F]
Dementia	IF a vulnerable elder with dementia has a caregiver (and, if capable, the patient assents), THEN the physician should discuss or refer the patient and caregiver for discussion about patient safety, provide education on how to deal with conflicts at home, and inform them about community resources for dementia. [P]
Depression	IF a vulnerable elder is diagnosed with depression, THEN antidepressant treatment, psychotherapy, or electroconvulsive therapy should be offered within 2 weeks after diagnosis unless there is documentation within that period that the patient has improved, or unless the patient has substance abuse or dependence, in which case treatment may wait until 8 weeks after the patient is in a drug- or alcohol-free state. [T]
Diabetes mellitus	IF a vulnerable elder has an elevated glycosylated hemoglobin level, THEN he or she should be offered a therapeutic intervention aimed at improving glycemic control within 3 months if the glycosylated hemoglobin level is 9.0% to 10.9%, and within 1 month if the glycosylated hemoglobin level is 11% or greater. [T]
End-of-life care	IF a vulnerable elder is admitted directly to the intensive care unit (from the outpatient setting or emergency department) and survives 48 hours, THEN within 48 hours of admission, the medical record should document consideration of the patient's preferences for care or that these could not be elicited or are unknown. [F]
Falls and mobility problems	IF a vulnerable elder reported 2 or more falls in the past year, or a single fall with injury requiring treatment, THEN there should be documentation that a basic fall evaluation was performed that resulted in specific diagnostic and therapeutic recommendations. [D]
Hearing loss	ALL vulnerable elders should have a hearing screening examination as part of the initial evaluation. [P]
Heart failure	IF a vulnerable elder has asymptomatic left ventricular dysfunction with a left ventricular ejection fraction of 40% or less, THEN he or she should be offered an ACE inhibitor. [P]
Hospital care	IF a vulnerable elder is admitted to the hospital for any acute or chronic illness or any surgical procedure, THEN the evaluation should include within 24 hours: 1) diagnoses, 2) prehospital and current medications, and 3) cognitive status. [P]
Hypertension	IF a vulnerable elder has a new diagnosis of hypertension, THEN there should be documentation regarding the presence or absence of other cardiovascular risk factors. [P]
Ischemic heart disease	IF a vulnerable elder with established coronary heart disease smokes, THEN he or she should be offered counseling for smoking cessation at least annually and have this documented in the medical record. [P]
Malnutrition	IF a vulnerable elder has involuntary weight loss of more than 10% of body weight over 1 year or less, THEN weight loss (or a related disorder) should be documented in the medical record as an indication that the physician recognized malnutrition as a potential problem. [D]
Medication management	IF a vulnerable elder is newly started on a diuretic, THEN serum potassium and creatinine levels should be checked within 1 month of the initiation of therapy and then annually thereafter. [F]
Osteoarthritis	IF an ambulatory vulnerable elder receives a new diagnosis of symptomatic osteoarthritis of the knee and has no contraindication to exercise, and is physically and mentally able to exercise, THEN a directed or supervised strengthening or aerobic exercise program should be prescribed within 3 months of diagnosis. [T]
Osteoporosis	IF a female vulnerable elder has a new diagnosis of osteoporosis, THEN the patient should be offered treatment with hormone replacement therapy, bisphosphonates, a selective estrogen receptor modulator, or calcitonin within 3 months of diagnosis. [T]
Pain management	IF a vulnerable elder with chronic pain is treated with opioids, THEN he or she should be offered a bowel regimen, or the medical record should document the potential for constipation or explain why bowel treatment is not needed. [T]
Pneumonia	IF a vulnerable elder is admitted to the hospital with pneumonia, THEN antibiotics should be administered within 8 hours of hospital arrival. [T]
Pressure ulcer	IF a vulnerable elder presents with a pressure ulcer, THEN the pressure ulcer should be assessed for 1) location, 2) depth and stage, 3) size, and 4) presence of necrotic tissue. [D]
Screening and prevention	ALL vulnerable elders newly admitted to a physician practice should receive within 6 months the elements of a comprehensive geriatric assessment. [D]
Stroke and atrial fibrillation	IF a vulnerable elder is admitted to the hospital with a diagnosis of acute ischemic or hemorrhagic stroke, THEN he or she should be admitted to a specialized acute or combined acute and rehabilitative stroke unit, or transferred to a specialized stroke unit if such a unit is available in the hospital. [T]
Urinary incontinence	ALL vulnerable elders should have documentation of the presence or absence of urinary incontinence during the initial evaluation. [P]
Vision care	IF a vulnerable elder who uses corrective lenses for any activities of daily living is hospitalized (or in a nursing home) and his or her corrective lenses are at the hospital (or nursing home), THEN the corrective lenses should be readily accessible to the vulnerable elder. [P]

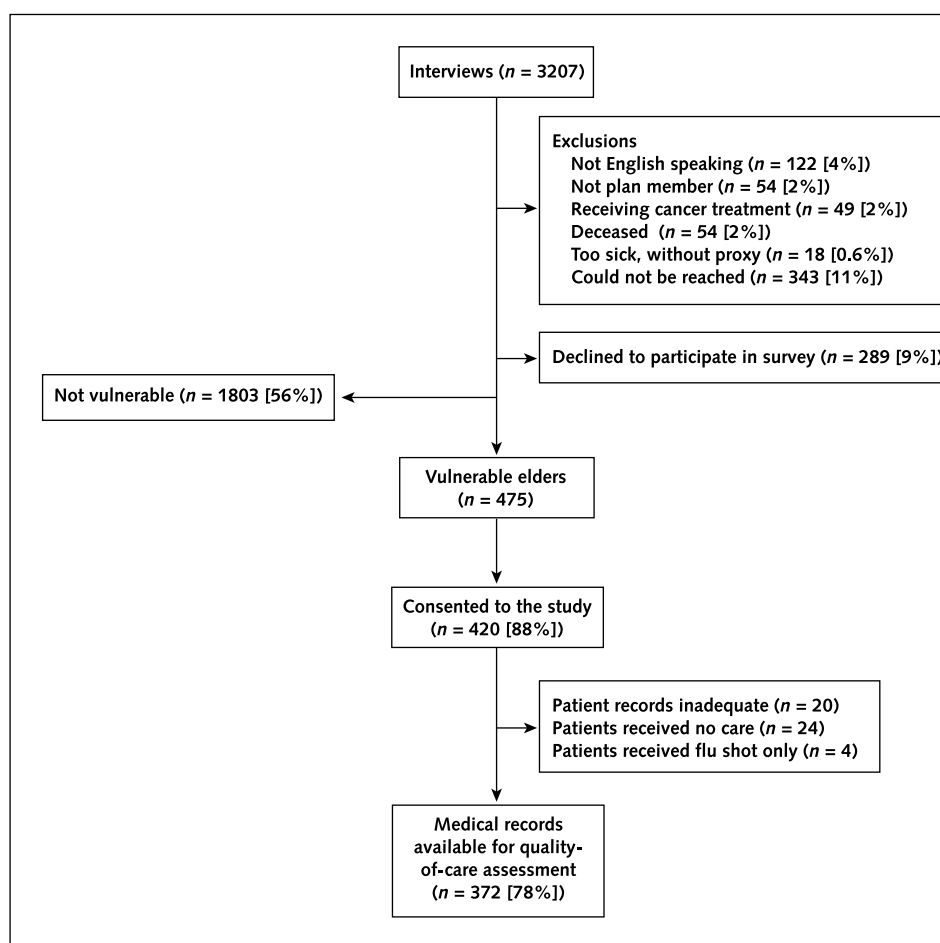
* One quality indicator from each condition is displayed (e.g., diabetes, heart failure). The domain of the indicator is signified by the bracketed letter at the end of the indicators. For a full set of quality indicators with scores for this cohort, see Appendix Table 1. ACE = angiotensin-converting enzyme; D = diagnostic; F = follow-up; P = prevention; QI = quality indicator; T = treatment.

Quality-of-Care Interview

A quality-of-care interview was conducted to ask study participants (or, if participants were incapable of responding, their proxies) about aspects of their care that might not be captured in the medical record (for example, physician-patient counseling). On the basis of conditions and medications reported during the interview, patients were

asked about specific processes of care they had received. Patients were also asked about care preferences that might affect the applicability of QIs. In addition, the interview included demographic questions and functional status items. The quality-of-care interview was conducted by telephone between August and October 2000 and required, on average, 44 minutes to complete.

Figure. Flow of patients through the study.



Statistical Analysis

Of the 236 QIs, we were able to evaluate 207 using chart abstraction ($n = 185$ [89%]) or interview ($n = 22$ [11%]). Interview was used to score QIs for data elements that we did not collect from the medical record. A QI was scored for a patient if he or she satisfied the “IF” statement of the QI and thus was eligible to receive the specified care process (Table 1). A score of 1 was awarded if the care process was carried out, and a score of 0 was assigned if it was not. For QIs that included several triggering events, a score between 0 and 1 was possible. If the medical record indicated that the patient declined the care process, the QI was considered to be passed (the care was credited in both the numerator and the denominator of the indicator score). On the other hand, if the patient had a prespecified contraindication to the care process (for example, a patient with asthma who was otherwise eligible to receive a β -blocker), he or she was considered ineligible for the QI and it had no effect, either positive or negative, on the quality score (the care was not included in the denominator or the numerator of the indicator score). Quality indicators also were inapplicable to a patient if the care process conflicted with the patient’s preferences (for example, if

statements in the chart or made during the interview indicated that the patient did not want surgery and the process was a surgical intervention) or if the Clinical Committee had voted to exclude the QI in the presence of advanced dementia or poor prognosis (expected survival < 6 months) (19) and the patient had this condition.

