Comparison of Quality of Care for Patients in the Veterans Health Administration and Patients in a National Sample

Steven M. Asch, MD, MPH; Elizabeth A. McGlynn, PhD; Mary M. Hogan, PhD; Rodney A. Hayward, MD; Paul Shekelle, MD, MPH; Lisa Rubenstein, MD; Joan Keesey, BA; John Adams, PhD; and Eve A. Kerr, MD, MPH

Background: **The Veterans Health Administration (VHA) has introduced an integrated electronic medical record, performance measurement, and other system changes directed at improving care. Recent comparisons with other delivery systems have been limited to a small set of indicators.**

Objective: **To compare the quality of VHA care with that of care in a national sample by using a comprehensive quality-of-care measure.**

Design: **Cross-sectional comparison.**

Setting: **12 VHA health care systems and 12 communities.**

Patients: **596 VHA patients and 992 patients identified through random-digit dialing. All were men older than 35 years of age.**

Measurements: **Between 1997 and 2000, quality was measured by using a chart-based quality instrument consisting of 348 indicators targeting 26 conditions. Results were adjusted for clustering, age, number of visits, and medical conditions.**

Results: **Patients from the VHA scored significantly higher for adjusted overall quality (67% vs. 51%; difference, 16 percentage points [95% CI, 14 to 18 percentage points]), chronic disease care (72% vs. 59%; difference, 13 percentage points [CI, 10 to 17 percentage points]), and preventive care (64% vs. 44%; difference, 20 percentage points [CI, 12 to 28 percentage points]), but not for acute care. The VHA advantage was most prominent in processes targeted by VHA performance measurement (66% vs. 43%; difference, 23 percentage points [CI, 21 to 26 percentage points]) and least prominent in areas unrelated to VHA performance measurement (55% vs. 50%; difference, 5 percentage points [CI, 0 to 10 percentage points]).**

Limitations: **Unmeasured residual differences in patient characteristics, a lower response rate in the national sample, and differences in documentation practices could have contributed to some of the observed differences.**

Conclusions: **Patients from the VHA received higher-quality care according to a broad measure. Differences were greatest in areas where the VHA has established performance measures and actively monitors performance.**

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For author affiliations, see end of text.

As methods for measuring the quality of medical care have matured, widespread quality problems have become increasingly evident (1, 2). The solution to these problems is much less obvious, however, particularly with regard to large delivery systems. Many observers have suggested that improved information systems, systematic performance monitoring, and coordination of care are necessary to enhance the quality of medical care (3). Although the use of integrated information systems (including electronic medical records) and performance indicators has become more common throughout the U.S. health care system, most providers are not part of a larger integrated delivery system and continue to rely on traditional information systems (4).

An exception is the Veterans Health Administration (VHA). As the largest delivery system in the United States, the VHA has been recognized as a leader in developing a more coordinated system of care. Beginning in the early 1990s, VHA leadership instituted both a sophisticated electronic medical record system and a quality measurement approach that holds regional managers accountable for several processes in preventive care and in the management of common chronic conditions (5, 6). Other changes include a system-wide commitment to quality improvement principles and a partnership between researchers and managers for quality improvement (7).

As Jha and colleagues (8) have shown, since these changes have been implemented, VHA performance has outpaced that of Medicare in the specific areas targeted. Nevertheless, whether this improvement has extended beyond the relatively narrow scope of the performance measures is unknown. Beyond that study, the data comparing VHA care with other systems of care are sparse and mixed. For example, patients hospitalized at VHA hospitals were more likely than Medicare patients to receive angiotensin-converting enzyme inhibitors and thrombolysis after myocardial infarction (9). On the other hand, VHA patients were less likely to receive angiography when indicated and had higher mortality rates after coronary artery bypass grafting than patients in community hospitals (10, 11). Kerr and colleagues found that care for diabetes was better in almost every dimension in the VHA system than in commercial managed care (12). More extensive comparisons, especially of outpatient care, are lacking. To address these issues, a more comprehensive assessment of quality is needed.

Using a broad measure of quality of care that is based on medical record review and was developed outside the

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VHA, we compared the quality of outpatient and inpatient care among 2 samples: 1) a national sample of patients drawn from 12 communities and 2) VHA patients from 26 facilities in 12 health care systems located in the southwestern and midwestern United States (13). We analyzed performance in the years after the institution of routine performance measurement and the electronic medical record. Using the extensive set of quality indicators included in the measurement system, we compared the overall quality of care delivered in the VHA system and in the United States, as well as the quality of acute, chronic, and preventive care across 26 conditions. In addition, we evaluated whether VHA performance was better in the specific areas targeted by the VHA quality management system.

METHODS

Development of Quality Indicators

For this study, we used quality indicators from RAND's Quality Assessment Tools system, which is described in more detail elsewhere (14–17). The indicators included in the Quality Assessment Tools system are process quality measures, are more readily actionable than outcomes measures, require less risk adjustment, and follow the structure of national guidelines (18, 19). After reviewing established national guidelines and the medical literature, we chose a subset of quality indicators from the Quality Assessment Tools system that represented the spectrum of outpatient and inpatient care (that is, screening, diagnosis, treatment, and follow-up) for acute and chronic conditions and preventive care processes representing the leading causes of morbidity, death, and health care use among older male patients. The **Appendix Table** (available at www.annals.org) lists the full indicator set, which was determined by four 9-member, multispecialty expert panels. These panels assessed the validity of the proposed indicators using the RAND/University of California, Los Angeles–modified Delphi method. The experts rated the indicators on a 9-point scale (1 = not valid; 9 = very valid), and we accepted indicators that had a median validity score of 7 or higher. This method of selecting indicators is reliable and has been shown to have content, construct, and predictive validity (20–23). Of the 439 indicators in the Quality Assessment Tools system, we included 348 indicators across 26 conditions in our study and excluded 91 indicators that were unrelated to the target population (for example, those related to prenatal care and cesarean sections). Of the 348 indicators, 21 were indicators of overuse (for example, patients with moderate to severe asthma should not receive β-blocker medications) and 327 were indicators of underuse (for example, patients who have been hospitalized for heart failure should have follow-up contact within 4 weeks of discharge).

Two physicians independently classified each indicator according to the type of care delivered; the function of the indicated care (screening, diagnosis, treatment, and follow-up); and whether the indicator was supported by a randomized, controlled trial, another type of controlled trial, or other evidence. Type of care was classified as acute (for example, in patients presenting with dysuria, presence or absence of fever and flank pain should be elicited), chronic (for example, patients with type 2 diabetes mellitus in whom dietary therapy has failed should receive oral hypoglycemic therapy), or preventive (for example, all patients should be screened for problem drinking). In addition, we further classified the indicators into 3 mutually exclusive categories according to whether they corresponded to the VHA performance indicators that were in use in fiscal year 1999. Twenty-six indicators closely matched the VHA indicators, 152 involved conditions that were targeted by the VHA indicators but were not among the 26 matches, and 170 did not match the VHA measures or conditions. We performed a similar process to produce a list of 15 indicators that matched contemporaneous Health Plan Employer Data and Information Set (HEDIS) performance measures (24). **Table 1** shows the conditions targeted by the indicators, and **Table 2** gives an example indicator for each of the conditions or types of care for which condition- or type-specific comparisons were possible.