We computed the number of patients eligible and the percentage adherence for all QIs, for QIs grouped by condition, and for QIs grouped by domain of care. The percentage passed was compared between managed care organizations by using a *t*-test. Standard errors were adjusted for clustering of indicators within patients. For purposes of analysis, we classified the target conditions as “general medical conditions,” “geriatric conditions,” and “cross-cutting conditions.” For the 11 general medical conditions (depression, diabetes, hearing impairment, heart failure, hypertension, ischemic heart disease, osteoarthritis, osteoporosis, pneumonia, stroke, and vision impairment), approach to care differs little throughout adult life. Geriatric conditions focus on syndromes that are frequently observed in vulnerable older patients and are less common in general adult care (dementia or delirium, end-of-life care,

falls or mobility disorders, malnutrition, pressure ulcers, and urinary incontinence). The remaining 5 conditions were cross-cutting conditions that might apply to patients with general medical conditions or geriatric conditions (continuity of care, hospital care, medication use, pain management, and screening and prevention).

We compared adherence to QIs for general medical conditions and QIs for geriatric conditions using a *t*-test adjusted for inpatient correlation. Because the number of triggered indicators varied substantially by QI, the QIs were separated into 3 categories in which the number of triggered QIs showed less variation: acute care (mean of 12 triggered cases per QI), chronic care (mean of 51 triggered cases per QI), and screening and prevention (mean of 99 triggered cases per QI). General medical and geriatric QIs were compared in each of these 3 categories to minimize the chance that the differences between the 2 types of conditions were due to variation in the types of QIs triggered. Analyses were performed with SAS statistical software (SAS Institute, Inc., Cary, North Carolina).

Role of the Funding Source

The funding source had no role in the design, analysis, or interpretation of the study or in the decision to submit the results for publication.

RESULTS

Of 3207 patients selected from the 2 managed care organizations, 2278 were screened for vulnerability (9% through proxies). Nine percent of patients declined to complete the survey, and other patients were not interviewed for the reasons specified in the **Figure**. Among screened patients, 475 (21%) were classified by the VE-13 Survey as vulnerable elders. Of these, 420 (88%) consented to participate in the study (**Figure**).

Table 2. Description of the Assessing Care of Vulnerable Elders Sample (n = 372)

Characteristic	Value
Demographic	
Mean age, y	80.6
Women, %	64
Mean educational level, y	11.4
Mean self-reported health (5-point scale)	2.6
Mean activities of daily living disabilities score (6-point scale)	0.49
Mean instrumental activities of daily living disabilities score (6-point scale)	1.2
Mean vulnerability score	5.3
Mean mental health score (5-point scale)*	3.2
Annual household income >\$15 000, %†	43
Clinical, %	
Diabetes mellitus	23
Heart failure	7
Chronic obstructive pulmonary disease	22
Dementia	6
Fall, recurrent or injurious	13
Incontinence, new or worsening	7
Smoker	5

* Mental health score based on 285 patients.

† Income based on 337 patients.

For these 420 patients, we received 1190 medical records, representing 95% of records requested. Adequate medical records were not available for measurement for 20 patients. An additional 24 patients received no care during the study period, and 4 patients received only an influenza vaccine; these 28 patients had no medical records available for abstraction. The study sample therefore consisted of 372 vulnerable elders (78% of vulnerable elders and 89% of consenting patients) who had available medical records that could be abstracted for measurement of medical care quality. This included 200 patients from the first managed care organization and 172 patients from the second.

Of these 372 patients, 341 were alive during the interview period and an interview was completed for 245 (72%). Most incomplete interviews were due to respondent unwillingness (*n* = 64 [19%]); in addition, 30 patients (9%) could not be contacted. One hundred thirty-three interviews were completed from the first managed care organization, and 112 interviews were completed from the second.

The mean age of the study sample was 80.6 years. Sixty-four percent of participants were women, and the mean vulnerability score was 5.3 (a score ≥3 was required for study entry [18]). The patients had a mean of 0.49 activity of daily living disabilities and a mean of 1.2 instrumental activity of daily living disabilities (each on a 6-point scale). Other characteristics are shown in **Table 2**. The 420 consenting vulnerable elders and the 55 vulnerable elders who chose not to participate in the study did not differ significantly in terms of age, number of disabilities, self-rated health, or vulnerability score. Also, the 372 patients with available medical records had demographic characteristics similar to those of the 48 patients without medical records, except that the former group was more likely to have a household income greater than \$15 000 (43% vs. 21%; *P* = 0.005).

The 372 vulnerable elders with available medical record data visited a mean of 2.7 different outpatient providers (range, 1 to 8 providers) during the 13-month study period. Providers included 187 internists, 161 family physicians, 373 medical specialists or surgeons, and 199 eye specialists. Seventy-one patients (19%) were hospitalized a total of 103 times (0.26 hospitalization per person per year) during the study period. The 372 vulnerable elders also had 72 emergency department visits and 11 skilled-nursing facility admissions during the study period.

Vulnerable elders were eligible for a total of 10 711 QIs (mean, 29 QIs per patient [range, 6 to 54 QIs per patient]). The overall adherence to QIs was 55% (95% CI, 53% to 57%), and there was no difference in overall adherence between managed care organizations. Patients in the first managed care organization triggered 5846 QIs, of which 54% (CI, 53% to 56%) were completed, and patients in the second managed care organization triggered 4865 QIs, of which 56% (CI, 55% to 58%) were completed.

Table 3. Number and Scores of Quality Indicators by Condition*

Condition	QIs Measured	QIs Triggered	QIs Passed (95% CI)
	n		%
Continuity and coordination of care	8	579	80 (78–83)
Dementia†	9	306	35 (29–41)
Depression	13	101	31 (22–39)
Diabetes mellitus	10	419	57 (52–62)
End-of-life care†	8	654	9 (7–12)
Falls and mobility problem†	8	830	34 (30–37)
Hearing loss	4	41	77 (65–89)
Heart failure	12	96	71 (59–83)
Hospital care	8	204	61 (55–66)
Hypertension	8	124	77 (69–85)
Ischemic heart disease	13	162	55 (46–63)
Malnutrition†	7	491	47 (42–51)
Medication management	13	2346	81 (80–82)
Osteoarthritis	11	324	31 (25–36)
Osteoporosis	9	740	36 (32–40)
Pain management	8	650	51 (47–54)
Pneumonia	7	767	49 (45–53)
Pressure ulcer†	9	39	41 (27–54)
Screening and prevention	9	727	67 (63–71)
Stroke and atrial fibrillation	10	54	82 (75–90)
Urinary incontinence†	10	528	29 (26–33)
Vision care	13	529	79 (76–82)
Overall	207	10 711	55 (53–57)

* QI = quality indicator.

† Geriatric conditions.

Quality Scores by Condition

The number of QIs triggered by condition varied widely, ranging from a low of 39 for pressure ulcers to a high of 2346 for medication management. Similarly, adherence to QIs varied substantially among conditions. At the low end were adherence levels of 9%, 29%, and 31% for end-of-life care, urinary incontinence, and osteoarthritis, respectively. Adherence was highest for the QIs of stroke (82%), medication management (81%), and continuity of care (80%) (Table 3).

To allow better understanding of these overall condition scores, we present the individual QI scores for 1 low-adherence condition: urinary incontinence. Only half of vulnerable elders had incontinence queried at an initial physician visit, and fewer than one third had the condition evaluated annually. When a vulnerable elder presented with new or worsening incontinence, few physicians completed an incontinence history (19%), examination (22%), or laboratory testing (13%). An incontinence treatment option was documented in the chart 59% of the time, although more than 1 option was described for only 22% of cases and behavioral treatment for stress or urge incontinence was described in only 13% of cases.

To allow examination of a high-adherence condition, we present the individual QIs of vision impairment. Most patients received prescribed periodic screening (89%) and received attention within 24 hours for an acute visual change (80%) or within 2 months for a chronic change

(100%). While only 31% of vulnerable elders with cataracts received an annual visual function evaluation, 86% had cataract extraction if a functional deficit was identified, and all received prescribed postoperative attention. For 88% of patients with diabetes who had a retinal examination, the presence or degree of retinopathy was documented. Ophthalmologic treatment was continued into the hospital setting: Eighty-three percent of patients continued to receive their eye medication, and 89% of patients reported that their corrective lenses were available to them. (For a description of each individual QI score, see Appendix Table 1, available at www.annals.org.)

Quality Scores by Domain of Care

Eighty-one percent of QIs focused on treatment were passed. This rate was higher than the adherence to QIs for care processes aimed at follow-up (63%), diagnosis (46%), or prevention (43%) (Table 4).

Quality Scores for General Medical Conditions and Geriatric Conditions

For all categories of care (acute care, chronic care, and screening and prevention), the pass rate was significantly lower for QIs for geriatric conditions than for general medical conditions ($P < 0.001$). Only 41% (CI, 27% to 55%) of geriatric QIs in acute care were passed, compared with 83% (CI, 77% to 89%) of acute care general medical QIs. For chronic care, 29% (CI, 26% to 31%) of geriatric QIs were completed, compared with 51% (CI, 48% to 55%) of general medical QIs. Similarly, in the category of screening and prevention, adherence was higher with general medical conditions than with geriatric conditions (Table 5).

DISCUSSION

Our study provides evidence that the care of vulnerable elders falls substantially short of acceptable levels for a wide variety of conditions. These data reinforce and extend the reports of others concerning quality of care in general (14) and for older, ill patients in particular (2–5). Our data also support the need to include geriatric conditions of importance to older patients in quality assessment systems. While care for traditionally studied conditions, such as heart failure, diabetes, and prevention, showed deficiencies consistent with previous studies, our data showed far greater deficiencies for conditions such as falls, dementia, and urinary incontinence.

Table 4. Number and Scores of Quality Indicators by Domain of Care*

Domain	QIs Measured	QIs Triggered	QIs Passed (95% CI)
	n		%
Prevention	54	5475	43 (41–45)
Diagnosis	45	1167	46 (43–49)
Treatment	73	2548	81 (79–83)
Follow-up	35	1508	63 (60–65)

* QI = quality indicator.

Table 5. Number and Scores of Quality Indicators for General Medical Care versus Geriatric Care*

Condition Category	Overall		Acute Care		Chronic Care		Screening and Prevention	
	QIs Triggered	QIs Passed (95% CI)	QIs Triggered	QIs Passed (95% CI)	QIs Triggered	QIs Passed (95% CI)	QIs Triggered	QIs Passed (95% CI)
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
General medical	3316	52 (50–54)	177	83 (77–89)	1269	51 (48–55)	1870	49 (47–52)
Geriatric	2908	31 (29–32)	47	41 (27–55)	1867	29 (26–31)	994	33 (30–36)
Cross-cutting	4487	74 (72–75)	114	59 (53–64)	2936	76 (74–77)	1437	71 (68–73)

* General medical condition scores and geriatric condition scores were different overall and for each care type (acute care, chronic care, and screening and prevention) ($P < 0.001$). QI = quality indicator.

Conditions such as falls and mobility disorders, urinary incontinence, cognitive impairment, and end-of-life care may receive inadequate attention in the context of primary care for several reasons. The skills needed to carry out the processes of care for these conditions may not be as well taught in medical school and primary care residencies (20, 21). Specific skills, such as the gait and cognitive evaluation, require expertise that may be difficult to acquire and maintain among physicians with primary care practices who see the problems only intermittently. Unlike skills such as reading an electrocardiogram or manipulating hypoglycemic or antihypertensive medication, which are practiced daily, a Mini-Mental Status Examination, an incontinence examination, or administration of an advance directive may be perceived as a time-consuming task that the clinician is less comfortable performing. Furthermore, conditions such as falls, incontinence, and cognitive impairment are poorly identified in clinical practice (22, 23). Finally, primary care physicians receive little feedback on these types of conditions. Although busy clinicians may receive daily reports from insurers about patients with previous myocardial infarctions who are not receiving β -blockade, diabetic patients without a recent glycosylated hemoglobin test, or patients with cardiac procedures who lack a cholesterol check, they never receive feedback about the geriatric conditions studied here.

Variation by domain deserves further attention to allow us to understand why treatment indicators are so often satisfied but prevention and diagnosis indicators are not. One explanation is that treatment indicators often involve prescription of a medication, which is a simple process. Preventive processes may include counseling or screening that is more time-consuming and requires screening tools. Although it is gratifying that older, ill patients received the treatments they needed, it is of particular concern that preventive care processes are least well performed in this group, which is at risk for functional decline if deficits are not detected and addressed.

Our study has several important limitations. First, there was nonresponse at the level of vulnerable elder identification, and some vulnerable elders declined to participate. Care for nearly one quarter of consenting patients was not evaluated, and an even larger proportion of patients were not interviewed. Although participants were

similar to those who declined, we could not evaluate response bias among patients who did not want to talk to the VE-13 Survey screener. In addition, we were able to include only English-speaking patients, a restriction that excluded 4% of the sample. Second, medical records were unavailable for 11% of patients, although those with missing records were similar to patients in the study sample. Over half of the patients without medical records received no care (or only an influenza shot) during the study period. Several of the screening QIs would have failed in these patients if the patients had been included in the trial; the quality scores we present are conservative estimates. In addition, medical record documentation has been shown to be an imperfect reflection of care provided (24, 25). However, poor documentation is correlated with poor process of care (26), suggesting that exclusion of incomplete and unreadable records makes our conclusions conservative. Third, methods for aggregating QIs across conditions and types of care are still in their infancy. To consider the widely divergent number of patients triggering QIs that represented different types of care, we stratified the analysis of general medical and geriatric conditions into acute care, chronic care, and screening and prevention. The results were similar in each category, suggesting that aggregation was acceptable. Fourth, this study lacked statistical power to compare managed care organizations by condition, and we could not make comparisons at the individual QI level. Finally, we studied patients from only 2 managed care organizations, and our results may not be applicable to other managed care organizations or to fee-for-service health care. However, we found nearly identical results for the QIs that overlapped with Jencks and colleagues' much larger study of quality in fee-for-service Medicare (2): angiotensin-converting enzyme inhibitor for heart failure (69% vs. 63% in our study), smoking cessation counseling after myocardial infarction (40% vs. 50%), antibiotics within 8 hours for pneumonia (85% vs. 88%), and annual glycosylated hemoglobin tests (71% vs. 80%). This supports the generalizability of our findings to the broader Medicare population.

Our study also has many strengths, including the rigorous methods used to construct our QIs, which involved systematic reviews assessing benefits and harms, group judgment of a multidisciplinary expert panel, and peer re-

view by additional clinical experts. We also supplemented medical record information with data from patient interviews to better capture care that might not have been recorded and to account for patient preferences. Third, we assessed care across a very broad range of conditions that included indicators assessing primary care and hospital care; prevention, treatment, diagnosis, and follow-up; and technical as well as interpersonal care. For these reasons, we believe our results present the most accurate assessment of quality of care available for vulnerable elders.

In summary, we have developed a method to comprehensively assess quality of care for vulnerable older patients. We demonstrated the feasibility of our method in a sample of older patients from 2 managed care organizations. Our results showed substantial deficiencies in care quality, particularly for conditions uniquely important to geriatric patients and their caregivers. Our study both calls attention to these deficiencies and provides a comprehensive method to assess the effectiveness of interventions to improve care.

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APPENDIX: ACOVE CHART ABSTRACTION Data Collector Training and Support

Nurse Abstractors

The nurse abstractors had between 17 and 39 years of clinical experience. Two of the 4 had 10 years of previous experience as medical record abstractors. Two had extensive experience in public health, home care, and rehabilitation, and 2 had extensive experience in quality-of-care auditing and oversight.

The nurse abstractors were selected on the basis of interview, past experience, and performance on a small “test” medical record abstraction. Inclusion as a study abstractor depended on the successful completion of a 5-day training course. The training included the objectives of the ACOVE study, relevant clinical background with abstraction exercises in the 22 study conditions, and complete medical record abstractions of 5 cases drawn from a larger sample provided by the managed care organization study sites.

The nurse abstractors were given a 104-page guideline document that covered details of clinical definitions and inclusion–exclusion rules for each abstraction item. Guideline updates and clinical support were provided to nurse abstractors during the entire data collection period, and project staff addressed abstractor questions in real time. In addition, weekly guideline updates were circulated that apprised all abstractors of any new clinical decisions or circumstances that arose during the previous week. The average time required for a nurse abstractor to abstract the medical records for a single case was 2.4 hours. When the abstraction was concluded, the project staff reviewed the abstraction form (Appendix Table 2) for accuracy and completeness.

MD Overreaders

Two internal medicine specialists, 1 geriatrician, and 1 ophthalmologist served as MD overreaders. Selected medical record abstraction items were singled out for MD overreader review for 2 reasons: 1) Eligibility or satisfaction of a QI required physician judgment (for example, to determine whether presenting symptoms required a depression evaluation or could be explained by other clinical circumstances, or whether the specific elements of a delirium evaluation were performed), and 2) data were complex enough to require physician judgment (for example, selected ophthalmology examination results that needed ophthalmologic interpretation).

Overreaders participated in a 2-hour training session provided by the ACOVE principal investigator. The training session included each physician item in the abstraction form and the standardized clinical approach to be used in reviewing each item. Overreaders were also given a 38-page guideline that covered details of how to handle reviews, along with clinical examples. Duration of physician review ranged from nonexistent to more

than 1 hour; the average review required 25 minutes. After completion of each MD overreading, project staff again reviewed the abstraction form for completeness before data entry.

Reliability

We evaluated reliability by reabstracting a random 10% sample of medical records. Overall, these charts contained 698 QIs. Across the dual abstractions, these indicators included 135 806 data elements. Overall error rate in these data elements, including abstraction and keypunching, was 1.6%. Overall, 97% of QIs were triggered identically in abstracted and reabstracted charts. For 95% of QIs, the identical QI trigger and score were identified in abstracted and reabstracted records. Nearly identical scores were obtained from abstracted and reabstracted records overall and by domain of care, as shown in Appendix Table 3.