Table 1. **Conditions and Number of Indicators Used in Comparisons**

Condition	Type of Condition	Indicators, *n*
Alcohol abuse	Chronic	5
Asthma	Acute or chronic	25
Atrial fibrillation	Acute or chronic	10
Benign prostatic hyperplasia	Chronic	4
Cancer pain and palliation	Chronic	3
Cerebrovascular disease	Chronic	10
Colorectal cancer	Chronic	12
Community-acquired pneumonia	Acute	5
Chronic obstructive pulmonary disease*	Acute or chronic	20
Coronary artery disease*	Acute or chronic	37
Depression*	Chronic	14
Diabetes*	Chronic	13
Dyspepsia and peptic ulcer disease	Chronic	8
Headache	Acute or chronic	21
Congestive heart failure*	Chronic	36
Hip fracture	Acute	9
Hyperlipidemia	Chronic	7
Hypertension*	Chronic	26
Low back pain, acute	Acute	6
Orthopedic conditions	Acute or chronic	10
Osteoarthritis	Chronic	3
Prostate cancer	Chronic	6
Senile cataract	Chronic	10
Sexually transmitted diseases	Acute	9
Urinary tract infection	Acute	12
Preventive care*	Preventive	27
Total	Overall	348

* Targeted within the Veterans Health Administration indicator set.

Identifying Participants

Patients were drawn from 2 ongoing quality-of-care studies: a study of VHA patients and a random sample of adults from 12 communities (13). The VHA patients were drawn from 26 clinical sites in 12 health care systems lo-

Table 2. **Example Indicators of Quality of Care***

Indicator	Condition	Function
CT or MRI for patients with new-onset headache and abnormal results on neurologic examination	Acute care	Diagnosis
Avoidance of nifedipine for patients with acute MI	Coronary artery disease	Treatment
Aspirin after MI	Coronary artery disease	Treatment
Theophylline levels during exacerbation if receiving theophylline therapy	COPD	Diagnosis
Diet and exercise counseling	Diabetes	Treatment
Follow-up after hospitalization	Depression	Follow-up
Change in treatment when blood pressure is persistently uncontrolled	Hypertension	Follow-up
Acetaminophen trial for patients with new diagnoses who need pharmacotherapy	Osteoarthritis	Treatment
Screening for colorectal cancer	Preventive care	Screening

* A full list of the indicators is included in the Appendix Table (available at www.annals.org). COPD = chronic obstructive pulmonary disease; CT = computed tomography; MI = myocardial infarction; MRI = magnetic resonance imaging.

cated in 2 Veterans Integrated Service Networks in the midwestern and southwestern United States. These networks closely match the overall Veterans Affairs system with regard to medical record review and survey-based quality measures (25, 26). We selected patients who had had at least 2 outpatient visits in each of the 2 years between 1 October 1997 and 30 September 1999. A total of 106 576 patients met these criteria. We randomly sampled 689, oversampling for chronic obstructive pulmonary disease (COPD), hypertension, and diabetes, and were able to locate records for 664 patients (a record location rate of 96%). Because of resource constraints, we reviewed a random subset of 621 of these records. Since this sample contained only 20 women and 4 patients younger than 35 years of age, we further restricted the sample to men older than 35 years of age. Thus, we included 596 VHA patients in the analysis. All of these patients had complete medical records.

The methods we used to obtain the national sample have been described elsewhere (13) and are summarized here. As part of a nationwide study, residents of 12 large metropolitan areas (Boston, Massachusetts; Cleveland, Ohio; Greenville, South Carolina; Indianapolis, Indiana; Lansing, Michigan; Little Rock, Arkansas; Miami, Florida; Newark, New Jersey; Orange County, California; Phoenix, Arizona; Seattle, Washington; and Syracuse, New York) were contacted by using random-digit dialing and were asked to complete a telephone survey (27). To ensure comparability with the VHA sample, we included only men older than 35 years of age. Between October 1998 and August 2000, we telephoned 4086 of these participants and asked for permission to obtain copies of their medical records from all providers (both individual and institutional) that they had visited within the past 2 years. We received verbal consent from 3138 participants (77% of those contacted by telephone). We mailed consent forms and received written permission from 2351 participants (75% of those who had given verbal permission). We received at least 1 medical record for 2075 participants (88% of those who had returned consent forms). We excluded participants who had not had at least 2 medical visits in the past 2 years to further ensure comparability with the VHA sample. Thus, our final national sample included 992 persons. The rolling abstraction period (October 1996 to August 2000) substantially overlapped the VHA sampling period. The average overlap was 70%, and all records had at least 1 year of overlap. Seven hundred eight (71%) of the 992 persons in the national sample had complete medical records. On the basis of data from the original telephone survey, we determined that participants in the national sample were more likely to be older, white, and better educated; to have higher income levels; and to have less than excellent health compared with eligible nonparticipants (13).

Chart Abstraction

We sent photocopies of all of the medical records to 1 of 2 central areas for abstraction. For VHA patients, we abstracted data on all care received between October 1997 and September 1999; for patients in the national sample, we abstracted data on all care received in the 2 years before the date of recruitment. We used computer-assisted abstraction software on a Microsoft Visual Basic 6.0 platform (Microsoft Corp., Seattle, Washington), which allowed us to tailor the manual chart abstraction to the specific record being reviewed and provided interactive data quality checks (consistency, range), calculations (for example, high blood pressure), and classifications (for example, drug class). Twenty trained registered nurse abstractors collected the data. To assess interrater reliability, we reabstracted charts for 4% of the participants selected at random. According to the κ statistic, average reliability in the national sample was substantial to almost perfect (28) at 3 levels: presence of a condition ($\kappa = 0.83$), indicator eligibility ($\kappa = 0.76$), and indicator scoring ($\kappa = 0.80$) (13).