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Appendix Table 1. Assessing Care of Vulnerable Elders Quality Indicator Scores from a Cohort of Vulnerable Elders in 2 Managed Care Organizations*

Condition	QI	Text of QI	QIs Triggered, n	QIs Passed, %	
Continuity and coordination of care	1	ALL vulnerable elders should be able to identify a physician or a clinic that they would call when in need of medical care or should know the phone number or other mechanism by which they can reach this source of care.†	276	100	
	2	IF an outpatient, vulnerable elder is started on a new prescription medication, and he or she has a follow-up visit with the prescribing physician, THEN the medical record at the follow-up visit should document 1 of the following: 1) the medication is being taken, 2) the physician asked about the medication (e.g., side effects or adherence or availability), or 3) the medication was not started because it was not needed or because it was changed.	189	66	
	3	IF a vulnerable elder is under the outpatient care of ≥2 physicians, and 1 physician prescribed a new prescription medication or a change in medications, THEN subsequent medical record entries by the nonprescribing physician should acknowledge the medication change.	6	42	
	7	IF a vulnerable elder is discharged from a hospital to home, and he or she received a new prescription medication or a change in medication before discharge, THEN the outpatient medical record should document or acknowledge the medication change within 6 weeks of discharge.	11	55	
	8	IF a vulnerable elder is discharged from a hospital to home or to a nursing home, and the transfer form or discharge summary indicates that a test result is pending, THEN the outpatient or nursing home medical record should include the test result within a 6 weeks of hospital discharge.	14	71	
	9	IF a vulnerable elder is discharged from a hospital to home or to a nursing home, and the hospital medical record specifies a follow-up appointment for a physician visit or a treatment (e.g., physical therapy or radiation oncology), THEN the medical record should document that the visit or treatment took place or that it was postponed or not needed.	62	90	
	12	IF a vulnerable elder is discharged from a hospital to home or to a nursing home, THEN there should be a discharge summary in the outpatient physician or nursing home medical record within 6 weeks.	52	41	
	13	IF a vulnerable elder is deaf or does not speak English, THEN an interpreter or translated materials should be employed to facilitate communication between the vulnerable elder and the health care provider.†	0	–	
	Dementia	1	Cognition	IF a vulnerable elder is admitted to a hospital or is new to a physician practice, THEN there should be documentation of a multidimensional assessment of cognitive ability.	130
Function		IF a vulnerable elder is admitted to a hospital or is new to a physician practice, THEN there should be an assessment of functional status.			
4		IF a vulnerable elder has newly diagnosed dementia, THEN serum levels of vitamin B ₁₂ and thyroid-stimulating hormone should be measured.	5	20	
6		IF a vulnerable elder is in a mild to moderate stage of Alzheimer disease, THEN the treating physician should discuss treatment with a cholinesterase inhibitor with the patient and the primary caregiver (if available).	0	–	
7		IF a vulnerable elder with dementia has a caregiver (and, if capable, the patient assents), THEN the physician should discuss or refer the patient and caregiver for discussion about patient safety, provide education on how to deal with conflicts at home, and inform them about community resources for dementia.	28	26	
8		IF a vulnerable elder with dementia has cerebrovascular disease, THEN he or she should be offered appropriate stroke prophylaxis.	2	100	
9		IF a vulnerable elder has dementia, THEN he or she should be screened for depression during the initial evaluation period.	5	60	
10		IF a vulnerable elder with dementia has depression, THEN he or she should be treated for the depression.	0	–	
11		IF a vulnerable elder has newly diagnosed dementia, THEN the diagnosing physician should advise the patient not to drive a motor vehicle or request that the Department of Motor Vehicles (or equivalent) retest the patient's ability to drive, or refer the patient to a drivers' safety and education course that includes assessment of driving ability consistent with state laws.	6	50	
Depression		1	IF a vulnerable elder presents with new onset of 1 of the following symptoms—sad mood, feeling down, insomnia or difficulties with sleep, apathy or loss of interest in pleasurable activities, reports of memory loss, unexplained weight loss of more than 5% of body weight in the past month or 10% over 1 year, or unexplained fatigue or low energy—THEN the patient should be asked about or treated for depression, or referred to a mental health professional within 2 weeks of presentation.	34	26
		3	IF a vulnerable elder receives a diagnosis of a new depression episode, THEN the medical record should document at least 3 of the 9 DSM-IV target symptoms for major depression within the first month of diagnosis.	13	0

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Appendix Table 1—Continued

	4	IF a vulnerable elder receives a diagnosis of a new depression episode, THEN the medical record should document on the day of diagnosis the presence or absence of suicidal ideation and psychosis (consisting of, at a minimum, auditory hallucinations or delusions).	13	0
	5	IF a vulnerable elder has thoughts of suicide, THEN the medical record should document, on the same date, that the patient either has no immediate plan for suicide or that the patient was referred for evaluation for psychiatric hospitalization.	0	–
	6	IF a vulnerable elder is diagnosed with depression, THEN antidepressant treatment, psychotherapy, or electroconvulsive therapy should be offered within 2 weeks after diagnosis unless there is documentation within that period that the patient has improved, or unless the patient has substance abuse or dependence, in which case treatment may wait until 8 weeks after the patient is in a drug- or alcohol-free state.	13	69
	7	IF a vulnerable elder is started on an antidepressant medication, THEN the following medications should not be used as first- or second-line therapy: tertiary amine tricyclics (amitriptyline, imipramine, doxepin, clomipramine, trimipramine); MAOIs (unless atypical depression is present); benzodiazepines; or stimulants (except methylphenidate).	10	90
	10	IF a vulnerable elder with a history of cardiac disease is started on a tricyclic antidepressant, THEN a baseline electrocardiogram should be obtained before initiation of or within 3 months before treatment.	1	0
	11	IF a vulnerable elder is taking a serotonin reuptake inhibitor, THEN an MAOI should not be used for at least 2 weeks after termination of paroxetine, sertraline, fluvoxamine, and citalopram or for at least 5 weeks after termination of fluoxetine.	0	–
	12	IF a vulnerable elder is taking an MAOI, THEN he or she should not receive medications that interact with MAOIs for at least 2 weeks after termination of the MAOI.	0	–
	13	IF a vulnerable elder is being treated for depression, THEN at each treatment visit suicide risk should be documented, if he or she had suicidal ideation during a previous visit.	0	–
	15	IF a vulnerable elder has no meaningful symptom response after 6 weeks of treatment, THEN 1 of the following treatment options should be initiated by the 8th week of treatment: Medication dose should be optimized or the patient should be referred to a psychiatrist (if initial treatment was medication), or medication should be initiated or referral to a psychiatrist should be offered (if initial treatment was psychotherapy alone).	9	22
	16	IF a vulnerable elder responds only partially after 12 weeks of treatment, THEN 1 of the following treatment options should be instituted by the 16th week of treatment: Switch to a different medication class or add a second medication to the first (if initial treatment included medication), add psychotherapy (if the initial treatment was medication), try medication (if initial treatment was psychotherapy without medication), consider electroconvulsive therapy, or refer to a psychiatrist.	8	25
	17	IF a vulnerable elder has responded to antidepressant medication, THEN he or she should be continued on the drug at the same dose for at least 6 months and should make contact with a clinician at least once (office visit or phone) during that time period.	0	–
Diabetes mellitus	1	IF a vulnerable elder has diabetes, THEN his or her glycosylated hemoglobin level should be measured at least every 12 months.	84	80
	2	IF a vulnerable elder has an elevated glycosylated hemoglobin level, THEN he or she should be offered a therapeutic intervention aimed at improving glycemic control within 3 months if the glycosylated hemoglobin level is 9.0% to 10.9%, and within 1 month if the glycosylated hemoglobin level is 11% or greater.	9	61
	3	IF a diabetic vulnerable elder does not have established renal disease and is not receiving an ACE inhibitor or ACE receptor blocker, THEN he or she should receive an annual test for proteinuria.	43	19
	4	IF a diabetic vulnerable elder has proteinuria, THEN he or she should be offered therapy with an ACE inhibitor or ACE receptor blocker.	5	20
	5	IF a vulnerable elder has diabetes, THEN his or her blood pressure should be checked at each outpatient visit.	85	59
	6	IF a diabetic vulnerable elder has a glycosylated hemoglobin level of 10% or greater, THEN he or she should be referred for diabetic education at least annually. [†]	0	–
	7	IF a diabetic vulnerable elder has elevated blood pressure, THEN he or she should be offered a therapeutic intervention to lower blood pressure within 3 months if blood pressure is 150 to 160/90 to 100 mm Hg or within 1 month if blood pressure is greater than 160/100 mm Hg.	44	79
	8	ALL diabetic vulnerable elders should be offered daily aspirin therapy.	59	41

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Appendix Table 1—Continued

	9	IF a diabetic vulnerable elder has a fasting total cholesterol level of 240 g/dL or greater, THEN he or she should be offered an intervention to lower cholesterol.	12	92
	10	IF a diabetic vulnerable elder is not blind, THEN he or she should receive an annual dilated eye examination performed by an ophthalmologist, optometrist, or diabetes specialist.	84	48
End-of-life care	1	ALL vulnerable elders should have in their outpatient charts 1) an advance directive indicating the patient's surrogate decision maker, 2) documentation of a discussion about who would be a surrogate decision maker or a discussion about a search for a surrogate, or 3) indication that there is no identified surrogate.	370	4
	2	IF a vulnerable elder with dementia, coma, or altered mental status is admitted to the hospital, THEN within 48 hours of admission the medical record should 1) contain an advance directive indicating the patient's surrogate decision maker, 2) document a discussion about who would be a surrogate decision maker or a discussion about a search for a surrogate, or 3) indicate that there is no identified surrogate.	20	25
	3	IF a vulnerable elder has a diagnosis of severe dementia, is admitted to the hospital, and survives 48 hours, THEN within 48 hours of admission, the medical record should document consideration of the patient's previous preferences for care or that these could not be elicited or are unknown.	2	100
	4	IF a vulnerable elder is admitted directly to the intensive care unit (from the outpatient setting or emergency department) and survives 48 hours, THEN within 48 hours of admission, the medical record should document consideration of the patient's preferences for care or that these could not be elicited or are unknown.	6	17
	5	IF a vulnerable elder indicates during an interview that he or she would rather die than live permanently comatose, ventilated, or tube fed, THEN 1) the chart should document a discussion of life-sustaining treatment preferences, 2) the chart should contain an advance directive, or 3) the patient should indicate that he or she discussed this topic with the physician or does not wish to discuss this.†	238	12
	6	IF a vulnerable elder has an advance directive in the outpatient, inpatient, or nursing home medical record or the patient reports the existence of an advance directive in an interview, and the patient receives care in a second venue, THEN 1) the advance directive should be present in the medical record at the second venue or 2) documentation should acknowledge its existence, its contents, and the reason that it is not in the medical record.	8	25
	7	IF a vulnerable elder requires mechanical ventilation during a hospitalization (except short-term and postoperative mechanical ventilation), THEN the medical record should document within 48 hours of the initiation of mechanical ventilation the goals of care and the patient's preference for mechanical ventilation or why this information is unavailable.	2	100
	8	IF a vulnerable elder with decision-making capacity has orders written in the hospital or the nursing home to withhold or withdraw a particular treatment (e.g., a do-not-resuscitate order or an order not to initiate dialysis), THEN the medical record should document 1) patient participation in the decision or 2) why the patient chose not to participate in the decision.	10	70
Falls and mobility problems	1	ALL vulnerable elders should have documentation that they were asked at least annually about the occurrence of recent falls.	372	25
	2	ALL vulnerable elders should have documentation that they were asked about or examined for the presence of balance or gait disturbances at least once.†	276	48
	3			
	History	IF a vulnerable elder reported 2 or more falls in the past year, or a single fall with injury requiring treatment, THEN there should be documentation of a basic fall history.	57	49
	Examination	IF a vulnerable elder reported 2 or more falls in the past year, or a single fall with injury requiring treatment, THEN there should be documentation of a basic fall examination.	57	3
	Recommendation	IF a vulnerable elder reported 2 or more falls in the past year, or a single fall with injury requiring treatment, THEN there should be an examination with documented recommendations.	57	30
	4	IF a vulnerable elder reports or is found to have new or worsening difficulty with ambulation, balance, or mobility, THEN there should be documentation that a basic gait, mobility, and balance evaluation was performed within 6 months and resulted in specific diagnostic and therapeutic recommendations.	22	23
	5	IF a vulnerable elder demonstrates decreased balance or proprioception or increased postural sway, THEN an appropriate exercise program should be offered and an evaluation for an assistive device performed.	13	62

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Appendix Table 1—Continued

	6	IF a vulnerable elder is found to have problems with gait, strength (e.g., ≥ 4 out of 5 on manual muscle testing or the need to use his or her arms to rise from a chair), or endurance (e.g., dyspnea on mild exertion), THEN an exercise program should be offered.	14	71	
Hearing loss	1	ALL vulnerable elders should have a hearing screening examination as part of the initial evaluation.	4	0	
	2	IF a vulnerable elder fails a hearing screening, THEN he or she should be offered a formal audiologic evaluation within 3 months.	18	94	
	3	IF a vulnerable elder has a hearing problem or fails an audiologic screening, THEN he or she should have an ear examination within 3 months.	15	83	
	5	IF a vulnerable elder is a hearing aid candidate, THEN he or she should be offered hearing rehabilitation.	4	50	
Heart failure	1	IF a vulnerable elder has heart failure and left ventricular ejection fraction of 40% or less (or unknown) THEN he or she should be offered an ACE inhibitor or receptor blocker.	23	65	
	3	IF a vulnerable elder receives a new diagnosis of heart failure, THEN he or she should have a history taken at the time of diagnosis and hospitalization that documents the presence or absence of previous myocardial infarction, documented coronary artery disease, revascularization, current symptoms of chest pain or angina, history of hypertension, history of diabetes, history of hypercholesterolemia, history of valvular heart disease, history of thyroid disease, smoking, current medications, and a description of functional capacity (e.g., New York Heart Association functional status).	6	83	
	4	IF a vulnerable elder receives a new diagnosis of heart failure, THEN he or she should have the following elements of the physical examination documented at the time of presentation: weight, blood pressure, heart rate, lung examination, cardiac examination, and abdominal or lower-extremity examination.	6	100	
	5	IF a vulnerable elder receives a new diagnosis of heart failure, THEN he or she should undergo the following studies within 1 month of the diagnosis (unless they have already been performed within the previous 3 months): chest radiography; electrocardiography; complete blood count; and measurement of serum sodium and potassium levels, serum creatinine concentration, and thyroid-stimulating hormone level (in patients with atrial fibrillation or heart failure with no obvious cause).	6	67	
	6	IF a vulnerable elder receives a new diagnosis of heart failure, THEN education about disease management should be provided and documented.†	2	50	
	7	IF a vulnerable elder receives a new diagnosis of heart failure, THEN he or she should be offered an evaluation of left ventricular ejection fraction within 1 month.	6	67	
	8	IF a vulnerable elder is hospitalized with heart failure, THEN he or she should have serum electrolyte levels, creatinine concentration, and blood urea nitrogen levels measured within 1 day of hospitalization.	8	100	
	9	IF a vulnerable elder has heart failure, left ventricular ejection fraction of 40% or less, and New York Heart Association class I to III disease, THEN he or she should be offered a β -blocker, unless a contraindication (e.g., uncompensated heart failure) has been documented.	21	48	
	10	IF a vulnerable elder has heart failure, has left ventricular ejection fraction of 40% or less, and does not have atrial fibrillation, THEN from among the 3 generations of calcium-channel blocker medications, he or she should not be treated with a first- or second-generation calcium-channel blocker.	9	100	
	11	IF a vulnerable elder has heart failure and left ventricular ejection fraction of 40% or less, THEN he or she should not be treated with a type I antiarrhythmic agent unless an implantable cardioverter defibrillator is in place.	1	100	
	13	IF a vulnerable elder has heart failure and atrial fibrillation, THEN he or she should be offered anticoagulation to achieve an INR or 2.0 to 3.0.	7	71	
	14	IF a vulnerable elder has heart failure and atrial fibrillation, AND he or she has documented contraindications to anticoagulation, THEN he or she should be offered aspirin.	3	33	
	Hospital care	1			
		History	IF a vulnerable elder is admitted to the hospital for any acute or chronic illness or any surgical procedure, THEN the evaluation should include, within 24 hours, 1) diagnoses and 2) prehospital and current medications.	57	97
Cognition		IF a vulnerable elder is admitted to the hospital for any acute or chronic illness or any surgical procedure, THEN documentation of cognitive status should be performed within 24 hours.	57	20	
	2	IF a vulnerable elder enters the hospital, THEN discharge planning should begin within 48 hours.	57	67	