Statistical Analysis

All analyses were conducted by using SAS, version 8.2 (SAS Institute, Cary, North Carolina). The unit of analysis was adherence to a given indicator in a given patient. For each indicator, we determined the criteria that made participants eligible for the process specified in the indicator (yes or no). We then determined whether participants had received the specified process each time an indication was noted in their medical record (yes, no, or proportion). We determined aggregate indicator scores for each summary category (that is, acute, chronic, and preventive care;

Table 3. **Veterans Health Administration and National Sample Characteristics***

Characteristic	Unweighted VHA Sample (*n* = 596)	Unweighted National Sample (*n* = 992)	Standardized VHA Sample (*n* = 596)	Standardized National Sample (*n* = 992)	Standardized *P* Value
Average age, *y*	62.6	57.1	62.0	61.4	>0.2
Average acute conditions, *n*	0.27	0.40	0.26	0.38	<0.001
Average chronic conditions, *n*	2.47	1.55	2.22	2.12	>0.2
COPD, %	17	6	12	12	>0.2
Coronary artery disease, %	26	18	23	25	>0.2
Depression, %	17	13	17	14	>0.2
Diabetes, %	39	19	30	30	>0.2
Hyperlipidemia, %	28	21	26	26	>0.2
Hypertension, %	67	47	66	66	>0.2
Osteoarthritis, %	29	16	29	19	<0.001
Annual outpatient visits, *n*	9.4	7.1	9.2	7.9	<0.001

* COPD = chronic obstructive pulmonary disease; VHA= Veterans Health Administration.

screening; diagnosis; treatment; and follow-up) by dividing all instances in which participants received recommended care by the total number of instances in which the care should have been received. We constructed the scores as proportions ranging from 0% to 100%, adjusting for clustering of indicators within patients. Because of clustering of the data, we used the bootstrap method to estimate standard errors for all of these scores (29).

We applied sampling weights to represent the original populations from which the 2 samples were drawn and to adjust for nonresponse. We also used weights to standardize the patients for characteristics common among the VHA population: COPD; hypertension; diabetes; and age categories ranging from 35 to 50 years of age, 51 to 65 years of age, and older than 65 years of age. Sampling weights were applied at the individual level; indicators were implicitly weighted on the basis of prevalence of eligibility. Although we report weighted results because we believe they are most representative, weighting did not affect the direction or significance of any reported results.

We used *t*-tests or chi-square tests with bootstrapped standard errors to compare the standardized VHA and national samples according to population characteristics; aggregate quality of care; subsets of indicators related to acute, chronic, and preventive care; subsets of indicators related to function of care; subsets of indicators supported by randomized, controlled trials; subsets of indicators similar to those used by the VHA in its performance measurement system; and chronic conditions that affected more than 50 patients from both samples, including COPD, coronary artery disease, depression, diabetes, hyperlipidemia, headache, hypertension, and osteoarthritis. We used logistic regression to compare the rates at which the respective samples received the care specified in the indicators. This allowed us to adjust for factors beyond the standardization, including age as an integer variable, number of chronic and acute conditions, and number of outpatient visits. We calculated adjusted scores after taking into account clustering of indicators at the individual patient level. For the logistic regression models, standard errors and confidence intervals were adjusted for the clustering of indicators within patients by using the sandwich estimator (30).

To test the sensitivity of our results to geography and insurance, we also estimated models confining the national sample to the 6 communities nearest the 2 VHA regions and to respondents with insurance. To test the sensitivity of our results to completeness of documentation, we estimated models restricted to patients with complete records and to the subset of indicators with high likelihood (laboratory tests and radiology) and less likelihood (counseling and education) of complete documentation. Since the number of visits could represent an intervening variable between the comparison samples and quality, we also ran models that did not adjust for the number of visits. Finally, to test the sensitivity of our results to the type of indicator set used, we compared the adjusted performance of the VHA and the community on the subset of indicators that matched the widely accepted HEDIS indicator set.

Role of the Funding Source

The funding agencies (Veterans Affairs Health Services Research and Development Service, the Robert Wood Johnson Foundation, the Centers for Medicare & Medicaid Services, the Agency for Healthcare Research and Quality, and the California HealthCare Foundation) did not participate in the data collection or analysis or in interpretation of the results. Veterans Affairs officials received advance copies of the manuscript for comment.

RESULTS

Characteristics of the Study Samples

Table 3 presents the characteristics of the VHA and national samples, with and without weighting for sampling, nonresponse, and standardization for age categories and the prevalence of COPD, hypertension, and diabetes in the VHA sample. After standardization, there were no statistically significant differences in the age of the participants or the number of chronic conditions, although patients in the national sample had slightly more acute conditions. There were also no significant differences in the rates of chronic conditions between the 2 samples, with the

Table 4. **Adjusted Adherence to Indicators by Category***

Indicator Category	VHA Sample				National Sample				Difference (95% CI), *percentage points*
	Indicators, *n*†	Patients, *n*	Eligible Events, *n*‡	Mean Score, %	Indicators, *n*†	Patients, *n*	Eligible Events, *n*‡	Mean Score, %	
Overall	294	596	11 449	67	330	992	18 961	51	16 (14 to 18)
Chronic care	202	561	5924	72	222	824	7396	59	13 (10 to 17)
COPD	17	103	465	69	19	62	668	59	10 (−2 to 23)
Coronary artery disease	31	93	557	73	37	179	1117	70	3 (−3 to 16)
Depression	14	96	266	80	14	131	497	62	18 (11 to 26)
Diabetes	13	232	1309	70	13	186	1683	57	13 (8 to 18)
Hyperlipidemia	7	169	256	64	7	204	346	53	11 (1 to 21)
Hypertension	24	405	1147	78	24	468	1681	65	13 (8 to 20)
Osteoarthritis	3	173	216	65	3	154	236	57	8 (−1 to 18)
Preventive care	27	596	4721	64	32	991	9169	44	20 (12 to 28)
Acute care	60	153	804	53	76	334	2396	55	−2 (−9 to 4)
Screening	15	597	2254	68	16	991	5598	46	22 (20 to 26)
Diagnosis	145	594	3762	73	139	992	6502	61	12 (8 to 16)
Treatment	103	596	3155	56	126	992	4845	41	15 (12 to 18)
Follow-up	37	477	2016	72	43	524	2278	58	14 (10 to 18)
VHA performance measures	26	596	3976	67	26	992	6699	43	24 (21 to 26)
VHA performance conditions	144	596	5875	70	152	992	8590	58	12 (10 to 15)
Non-VHA performance conditions	124	394	1598	55	152	579	3672	50	5 (0 to 10)

* Adjusted for age, number of chronic conditions, number of acute conditions, and number of outpatient visits. COPD = chronic obstructive pulmonary disease; VHA = Veterans Health Administration.
† Number of unique indicators in category with at least 1 eligible patient.
‡ The number of eligible events is the number of times indicators in the category were triggered.

exception that VHA patients had a somewhat higher prevalence of osteoarthritis. Patients from the VHA also had a significantly greater number of outpatient visits per year (9.2 vs. 7.9; $P < 0.001$).