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Appendix Table 1—Continued

	3	IF a vulnerable elder has valvular or congenital heart disease, intracardiac valvular prosthesis, hypertrophic cardiomyopathy, mitral valve prolapse with regurgitation, or previous episode of endocarditis, and a high-risk procedure is planned, THEN endocarditis prophylaxis should be given.	1	100
	4	IF a hospitalized vulnerable elder is at very high risk for venous thrombosis, THEN the patient should have venous thromboembolism prophylaxis.	4	100
	5	IF a hospitalized vulnerable elder has risk factors for peptic stress ulcers, THEN the patient should receive prophylaxis with an H ₂ -blocker, sucralfate, or a proton-pump inhibitor.	10	45
	9			
	Work-up	IF a hospitalized vulnerable elder has a definite or suspected diagnosis of delirium, THEN an evaluation for potentially precipitating factors must be undertaken and identified causes treated.	10	60
	Treatment	IF a hospitalized vulnerable elder has a definite or suspected diagnosis of delirium, THEN identified potential causes should be treated.	9	44
Hypertension	1	IF a vulnerable elder has newly diagnosed hypertension, THEN electrocardiography should be performed within 4 weeks of the diagnosis.	6	33
	2	IF a vulnerable elder has a new diagnosis of hypertension, THEN there should be documentation regarding the presence or absence of other cardiovascular risk factors.	6	33
	3	IF a vulnerable elder receives a diagnosis of hypertension and the blood pressure is below 170/90 mm Hg, THEN there should be evidence that 3 or more blood pressure measurements of 140/90 mm Hg or greater were obtained before the diagnosis.	3	33
	4	IF a vulnerable elder receives a diagnosis of hypertension, THEN nonpharmacologic therapy with lifestyle modification for treatment of hypertension should be recommended, including dietary sodium restriction and weight loss if the patient is more than 10% over ideal body weight.	6	33
	5	IF a vulnerable elder remains hypertensive after nonpharmacologic intervention, THEN pharmacologic antihypertensive treatment should be initiated.	11	64
	6	IF a vulnerable elder requires pharmacotherapy for treatment of hypertension in the outpatient setting, THEN a once- or twice-daily medication should be used unless there is documentation regarding the need for agents that require more frequent dosing.	59	93
	7	IF a vulnerable elder has hypertension and has renal parenchymal disease with a serum creatinine concentration greater than 1.5 mg/dL or more than 1 g of protein/24 h of collected urine, THEN therapy with an ACE inhibitor should be offered.	19	63
	8	IF a vulnerable elder has hypertension and asthma, THEN β -blocker therapy for hypertension should not be used.	15	100
Ischemic heart disease	1	IF a vulnerable elder is hospitalized with acute myocardial infarction, THEN he or she should be offered assessment of left ventricular function before discharge or within 3 days after hospital discharge.	2	50
	2	IF a vulnerable elder has an acute myocardial infarction or unstable angina, did not undergo angiography, and does not have contraindications to revascularization, THEN he or she should be offered noninvasive stress testing 4 to 21 days after the infarction or anginal event.	3	0
	3	IF a vulnerable elder has an acute myocardial infarction or unstable angina, THEN he or she should be given aspirin therapy within 1 hour of presentation.	2	0
	4	IF a vulnerable elder has unstable angina or an acute myocardial infarction, THEN he or she should be offered β -blocker therapy within 12 hours of presentation.	2	50
	5	IF a vulnerable elder has an acute myocardial infarction that is measurable by electrocardiography and does not have contraindications to reperfusion therapy, THEN he or she should be offered treatment with reperfusion therapy.	0	—
	6	IF a vulnerable elder without contraindications to revascularization has an acute myocardial infarction or unstable angina with 1 or more of the following—pain refractory to medical therapy (>1 h of aggressive medical therapy), recurrent angina or ischemia at rest or with low-level activities, ischemia accompanied by symptoms of heart failure—THEN he or she should be offered urgent catheterization.	0	—
	7	IF a vulnerable elder has significant left main or significant 3-vessel coronary artery disease with left ventricular ejection fraction less than 50%, THEN he or she should be offered coronary artery bypass graft surgery.	1	0
	8	IF a vulnerable elder has established coronary artery disease and his or her cholesterol level is not known, THEN he or she should undergo a fasting cholesterol evaluation, including total LDL and HDL cholesterol levels.	3	33

Continued on following page

Appendix Table 1—Continued

	9	IF a vulnerable elder has established CHD and an LDL cholesterol level greater than 130 mg/dL, and a trial of step II diet therapy was not offered or was ineffective, THEN he or she should be offered cholesterol-lowering medication.	16	47
	10	IF a vulnerable elder has established CHD and is not taking warfarin, THEN he or she should be offered antiplatelet therapy.	73	66
	11	IF a vulnerable elder with established CHD smokes, THEN he or she should be offered counseling for smoking cessation at least annually and have this documented in the medical record.	8	50
	12	IF a vulnerable elder has had a recent myocardial infarction or recent coronary bypass graft surgery, THEN he or she should be offered cardiac rehabilitation.	2	0
	13	IF a vulnerable elder has had a myocardial infarction, THEN he or she should be offered a β -blocker.	53	53
Malnutrition	1	ALL vulnerable elders should be weighed at each physician office visit, and these weights should be documented in the medical record.	355	42
	2	IF a vulnerable elder has involuntary weight loss of more than 10% of body weight over 1 year or less, THEN weight loss (or a related disorder) should be documented in the medical record as an indication that the physician recognized malnutrition as a potential problem.	13	77
	3	IF a vulnerable elder has documented involuntary weight loss or hypoalbuminemia (<3.5 g/dL), THEN she or he should receive an evaluation for potentially reversible causes of poor nutritional intake.	33	52
	4	IF a vulnerable elder has documented involuntary weight loss or hypoalbuminemia (<3.5 g/dL), THEN he or she should receive an evaluation for potentially relevant comorbid conditions, including medications that might be associated with decreased appetite (e.g., digoxin, fluoxetine, anticholinergics), depressive symptoms, and cognitive impairment.	33	76
	5	IF a vulnerable elder is hospitalized, THEN his or her nutritional status should be documented during the hospitalization by evaluation of oral intake or serum biochemical testing (e.g., albumin, prealbumin, or cholesterol).	57	47
	7	IF a vulnerable elder who was hospitalized for a hip fracture has evidence of nutritional deficiency (thin body habitus or low serum albumin or prealbumin levels), THEN oral or enteral nutritional protein–energy supplementation should be initiated postoperatively.	0	–
	8	IF a stroke patient has persistent dysphagia at 14 days, THEN a gastrostomy or jejunostomy tube should be considered for enteral feeding.	0	–
Medication management	1	IF a vulnerable elder is prescribed a new drug, THEN the prescribed drug should have a clearly defined indication documented in the record.	258	98
	2	IF a vulnerable elder is prescribed a new drug, THEN the patient (or, if incapable, a caregiver) should receive education about the purpose of the drug, how to take it, and expected side effects or important adverse reactions.	259	18
	4	EVERY new drug that is prescribed to a vulnerable elder on an ongoing basis for a chronic medical condition should have a documentation of response to therapy within 6 months.	180	65
	5	ALL vulnerable elders should have a drug regimen review at least annually.†	245	68
	6			
	Initial	IF a vulnerable elder is prescribed warfarin, THEN an INR should be determined within 4 days after initiation of therapy and at least every 6 weeks.	11	45
	Long term	IF a vulnerable elder is prescribed warfarin, THEN an INR should be determined at least every 6 weeks.	44	53
	7	IF a vulnerable elder is prescribed a thiazide or loop diuretic, THEN he or she should have electrolytes checked at least yearly.	127	80
	8	IF a vulnerable elder is prescribed an oral hypoglycemic drug, THEN chlorpropamide should not be used.	89	99
	9	ALL vulnerable elders should not be prescribed a medication with strong anticholinergic effects if alternatives are available.	366	98
	10	IF a vulnerable elder does not need control of seizures, THEN barbiturates should not be used.	372	99
	11	IF a vulnerable elder requires analgesia, THEN meperidine should not be used.	369	99
	12			
	Diuretic	IF a vulnerable elder is newly started on a diuretic, THEN serum potassium and creatinine levels should be checked within 1 month of the initiation of therapy and then annually thereafter.	25	34
	ACE inhibitor	IF a vulnerable elder is newly started on an ACE inhibitor, THEN serum potassium and creatinine levels should be checked within 1 month of the initiation of therapy.	23	37
Osteoarthritis	1	IF a vulnerable elder receives a diagnosis of symptomatic osteoarthritis, THEN functional status and degree of pain should be assessed annually.†	169	40