Comparisons of Quality of Care

Table 4 presents the results of our analyses comparing the quality of care between the standardized VHA and national samples, adjusting for age and for the number of chronic conditions, acute conditions, and outpatient visits. Sixteen of the 348 indicators had no eligible patients in either sample, leaving 294 indicators and 596 patients on which to base the VHA scores and 330 indicators and 992 patients on which to base the national scores. Overall, VHA patients were more likely than patients in the national sample to receive the care specified by the indicators (67% vs. 51%; difference, 16 percentage points [CI, 14 to 18 percentage points]). Performance in the VHA outpaced that of the national sample for both chronic care (72% vs. 59%; difference, 13 percentage points [CI, 10 to 17 percentage points]) and preventive care (64% vs. 44%; difference, 20 percentage points [CI, 12 to 28 percentage points]), but not for acute care (53% vs. 55%; difference, −2 percentage points [CI, −9 to −4 percentage points]). In particular, the VHA sample received significantly better care for depression, diabetes, hyperlipidemia, and hypertension. The VHA also performed consistently better across the entire spectrum of care, including screening, diagnosis, treatment, and follow-up. These differences in quality of care held true when we considered only those indicators ($n = 72$) supported by randomized, controlled trials (57% vs. 45%; difference, 12 percentage points [CI, 3 to 20 percentage points]).

Associations with Performance Measurement

To test the association between performance and performance measurement within the VHA, we restricted the analysis of overall quality to processes and conditions specifically addressed by the VHA performance measurement set. When we restricted the analysis to specific indicators that closely matched the performance measures targeted by the VHA, VHA patients had a substantially greater chance of receiving the indicated care than did patients in the national sample (adjusted scores, 67% vs. 43%; difference, 24 percentage points [CI, 21 to 26 percentage points]). Patients from the VHA were also more likely than national patients to receive care in the conditions or areas specified by the VHA indicator set, even when the processes covered by the indicators were substantially different (70% vs. 58%; difference, 12 percentage points [CI, 10 to 15 percentage points]). The difference between VHA patients and national patients in conditions or areas not covered by the VHA performance measurement system barely reached conventional levels of statistical significance (55% vs. 50%; difference, 5 percentage points [CI, 0 to 10 percentage points]).

Sensitivity Analyses

Confining the analyses to patients in both samples who had complete records did not change the direction or significance of any reported results. The VHA advantage was largest in indicators most likely to have possible underdocumentation (adjusted performance for counseling and education, 45% vs. 26%; difference, 19 percentage points [CI, 14 to 30 percentage points]), but even in laboratory tests and radiology, an area that would be less sensitive to documentation differences, there was also a substantial difference (67% vs. 52%; difference, 15 percentage points [CI, 11 to 19 percentage points]). Confining the analysis to the 6 nationally sampled metropolitan areas closest to the 2 VHA regions also did not change the direction or significance of any result, nor did excluding uninsured patients from the national sample. Models that did not adjust for the number of visits had the same VHA effects as those that did adjust for number of visits. Patients from the VHA also still received more indicated care (adjusted rates, 60% vs. 39%; difference, 21 percentage points [CI, 16 to 26 percentage points]) when the analyses were confined to the overlap of our indicator set and HEDIS measures, the most commonly used national performance indicator set for managed care.

Discussion

Using the RAND Quality Assessment Tools broad measure of quality of care, we found that adherence to recommended processes of care in 2 VHA regions typically exceeded that in a comparable national sample in 12 communities. These findings persisted when we adjusted the samples for age, number of acute and chronic conditions, and number of outpatient visits and when we examined only processes supported by randomized, controlled trials. In addition, we found that the differences between the VHA and national sample were greatest in processes subject to the VHA performance measurement system. The "halo effect" of better VHA care extended to measures of processes in the same condition or area that were not specifically measured by the VHA performance system; however, this effect decreased greatly in unrelated areas. Acute care, COPD care, osteoarthritis care, and coronary artery disease care were exceptions to the pattern of better care in the VHA, although our power to distinguish quality differences was limited by the small number of patients with COPD in the national sample ($n = 62$).

To date, the VHA has not targeted acute care or osteoarthritis care as part of its intensive performance measurement system (6). Coronary artery disease, on the other hand, has been the subject of quality improvement efforts both inside and outside the VHA, including those sponsored by the American Heart Association (31–33). Indeed, many previous comparisons between VHA and national samples outside the VHA performance set have involved patients with coronary artery disease and have yielded mixed results (10). That we found little difference between the care provided to patients with coronary artery disease in the VHA and in a national sample is consistent with other findings and could be the result of comparable quality measurement programs for this condition in the United States and in the VHA. On the other hand, predominantly outpatient-based quality improvement efforts for diabetes have also been implemented in both the VHA system and other institutions, and our analyses showed that the VHA outperformed the national sample for diabetes care. The difference may be due to more effective outpatient VHA quality improvement for diabetes, but further research is needed to investigate the roots of this discrepancy.

Although our study is one of the most comprehensive comparisons between VHA patients and national patients, it has limitations. First, our analysis is based on a comparison of 2 different study samples. Although we used robust statistical techniques to account for any differences between the samples, we could not adjust for the somewhat different geographic distributions or abstraction periods, although there was a great deal of overlap in both areas. Furthermore, in other analyses, we have not observed any large geographic variations in the aggregate indicator scores for the national sample, and our results did not change when we confined the national sample to the 6 communities closest to the 2 Veterans Affairs regions (34). Our study also relied on patient recollection of provider visits in the national sample. It is possible that patients received care from additional providers but did not recall or that we did not receive all available charts. However, we found that confining our analyses to patients with complete records did not change the results, and persons with missing charts were likely to have higher quality scores (13). We lack data on whether patients in the national sample were also receiving care at the VHA, or vice versa. Other studies have found evidence of co-management between VHA and non-VHA providers (35). To the extent that this co-management occurred, it would probably lead to an underestimate of the differences between the 2 groups. An additional limitation of our study is that there were too few men younger than 35 years of age and too few women in our VHA sample to analyze care for these subgroups. For women, limited data from other studies indicate a VHA advantage in breast cancer screening (7). While the Quality Assessment Tools system is quite broad, it cannot represent all of medical care, and there are probably gaps in the indicator set. Last, the evidence grading system for Quality Assessment Tools is based on a simple measure of research design. More precise evidence categories might have altered our analysis of the effect of level of evidence on the comparison between the VHA and national samples, but it is difficult to tell whether the differences would be accentuated or diminished.

Several unmeasured patient characteristics could have biased our results. The response rate was lower in the national sample than in the VHA sample, underrepresenting

ethnic minorities and the poor and exacerbating the natural difference in prevalence between the VHA and the United States as a whole. Ethnic minorities and people with low incomes generally receive lower-quality care (36, 37), although these disparities have not yet been examined by using the Quality Assessment Tools system. If we had been able to adjust for these variables, the differences in quality of care that we observed may have been even greater. Patients from the VHA also tend to have more severe disease than patients outside the VHA, and it is possible that severity of disease influences care quality (38). However, the process indicators we used are clinically precise, and all eligible patients should have received the indicated care regardless of disease severity. In any case, our findings persisted even when we adjusted for number of conditions.

One of the purported advantages of the electronic medical record (which was universally available in the VHA sites) is more thorough documentation. Indeed, the volume of the VHA medical records we reviewed was larger than that of the national sample; it took almost one and a half times longer to abstract data from the VHA sample, although some of this difference was no doubt due to the higher number of visits and conditions. Some of the observed differences may be due to more thorough documentation for VHA patients rather than more thorough medical care. In constructing the indicator set, expert panelists were instructed to include indicators only where the absence of documentation itself would be evidence of poor care. Even so, 1 VHA study found gaps of only approximately 10% between documentation in the medical record and actual care provision among standardized patients (39, 40). Furthermore, the VHA patients received more care both in indicators that are sensitive to documentation practices (counseling and education) and those that are insensitive (laboratory tests and radiology). Therefore, it seems unlikely that different documentation practices alone could account for all of the differences we observed. Instead, other aspects of the electronic medical record, such as notation templates that structure physician–patient interaction or computerized reminders targeting performance measures, may account for the difference.

The implications of these data are important to our understanding of quality management. The VHA is the largest health care system to have implemented an electronic medical record, routine performance monitoring, and other quality-related system changes, and we found that the VHA had substantially better quality of care than a national sample. Our finding that performance and performance measurement are strongly related suggests that the measurement efforts are indeed contributing to the observed differences. Performance measurement alone seems unlikely to account for all the differences; the VHA scored better even on HEDIS measures widely applied in managed care settings (but not in other settings) outside the VHA. Our study was not designed to determine which other mechanisms might be acting to improve VHA care, but other studies have suggested that they might include computerized reminders, standing orders, improved interprovider communication, facility performance profiling, leveraging of academic affiliations, accountability of regional managers for performance, and a more coordinated delivery system (5, 6, 41, 42). More research is needed to estimate the relative effects of these practices. As more coordinated systems of medical care delivery develop, our data support the use of the types of information and quality management systems available in the VHA.

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Requests for Single Reprints: Steven M. Asch, MD, MPH, West Los Angeles Veterans Affairs Medical Center, Mail Code 111G, 11301 Wilshire Boulevard, Los Angeles, CA 90073; e-mail, Steven.Asch@med.va.gov.

Current author addresses are available at www.annals.org.

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Current Author Addresses: Dr. Asch: West Los Angeles Veterans Affairs Medical Center, Mail Code 111G, 11301 Wilshire Boulevard, Los Angeles, CA 90073

Drs. McGlynn and Shekelle: RAND, 1776 Main Street m4s, Santa Monica, CA 90407.

Drs. Hogan, Hayward, and Kerr: Ann Arbor Veterans Affairs Center for Practice Management and Outcomes Research, PO Box 130170, Ann Arbor, MI 48113.

Drs. Rubenstein and Adams and Ms. Keesey: RAND, 1776 Main Street m3s, Santa Monica, CA 90407.

Appendix Table. **Comparison of Performance of the Veterans Health Administration Sample and the National Sample by Indicator***

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Alcohol										
All patients hospitalized with trauma and hepatitis should be screened for problem drinking at least once during their hospital stay.	A	S	H	3	3	2	0	3	4	0
The record should indicate assessment for dependence, tolerance of psychoactive effects, loss of control, and consequences of use if the medical record indicates the patient is a daily or binge drinker.	C	D	H	2	37	36	29	22	18	80
Regular or binge drinkers should be advised to decrease their drinking.	C	T	E	1	37	36	38	22	18	42
Patients with diagnosed alcohol dependence should be referred for further treatment to ≥1 of the following: inpatient rehabilitation program, outpatient rehabilitation program, mutual help group (e.g., AA), substance abuse counseling, and/or aversion therapy.	C	T	R	1	37	36	8	22	18	6
Providers should reassess the alcohol intake of patients who report regular or binge drinking at the next routine health visit.	C	T	H	3	31	29	28	7	5	38
Asthma										
Patients with diagnosed moderate to severe asthma should have had some historical evaluation of asthma precipitants within 6 months of diagnosis.	C	D	H	3	4	4	33	2	2	0
Patients with diagnosed moderate to severe asthma should have baseline spirometry or peak flow performed within 6 months of diagnosis.	C	D	L	3	4	4	46	2	2	0
Patients with diagnosed moderate to severe asthma should have been prescribed a β_2-agonist inhaler for symptomatic relief of exacerbations.	C	T	M	3	26	29	91	23	21	86
Patients who report using a β_2-agonist inhaler >3 times/d on a daily basis (not only during an exacerbation) should be prescribed a longer-acting bronchodilator (theophylline) and/or an anti-inflammatory agent (inhaled corticosteroids, cromolyn).	C	T	M	3	7	8	41	3	3	72

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients with moderate to severe asthma should not receive β-blocker medications (e.g., atenolol, propranolol).	C	T	M	3	26	29	76	23	21	81
Patients requiring long-term treatment with systemic corticosteroids during any 12-month period should have been prescribed inhaled corticosteroids during that same time period.	C	T	M	3	4	4	26	0	0	NA
Patients receiving long-term theophylline therapy (>600 mg/d for ≥6 months) should have ≥1 serum theophylline level determination per year.	C	F	L	3	2	2	0	2	2	0
Patients with diagnosed moderate to severe asthma should have had a documented influenza vaccination in September to January of the previous year.	C	T	I	3	23	26	37	22	20	57
All patients seen for an acute asthma exacerbation should have a history taken for all current medications.	C	T	H	3	15	32	56	7	7	70
All patients seen for an acute asthma exacerbation should have a history taken for previous hospitalizations and emergency department visits for asthma.	C	T	H	3	15	32	16	7	7	0
All patients seen for an acute asthma exacerbation should have a history taken of previous episodes of respiratory failure requiring intubation.	C	T	H	3	15	32	5	7	7	0
Patients presenting to the physician's office with an asthma exacerbation or historical worsening of asthma symptoms should have lung function assessed by using PEF or FEV_1.	C	T	L	3	19	34	27	9	9	38
At the time of an exacerbation, patients taking theophylline should have theophylline level measured.	C	T	L	3	2	3	0	0	0	NA
A physical examination of the chest should be performed on patients presenting with an asthma exacerbation in the physician's office or emergency department.	C	T	P	3	13	23	87	6	7	100
Patients presenting to the physician's office or emergency department with an FEV_1 or PEF <70% of baseline should be treated with β_2-agonists before discharge.	C	T	M	3	2	3	100	0	0	NA