Continued on following page

Appendix Table 1—Continued

	2	IF a vulnerable elder has monoarticular joint pain associated with redness, warmth, or swelling and the patient also has an oral temperature greater than 38.0 °C and does not have a previously established diagnosis of pseudogout or gout, THEN a diagnostic aspiration of the painfully swollen red joint should be performed that day.	0	–
	3	IF an ambulatory vulnerable elder receives a new diagnosis of symptomatic osteoarthritis of the knee and has no contraindication to exercise, and is physically and mentally able to exercise, THEN a directed or supervised strengthening or aerobic exercise program should be prescribed within 3 months of diagnosis.	19	16
	4	IF an ambulatory vulnerable elder has had a diagnosis of symptomatic osteoarthritis of the knee for more than 12 months, has no contraindication to exercise, and is physically and mentally able to exercise, THEN there should be evidence that a directed or supervised strengthening or aerobic exercise program was prescribed at least once since the time of diagnosis.†	6	0
	5	IF an ambulatory vulnerable elder has had a diagnosis of symptomatic osteoarthritis for more than 6 months, THEN there should be evidence that education regarding the natural history, treatment, and self-management of the disease was offered at least once.†	14	36
	6	IF an ambulatory vulnerable elder has had a diagnosis of symptomatic osteoarthritis of the knee for more than 12 months, THEN there should be evidence that the patient was offered education at least once since the time of diagnosis.†	6	33
	7	IF oral pharmacologic therapy is initiated to treat osteoarthritis, THEN acetaminophen should be the first drug used, unless there is a documented contraindication to use.	37	43
	8	IF oral pharmacologic therapy for osteoarthritis is changed from acetaminophen to a different oral agent, THEN there should be evidence that the patient has had a trial of maximum-dose acetaminophen (suitable for age and comorbid conditions).	3	33
	9	IF a vulnerable elder is treated with cyclooxygenase nonselective NSAIDs, THEN there should be evidence that the patient was advised of the risks associated with these drugs.	50	4
	10	IF a vulnerable elder is older than age 75 years or has a history of peptic ulcer disease, gastrointestinal bleeding, or current coumadin use, AND the patient is being treated with a cyclooxygenase nonselective NSAID, THEN he or she should be offered concomitant treatment with misoprostol or a proton-pump inhibitor.	38	11
	11	IF a vulnerable elder with severe symptomatic osteoarthritis of the knee or hip has not responded to nonpharmacologic and pharmacologic therapy, THEN the patient should be offered referral to an orthopedic surgeon to be evaluated for total joint replacement within 6 months unless a contraindication to surgery is documented.	10	90
Osteoporosis	1	ALL female vulnerable elders should be counseled at least once regarding intake of dietary calcium and vitamin D and weight-bearing exercises.†	182	47
	2	ALL female vulnerable elders who smoke should be counseled annually about smoking cessation.	25	48
	3	ALL female vulnerable elders should be counseled about estrogen replacement therapy at least once.†	185	23
	4	IF a vulnerable elder has a new diagnosis of osteoporosis, THEN during the initial evaluation period an underlying cause of osteoporosis should be sought by checking medication use and current alcohol use.	12	42
	5	IF an ambulatory vulnerable elder has an osteoporotic fracture diagnosed, THEN physical therapy or an exercise program should be offered within 3 months.	7	0
	6	IF a vulnerable elder has osteoporosis, THEN calcium and vitamin D supplements should be recommended at least once.†	61	26
	7	IF a vulnerable elder is taking corticosteroids for more than 1 month, THEN the patient should be offered calcium and vitamin D.	7	71
	8	IF a female vulnerable elder has a new diagnosis of osteoporosis, THEN the patient should be offered treatment with hormone replacement therapy, bisphosphonates, a selective estrogen receptor modulator or calcitonin within 3 months of diagnosis.	10	60
	9	IF a male vulnerable elder has osteoporosis and is hypogonadal, THEN he should be offered testosterone treatment.	0	–
Pain management	1	ALL vulnerable elders should be screened for chronic pain during the initial evaluation period.†	38	70
	2	ALL vulnerable elders should be screened for chronic pain every 2 years.†	96	41
	3			
	History	IF a vulnerable elder has a newly reported chronic painful condition, THEN a targeted history should be performed within 1 month.	123	40

Continued on following page

Appendix Table 1—Continued

	Examination	IF a vulnerable elder has a newly reported chronic painful condition, THEN a physical examination should be performed within 1 month.	123	58
4		IF a vulnerable elder has been prescribed a cyclooxygenase nonselective NSAID for treatment of chronic pain, THEN the medical record should indicate whether he or she has a history of peptic ulcer disease and, if a history is present, justification of NSAID use should be documented.	50	10
5		IF a vulnerable elder with chronic pain is treated with opioids, THEN he or she should be offered a bowel regimen, or the medical record should document the potential for constipation or explain why bowel treatment is not needed.	46	0
6		IF a vulnerable elder has a newly reported chronic painful condition, THEN treatment should be offered.	121	86
7		IF a vulnerable elder is treated for a chronic painful condition THEN he or she should be assessed for a response within 6 months.	70	66
Pneumonia	1	IF a vulnerable elder with no history of allergy to the pneumococcal vaccine is not known to have already received a pneumococcal vaccine or if the patient received it more than 5 years ago (if before age 65 years), THEN a pneumococcal vaccine should be offered.	372	29
	2	IF a vulnerable elder has no history of anaphylactic hypersensitivity to eggs or to other components of the influenza vaccine, THEN the patient should be offered an annual influenza vaccination.	376	66
	6	IF a smoker develops pneumonia, THEN the smoker should be advised to quit smoking.	3	33
	7	IF a vulnerable elder is admitted to the hospital with pneumonia, THEN antibiotics should be administered within 8 hours of hospital arrival.	8	88
	8	IF a vulnerable elder is admitted to the hospital with community-acquired pneumonia with hypoxia, THEN the patient should receive oxygen therapy.	7	100
	9	IF a vulnerable elder has an empyema, THEN drainage is required.	0	–
	11	IF a vulnerable elder with community-acquired pneumonia is to be discharged home, THEN the patient should not be unstable on the day before or the day of discharge.	7	100
Pressure ulcer	1	IF a vulnerable elder is admitted to an intensive care unit or a medical–surgical unit of a hospital and is unable to reposition himself or herself or has limited ability to do so, THEN risk assessment for pressure ulcers should be performed on admission.	11	59
	2	IF a vulnerable elder is identified as at risk for pressure ulcer development or a pressure ulcer risk assessment score indicates that the person is at risk, THEN preventive intervention must be instituted within 12 hours, addressing repositioning needs and pressure reduction (or management of tissue loads).	9	0
	3	IF a vulnerable elder is identified as at risk for pressure ulcer development and has malnutrition (involuntary weight loss of $\geq 10\%$ of body weight over 1 year or low albumin or prealbumin levels), THEN nutritional intervention or dietary consultation should be instituted.	6	83
	4	IF a vulnerable elder presents with a pressure ulcer, THEN the pressure ulcer should be assessed for 1) location, 2) depth and stage, 3) size, and 4) presence of necrotic tissue.	9	33
	5	IF a vulnerable elder presents with a clean full-thickness pressure ulcer and has no improvement at 4 weeks post-treatment, THEN 1) the appropriateness of the treatment plan and 2) the presence of cellulitis or osteomyelitis should be assessed.	2	50
	6	IF a vulnerable elder presents with a partial-thickness pressure ulcer and has no improvement at 2 weeks post-treatment, THEN the appropriateness of the treatment plan should be assessed.	1	33
	7	IF a vulnerable elder presents with a full-thickness sacral or trochanteric pressure ulcer covered with necrotic debris or eschar, THEN debridement interventions using sharp, mechanical, enzymatic, or autolytic procedures should be instituted within 3 days of diagnosis.	0	–
	9	IF a vulnerable elder with a full-thickness pressure ulcer presents with systemic signs and symptoms of infection such as elevated temperature, leukocytosis, or confusion and agitation, and these signs and symptoms are not due to another identified cause, THEN the ulcer should be debrided of necrotic tissue within 12 hours.	1	0
	10	IF a vulnerable elder with a full-thickness pressure ulcer presents with systemic signs and symptoms of infection, such as elevated temperature, leukocytosis, or confusion and agitation, and these signs and symptoms are not due to another identified cause, THEN a tissue biopsy or needle aspiration sample should be obtained and sent for culture and sensitivity testing within 12 hours.	0	–
Screening and prevention	1	Evaluation ALL vulnerable elders newly admitted to a physician practice should receive the elements of a comprehensive geriatric assessment within 6 months.	4	14

Continued on following page

Appendix Table 1—Continued

	Recommendation	ALL vulnerable elders newly admitted to a physician practice should receive within 6 months recommendations from the comprehensive geriatric assessment.	3	44
2		IF the elements of a comprehensive geriatric assessment are performed, THEN follow up should assure the implementation of recommendations.	2	100
3		ALL vulnerable elders should be screened to detect problem drinking and hazardous drinking by taking a history of alcohol use or by using standardized screening questionnaires (e.g., CAGE, AUDIT) at least once.†	265	49
4		ALL vulnerable elders should receive screening for tobacco use and nicotine dependence.†	23	83
5		IF a vulnerable elder uses tobacco regularly, THEN he or she should be offered counseling or pharmacologic therapy to stop tobacco use at least once.†	23	83
6		ALL vulnerable elders should receive an assessment of their activity level and be provided with counseling to promote regular physical activity at least once.†	270	74
7		ALL vulnerable elders should be offered screening for colorectal cancer at least once with fecal occult blood testing or should have had sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years.†	262	76
8		IF a female vulnerable elder is younger than age 70 years, THEN she should be offered mammographic screening for breast cancer every 2 years.†	3	100
Stroke and atrial fibrillation	1	IF a male vulnerable elder has carotid artery symptoms, receives a diagnosis of TIA or nondisabling stroke, and has had carotid imaging documenting at least 70% carotid stenosis on the side ipsilateral to the hemisphere producing the symptoms, and the medical record does not document that no facility is available with 30-day morbidity and mortality rates of less than 6%, THEN he should receive referral for evaluation for carotid endarterectomy within 4 weeks of the diagnostic study or event, whichever is later.	0	–
	2	IF a male vulnerable elder has carotid artery symptoms and is diagnosed with TIA or nondisabling stroke, and the medical record does not document that the patient is not a candidate for carotid surgery, THEN a carotid artery imaging study should be performed within 4 weeks.	3	100
	4	IF a vulnerable elder has atrial fibrillation for more than 48 hours and has any high-risk condition (impaired left ventricular function; female >75 years of age; hypertension or systolic blood pressure > 160 mm Hg; previous ischemic stroke, TIA, or systemic embolism), THEN he or she should be offered oral anticoagulation, or antiplatelet therapy if the medical record documents a reason not to give anticoagulant therapy.	18	94
	5	IF a vulnerable elder has a presumed stroke, THEN CT or MRI of the head should be performed before initiation or continuation of thrombolytic treatment, anticoagulant therapy, or antiplatelet therapy.	2	100
	6			
	Initial	IF a vulnerable elder is taking warfarin for atrial fibrillation, THEN the INR should be checked within 4 days of the first dose and at least every 6 weeks.	3	67
	Long term	IF a vulnerable elder is taking warfarin for atrial fibrillation, THEN the INR should be checked at least every 6 weeks.	18	64
	7	IF a vulnerable elder has a diagnosis of acute atherothrombotic ischemic stroke or a TIA, THEN antiplatelet treatment should be offered within 48 hours following the stroke or TIA, unless the patient is already receiving anticoagulant treatment.	2	100
	8	IF a vulnerable elder has a TIA or stroke, THEN the medical record should document that smoking status was assessed and that smokers were counseled to stop smoking.	6	100
	9	IF a vulnerable elder is started on thrombolytic therapy for a stroke, THEN all of the following should be true: head CT or MRI should precede initiation of thrombolytic therapy; sulcal effacement, mass effect, edema, or possible hemorrhage should not be present on neuroimaging; time from symptom onset to initiation of thrombolytic therapy should be documented in the medical record and should not exceed 3 hours; absence of absolute contraindications to thrombolysis should be documented in the medical record; tissue plasminogen activator should be used; AND National Institute of Neurological Disorders and Stroke exclusion criteria should not be present.	0	–
	10	IF a vulnerable elder is admitted to the hospital with a diagnosis of acute ischemic or hemorrhagic stroke, THEN he or she should be admitted to a specialized acute or combined acute and rehabilitative stroke unit, or transferred to a specialized stroke unit if such a unit is available in the hospital.	2	50
Urinary incontinence	1	ALL vulnerable elders should have documentation of the presence or absence of urinary incontinence during the initial evaluation.	4	50