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients who receive treatment with β_2-agonists in the physician's office or emergency department for FEV_1 <70% of baseline should have an FEV_1 or PEF measurement repeated before discharge.	C	T	L	3	2	3	57	0	0	NA
Patients with an FEV_1 or PEF <70% of baseline after treatment for an asthma exacerbation in the physician's office should be placed on an oral corticosteroid taper.	C	T	M	3	0	0	NA	0	0	NA
Patients admitted to the hospital for an asthma exacerbation should have oxygen saturation measured.	C	T	L	3	3	9	96	1	1	100
Hospitalized patients should receive systemic steroids (either oral or IV).	C	T	M	3	3	9	31	1	1	0
Hospitalized patients should receive treatment with β_2-agonists.	C	T	M	3	3	9	71	1	1	0
Hospitalized patients with oxygen saturation <90% should receive supplemental oxygen, unless PCO_2 >40 mm Hg is previously documented.	C	T	O	3	0	0	NA	0	0	NA
Hospitalized patients with PCO_2 >40 mm Hg should receive ≥1 additional blood gas measurement to evaluate response to treatment, unless PCO_2 >40 mm Hg is previously documented.	C	T	L	3	0	0	NA	0	0	NA
Hospitalized patients should not receive sedative drugs (e.g., anxiolytics), except if on a ventilator, physiologically dependent on sedatives, or in alcohol withdrawal.	C	T	M	3	3	9	82	1	1	100
Patients newly prescribed inhaled bronchodilators should be concurrently given either a spacer device or instructions in proper use of an MDI.	C	T	E	3	4	5	34	1	1	0
Patients hospitalized for an asthma exacerbation should receive outpatient follow-up contact within 14 days.	C	F	O	3	3	8	60	2	1	55
Atrial fibrillation										
Patients presenting with new-onset atrial fibrillation or atrial fibrillation of unknown duration should be asked about alcohol use and stimulant drug use at presentation.	C	D	H	3	42	181	15	21	19	39

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients presenting with new-onset atrial fibrillation or atrial fibrillation of unknown duration should have thyroid function checked within the first 2 weeks of presentation.	C	D	L	3	42	60	9	22	18	4
Patients with atrial fibrillation of >48 hours' or unknown duration who do not have contraindications to warfarin should receive warfarin if they are <65 years of age with ≥1 other risk factor for stroke.	C	T	M	1	9	11	54	5	6	100
Patients with atrial fibrillation of >48 hours' or unknown duration who do not have contraindications to warfarin should receive warfarin if they are ≥65 years of age.	C	T	M	1	27	44	57	17	16	27
Patients with chronic atrial fibrillation who have contraindications to warfarin or have declined warfarin therapy should receive aspirin if they are <65 years of age with ≥1 other risk factor for stroke.	C	T	M	1	2	3	0	0	0	NA
Patients with atrial fibrillation who do not have contraindications to warfarin should be started on warfarin within 2 weeks of presenting with new-onset ischemic or embolic stroke.	C	T	M	1	0	0	NA	0	0	NA
Patients with atrial fibrillation who do not have contraindications to warfarin should be started on warfarin within 1 week of presenting with new-onset TIA.	C	T	M	1	0	0	NA	0	0	NA
Patients with atrial fibrillation of >48 hours' or unknown duration who are undergoing elective electrical or chemical cardioversion should receive anticoagulation for ≥3 weeks before cardioversion unless they have had transesophageal echocardiography within 24 hours of cardioversion that indicates no clot.	C	T	M	3	5	8	13	2	1	54
All patients with atrial fibrillation of >48 hours' or unknown duration should receive anticoagulation for ≥4 weeks after cardioversion unless there are contraindications to anticoagulation.	C	T	M	3	4	5	36	2	1	54

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients with atrial fibrillation started on warfarin therapy should have an INR checked within 1 week of the first dose.	C	F	L	3	7	12	22	4	5	100
Benign prostatic hypertrophy										
Patients with diagnosed benign prostatic hypertrophy who report recent symptoms of prostatism and who are taking anticholinergic or sympathomimetic medications should have discontinuation or dose reduction of these medications offered or discussed within 1 month of when symptoms are noted.	C	D	M	3	7	9	37	9	6	0
Patients with diagnosed benign prostatic hypertrophy who report symptoms of moderate prostatism should have treatment options discussed or offered within 1 month of when symptoms are noted.	C	T	E	3		Excluded			Excluded	
Patients with diagnosed benign prostatic hypertrophy should be offered surgical therapy within 2 months of any continued reports of moderate symptoms of prostatism after α_1-adrenergic therapy, unless the patient is not a surgical candidate.	C	T	S	2	6	7	0	11	12	0
Patients with diagnosed benign prostatic hypertrophy who have surgical therapy should have their symptoms reassessed 6 months after initiation of therapy.	C	F	H	3	9	13	44	2	1	100
Patients with diagnosed benign prostatic hypertrophy who have α_1-adrenergic therapy should have their symptoms reassessed 6 months after initiation of therapy.	C	F	H	3	5	7	68	14	14	69
Breast cancer										
If a palpable breast mass has been detected, ≥1 of the following procedures should be completed within 3 months: FNA, mammography, ultrasonography, biopsy, and/or a follow-up visit.	C	D	L	3		Excluded			Excluded	

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
If a breast mass has been detected on 2 separate occasions, then a biopsy, FNA, or ultrasonography should be performed within 3 months of the second visit.	C	D	L	3		Excluded			Excluded	
A biopsy or FNA should be performed within 6 weeks either when the mammography suggests malignant disease or the persistent palpable mass is not cystic on ultrasonography.	C	D	S	3		Excluded			Excluded	
A biopsy should be performed within 6 weeks if FNA cannot rule out malignant disease.	C	D	S	3		Excluded			Excluded	
Women with stage I or stage II breast cancer should be offered a choice of modified radical mastectomy or breast-conserving surgery, unless contraindications to breast-conserving surgery are present.	C	T	S	1		Excluded			Excluded	
Women treated with breast-conserving surgery should begin radiation therapy within 6 weeks of completing either of the following: the last surgical procedure on the breast (including reconstructive surgery that occurs within 6 weeks of primary resection) or chemotherapy, if patient receives adjuvant chemotherapy, unless wound complications prevent the initiation of treatment.	C	T	L	3		Excluded			Excluded	
Women with invasive breast cancer that is node-positive, or node-negative with a primary tumor ≥1 cm, should be treated with adjuvant systemic therapy, including combination chemotherapy and/or tamoxifen (20 mg/d).	C	T	M	1		Excluded			Excluded	
Women with a history of breast cancer should have yearly mammography.	C	F	L	1		Excluded			Excluded	
Women with metastatic breast cancer should be offered hormonal therapy, chemotherapy, and/or enrollment in a clinical trial with documentation of informed consent within 6 weeks of the identification of metastases.	C	T	M	3		Excluded			Excluded	

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Cancer pain										
Patients with metastatic cancer to bone should have the presence or absence of pain noted at least every 6 months.	C	F	H	3	2	3	78	3	4	75
Cancer patients whose pain is uncontrolled should be offered a change in pain management within 24 hours of the pain report.	C	T	M	3	3	3	20	4	5	71
Patients receiving emetogenic chemotherapy should be offered concurrent potent antiemetic therapy (e.g., 5-HT blockade).	C	T	M	3	4	6	19	4	3	54
Cerebrovascular disease										
Patients who receive anticoagulant or antiplatelet therapy for acute stroke within 7 days of presentation should receive a head CT or MRI before initiation of anticoagulant or antiplatelet treatment.	C	D	L	3	8	15	75	2	1	79
Patients with new diagnoses of stroke without a known cardiac source should be started on antiplatelet therapy within 1 week of the diagnosis unless a contraindication is documented.	C	T	M	1	9	15	44	4	3	54
Patients with new diagnosis of TIA without a known cardiac source should be started on antiplatelet therapy within 1 week of the diagnosis unless a contraindication is documented.	C	T	M	1	8	12	56	2	1	64
Patients with a documented history of stroke or TIA without a known cardiac source should be receiving daily antiplatelet treatment, unless a contraindication is documented.	C	T	M	1	25	39	56	30	27	79
Patients who present for care with carotid artery symptoms and receive a diagnosis of TIA or stroke should have a carotid artery imaging study within 6 months before or 1 month after the event, unless the patient is not a candidate for carotid surgery.	C	D	L	1	9	18	84	4	3	43

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients admitted with a newly diagnosed stroke should have an assessment of functional status and swallowing before discharge.	C	F	H	3	8	16	66	1	1	100
Patients presenting with a new diagnosis of stroke should have a neurologic examination at presentation.	C	D	P	3	10	19	92	4	3	74
Patients presenting with a new diagnosis of TIA should have a neurologic examination at presentation.	C	D	P	3	9	15	47	2	1	64
Patients who smoke and present with stroke but are not hospitalized should be counseled to stop smoking at the time they present with the stroke.	C	F	H	3	2	4	0	0	0	NA
Patients who smoke and present with TIA but are not hospitalized should be counseled to stop smoking at the time they present with the TIA.	C	F	H	3	2	3	0	0	0	NA
Colorectal cancer										
Patients documented in the chart as having ≥1 first-degree relative with colorectal cancer should be offered ≥1 of the following colon cancer screening tests beginning at age 40 years: FOBT (if not done in the past 2 years), sigmoidoscopy (if not done in the past 5 years), colonoscopy (if not done in the past 10 years), double-contrast barium enema (if not done in the past 5 years).	P	S	L	1	22	24	71	9	9	61
Providers should offer to remove all polyps that are >1 cm in size and/or have adenomatous histologic characteristics within 3 months of detection.	P	T	S	3	24	39	92	18	22	79
Procedure note documentation for endoscopic management of polyps should include the location of any polyps removed endoscopically and the polyp type (sessile vs. pedunculated).	P	D	S	3	26	51	22	16	23	59
All patients with positive results on screening sigmoidoscopy should be offered a diagnostic colonoscopy within 3 months.	P	D	L	2	3	2	72	3	3	39

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
If results of a screening FOBT are positive, a diagnostic evaluation of the colon should be offered within 3 months.	P	D	L	1	30	56	45	23	25	34
Patients who have undergone surgical resection for colon or rectal cancer should have documentation in the chart that colonoscopy or barium enema with sigmoidoscopy was offered within the preceding 12 months.	C	D	L	2	2	2	60	0	0	NA
Patients with diagnosed colon cancer but no metastatic disease should be offered a wide resection with anastomosis within 6 weeks of diagnosis.	C	T	S	2	4	4	100	1		100
Patients who undergo a wide surgical resection should have negative margins noted on the most recent final pathology report or have documentation that they were offered repeated resection if they have stage I colon cancer.	C	T	S	2	2	2	100	0	0	NA
Patients with stage III colon cancer who have undergone a surgical resection should be offered adjuvant chemotherapy to start within 6 weeks of surgery with a published 5-FU–containing regimen (or be enrolled in a clinical trial with documentation of informed consent).	C	T	M	1	1	1	100	1		100
Patients with a preoperative diagnosis of stage I rectal cancer should be offered low anterior resection, abdominal perineal resection, or full-thickness local excision, or should be offered enrollment in a clinical trial with documentation of informed consent, within 6 weeks of diagnosis.	C	T	S	2	0	0	NA	0	0	NA
Patients who undergo a wide surgical resection should have negative margins noted on the most recent final pathology report or have documentation that they were offered repeated resection if they have stage I rectal cancer or stage II or III rectal cancer that is not invading other organs (not a T4 lesion).	C	T	S	2	0	0	NA	0	0	NA

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients with stages I, II, and III colorectal cancer should receive colonoscopy or double-contrast barium enema within a year of curative surgery if cancer did not occur within 12 months preoperatively.	C	F	L	2	3	3	100	1		100
Community-acquired pneumonia										
Patients >65 years of age or with coexisting illness and a diagnosis of pneumonia should receive a WBC on the day of presentation.	A	D	L	3	32	52	35	25	25	79
Patients >65 years of age or with coexisting illness and a diagnosis of pneumonia should receive BUN on the day of presentation.	A	D	L	3	32	52	31	25	25	69
Nonhospitalized persons ≤65 years of age who have diagnosed pneumonia with no known bacteriologic cause and no coexisting illness should be offered an oral empirical macrolide, unless allergic.	A	T	M	3	10	8	66	3	5	41
Nonhospitalized persons >65 years of age with diagnosed pneumonia but no known bacteriologic cause and with coexisting illnesses should be offered 1 of the following oral empirical antibiotic regimens: a second-generation cephalosporin, trimethoprim–sulfamethoxazole, or a β-lactamase inhibitor combination.	A	T	M	3	10	15	37	4	4	22
Persons treated for pneumonia should have follow-up contact with a provider within 6 weeks after discharge or diagnosis.	A	F	O	3	18	25	65	12	11	75
COPD										
Patients with COPD who are receiving bronchodilator therapy and have not had spirometry in the previous 12 months should have spirometry performed within 3 months after initiation of therapy.	C	D	P	3	7	13	51	3	2	52
Patients with new diagnoses of COPD who smoke should be counseled or referred for smoking cessation within 3 months of the new diagnosis of COPD.	C	T	E	3	5	9	80	4	2	100

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
All patients receiving regular bronchodilator treatment for COPD symptoms should be receiving ipratropium, unless intolerance is documented.	C	T	M	3	46	86	63	88	62	86
Patients newly prescribed inhaled bronchodilators should be concurrently given either a spacer device or instructions in proper use of an MDI.	C	T	E	3	21	38	22	7	5	23
Patients with COPD should have a theophylline level checked within 1 week of either initiation or increase of theophylline dose.	C	F	L	3	2	5	47	4	4	32
In patients receiving theophylline, if a serum theophylline level exceeds 111 μmol/L, the dose should be modified within 1 day of the measurement.	C	T	M	3	2	3	69	1	1	100
In patients receiving theophylline, if a serum theophylline level exceeds 111 μmol/L, retesting of level should be performed within 1 week, unless theophylline was withdrawn.	C	T	L	3	1	1	0	0	0	NA
Patients with COPD should receive home oxygen if their baseline room air oxygen saturation is <88% at rest (not during an exacerbation).	C	T	O	1	2	2	0	0	0	NA
The outpatient COPD medications should be documented in the medical record at the time of a COPD exacerbation.	C	D	H	3	40	207	64	48	47	66
Information on previous hospitalizations, urgent care, or emergency department visits for COPD (e.g., time of most recent visit or number per year) should be documented in the medical record at the time of a COPD exacerbation.	C	D	H	3	40	207	33	48	47	38
The presence or absence of new cough should be documented in the medical record at the time of a COPD exacerbation.	C	D	H	3	40	207	54	48	47	65
Vital signs, including respiratory rate, pulse, temperature, and blood pressure, should be documented in the medical record at the time of a COPD exacerbation.	C	D	P	3	40	207	64	48	47	82
A chest examination should be documented in the medical record at the time of a COPD exacerbation.	C	D	P	3	40	207	92	48	47	91