Continued on following page

Appendix Table 1—Continued

	2	ALL vulnerable elders should annually have documentation of the presence or absence of urinary incontinence.	363	31
	3	IF a vulnerable elder has new urinary incontinence that persist for more than 1 month or urinary incontinence at the time of a new evaluation, THEN a targeted history should be obtained that documents each of the following: 1) characteristics of voiding, 2) ability to get to the toilet, 3) previous treatment for urinary incontinence, 4) importance of the problem to the patient, and 5) mental status.	32	19
	4	IF a vulnerable elder has new urinary incontinence that persists for more than 1 month or urinary incontinence at the time of a new evaluation, THEN a targeted physical examination should be performed that documents 1) a rectal examination and 2) a genital system examination (including a pelvic examination for women).	32	22
	5	IF a vulnerable elder has new urinary incontinence that persists for more than 1 month or urinary incontinence at the time of a new evaluation, THEN a dipstick urinalysis and post-void residual should be obtained.	32	13
	6	IF a vulnerable elder has new urinary incontinence or urinary incontinence at the time of a new evaluation, THEN treatment options should be discussed.	32	59
	7	IF a cognitively intact vulnerable elder who is capable of independent toileting has documented stress, urge, or mixed incontinence without evidence of hematuria or high post-void residual, THEN behavioral treatment should be offered.	31	13
	8	IF a vulnerable elder undergoes surgery or periurethral injections for urinary incontinence, THEN subtracted cystometry should be performed before the procedure.	1	0
	9	IF a female vulnerable elder has documented stress urinary incontinence caused by isolated intrinsic sphincter deficiency or isolated intrinsic sphincter deficiency with coexistent hypermobility and she undergoes surgical correction, THEN a sling or artificial sphincter procedure should be used.	1	100
	10	IF a vulnerable elder has clinically significant, newly discovered overflow urinary incontinence, and indwelling urethral catheterization is used, THEN there should be documentation that the patient is not a candidate for alternative interventions as a result of severe physical or mental impairments or does not want alternative interventions.	0	–
Vision care	1	ALL vulnerable elders should be offered an eye evaluation every 2 years that includes the essential components of a comprehensive eye examination.†	275	89
	2	IF a vulnerable elder has sudden-onset visual changes, eye pain, corneal opacity, or severe purulent discharge, THEN the patient should be examined within 72 hours by an ophthalmologist.	10	80
	3	IF a vulnerable elder develops progression of a chronic visual deficit that now interferes with his or her ability to carry out needed or desired activities, THEN he or she should have an ophthalmic examination by a person skilled at ophthalmic examination within 2 months.	5	100
	4	IF a vulnerable elder is diagnosed with a cataract, THEN assessment of visual function with respect to his or her ability to carry out needed or desired activities should be performed every 12 months.	102	31
	6	IF a vulnerable elder has a new diagnosis of primary open-angle glaucoma, THEN the initial evaluation of each eye should include the essential components of a comprehensive eye examination AND documentation of the optic nerve appearance, visual field testing, and determination of an initial target pressure.	3	0
	7	IF a vulnerable elder with diabetes has a retinal examination, THEN the presence and degree of diabetic retinopathy should be documented.	43	88
	8	IF a vulnerable elder receives a diagnosis of proliferative diabetic retinopathy, THEN a dilated eye examination should be performed at least every 4 months.	0	–
	9	IF a vulnerable elder with diabetes receives a diagnosis of macular edema, THEN a dilated eye examination should be performed at least every 6 months.	2	100
	10	IF a vulnerable elder receives a diagnosis of a cataract that limits the patient's ability to carry out needed or desired activities, THEN cataract extraction should be offered.	22	86
	11	IF a vulnerable elder undergoes cataract surgery, THEN a follow-up ocular examination should occur within 48 hours and reexamination should occur within 3 months.	18	100
	12	IF a vulnerable elder with glaucoma experiences progressive optic nerve damage on visual field tests or optic nerve examination, THEN treatment should be reassessed or advanced at least every 3 months until the intraocular pressure is lowered by at least 20% or there is documentation that the vision loss has stabilized.	0	–

Continued on following page

Appendix Table 1—Continued

13	IF a vulnerable elder who has been prescribed an ocular therapeutic regimen becomes hospitalized, THEN the regimen should be administered in the hospital unless discontinued by an ophthalmologic consultant.	6	83
15	IF a vulnerable elder who uses corrective lenses for any activities of daily living is hospitalized (or in a nursing home) and his or her corrective lenses are at the hospital (or nursing home), THEN the corrective lenses should be readily accessible to the vulnerable elder.†	84	89

* ACE = angiotensin-converting enzyme; AUDIT = Alcohol Use Disorders Identification Test; CAGE = Have you ever felt you should Cut down on your drinking; have people Annoyed you by criticizing your drinking; have you ever felt Guilty about your drinking; have you ever taken an Eye-opener?; CHD = coronary heart disease; CT = computed tomography; DSM-IV = *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition; HDL = high-density lipoprotein; INR = international normalized ratio; LDL = low-density lipoprotein; MAOI = monoamine oxidase inhibitor; MRI = magnetic resonance imaging; NSAID = nonsteroidal anti-inflammatory drug; TIA = transient ischemic attack; QI = quality indicator.

† Quality indicator measured by interview, at least in part. All other quality indicators were measured from the medical record.

Appendix Table 2. Content of the Medical Record Abstraction Form*

Topic	Pages, nt
List of records	
Summary list of all records of care for a single case by type	
Medical record abstraction form	
Summary provider forms. One form was completed for each care provider. The number of providers varied by case.	
MD office	9
Dates of office visits, blood pressure measurements, weights, medications, telephone contacts, medical history, care preferences, discharge summaries, smoking status, new patient cognitive and function assessments	
Acute hospitalization	4
Dates of hospitalization, reason for hospitalization, medications, medical history, care preferences, smoking status, discharge destination, postdischarge follow-up	
Emergency department	4
Date of visit, reason for visit, medications, medical history, smoking status, care preferences	
Skilled-nursing facility or rehabilitation center	4
Dates of stay, medications, inpatient problems, medical history, care preferences, smoking status, discharge destination, postdischarge follow-up	
Ancillary and outpatient care	2
Type of ancillary and outpatient care, date of service, care preferences, medication changes	
Laboratory tests and procedures	13
Summarized dates and results of selected tests and procedures	
Measurement of serum albumin, prealbumin, cholesterol, HDL cholesterol, LDL cholesterol, creatinine, hemoglobin A _{1c} , serum glucose, INR; random and timed urine tests for protein; cardiac stress or imaging tests; coronary angiography, coronary revascularizations, carotid imaging, carotid endarterectomies	
Condition modules	177
Summarized specific data for each of the 22 study conditions. Selected elements were provider specific, and others reflected care across all relevant providers. Most data elements were collected by the nurse-abstractors. A selected subset of items was collected and reviewed by MD overreaders.	
Total pages in forms	213

* HDL = high-density lipoprotein; INR = international normalized ratio; LDL = low-density lipoprotein.

† The actual number of pages used for each case varied with the number of providers. Therefore, when a patient had several providers, the total number of pages exceeded 213.

Appendix Table 3. Quality Indicators Passed on Abstraction and Reabstraction*

Domain	QIs Passed (95% CI)	
	Abstraction	Reabstraction
Prevention	31 (26–36)	32 (27–37)
Diagnosis	46 (36–57)	46 (36–56)
Treatment	85 (80–90)	83 (78–87)
Follow-up	45 (35–56)	45 (35–56)
Overall	51 (47–54)	50 (47–54)

* QI = quality indicator.