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients who are admitted to the hospital for an exacerbation of COPD and have a history of coronary disease should have ECG within 24 hours of admission.	C	D	L	3	8	32	67	13	8	61
A theophylline level should be obtained for patients taking theophylline who are hospitalized with an exacerbation of COPD.	C	D	L	3	5	24	9	6	5	14
A theophylline level should be obtained for patients taking theophylline who present in the outpatient setting with an exacerbation of COPD.	C	D	L	3	3	15	65	6	5	40
Patients presenting with COPD exacerbation should have oxygen administered if the oxygen saturation is <88% or Po_2 is <55 mm Hg.	C	T	O	3	3	7	53	8	7	74
Patients presenting with COPD exacerbation should be admitted to the hospital if acute ischemia is documented in the medical record on the date of presentation.	C	T	O	3	1	2	0	0	0	NA
Patients hospitalized with a COPD exacerbation should be admitted to a critical care bed when severe dyspnea (breathing rate >35 breaths/min with accessory muscle use) occurs despite initial therapeutic measures.	C	T	O	3	2	7	75	5	5	39
Patients with COPD hospitalized for an exacerbation should be discharged on home oxygen if the last documented oxygen saturation before discharge is <88%.	C	T	O	3	0	0	NA	1		0
CAD										
Patients with newly diagnosed CAD should receive aspirin within 1 week of the diagnosis of CAD, unless they have a contraindication to aspirin.	C	T	M	1	30	40	49	17	14	75
Patients with a previous diagnosis of CAD who are not taking aspirin and do not have contraindications to aspirin should receive aspirin within 1 week of any visit to a provider in which CAD was addressed.	C	T	M	1	127	178	56	113	106	43

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients with new diagnoses of CAD who smoke should have documentation of counseling on smoking cessation at the time of CAD diagnosis.	C	T	E	1	10	22	29	5	3	0
Patients with a diagnosis of unstable angina should receive aspirin within 2 hours of admission or presentation to the emergency department.	C	T	M	1	40	93	64	31	32	80
Patients admitted with the diagnosis of unstable angina who have angina >5 minutes at rest associated with ischemic ST-segment changes and do not have contraindications to heparin should receive heparin within 2 hours of initial ECG demonstrating ischemic changes, and continuous heparin infusion or subcutaneous LMWH for ≥24 hours (or until 26 hours after ECG with ischemic changes).	C	T	M	1	2	3	48	0	0	NA
Patients admitted with the diagnosis of unstable angina who have angina >5 minutes at rest associated with ischemic ST-segment changes should receive β-blockers within 4 hours (unless they have contraindications to β-blockers).	C	T	M	1	2	3	48	0	0	NA
Patients presenting with acute MI should receive ≥160 mg of aspirin within 2 hours of presentation or admission unless they have contraindications to aspirin.	C	T	M	1	6	9	87	1	1	100
Patients <75 years of age presenting with an acute MI who are within 12 hours of the onset of MI symptoms and who do not have contraindications to thrombolysis or revascularization should receive a thrombolytic agent within 1 hour of the time ECG initially shows ST-segment elevation >0.1 mV in 2 or more contiguous leads, or a left bundle-branch block not known to be old.	C	T	M	1	1	1	0	0	0	NA

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Patients admitted within 12 hours of the onset of acute MI who do not have contraindications to heparin should receive heparin (subcutaneous or IV) for ≥24 hours unless they have received streptokinase, APSAC, or urokinase.	C	T	M	3	1	1	100	0	0	NA
Patients admitted with acute MI should receive a β-blocker within 12 hours of admission (unless they have contraindications to β-blockers).	C	T	M	1	7	11	70	1	1	100
Patients admitted with acute MI should not receive short-acting nifedipine during hospitalization.	C	T	M	1	11	18	100	4	4	100
Patients admitted with acute MI should not receive any calcium-channel blocker if they have a reduced LVEF (≤0.4) or heart failure during the hospitalization.	C	T	M	1	3	3	100	1	1	100
Patients discharged after an acute MI who do not have contraindications to aspirin should be discharged on aspirin.	C	T	M	1	11	18	88	4	4	11
Patients discharged after an acute MI should be discharged on a β-blocker (unless they have contraindications to β-blockers).	C	T	M	1	10	17	73	4	4	20
Patients discharged after an acute MI who have an LVEF ≤0.4 documented at any time during the hospitalization should receive ACE inhibitors at discharge (unless they have contraindications to ACE inhibitors).	C	T	M	1	4	4	47	2	1	0
Patients with CAD who do not have contraindications to revascularization should be offered PTCA or coronary artery bypass surgery within 1 month of coronary angiography if they have 3-vessel CAD and an LVEF ≤0.4.	C	T	S	1	5	9	49	0	0	NA
Patients with CAD who do not have contraindications to revascularization should be offered coronary artery bypass surgery within 1 month of coronary angiography if they have left main stenosis >50%.	C	T	S	1	3	4	60	2	2	52

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients age 40 to 75 years who have a high-risk stress test result should be offered coronary angiography within 6 weeks of the stress test (unless they have contraindications to revascularization).	C	D	L	3	2	3	100	0	0	NA
Patients with newly diagnosed CAD should have 12-lead ECG at diagnosis.	C	D	L	3	37	51	37	24	19	51
Patients with newly diagnosed angina should have hemoglobin level and/or hematocrit measured at diagnosis.	C	D	L	3	24	33	70	2	1	41
Patients with newly diagnosed unstable angina should have hemoglobin level and/or hematocrit measured at diagnosis.	C	D	L	3	39	81	73	31	29	95
Patients being evaluated for unstable angina or to rule out unstable angina should have blood pressure measured.	C	D	P	3	36	95	84	20	20	86
Patients being evaluated for unstable angina or to rule out unstable angina should have their heart rate measured.	C	D	P	3	36	95	85	20	20	86
Patients being evaluated for unstable angina or to rule out unstable angina should have a heart examination.	C	D	P	3	36	95	89	20	20	86
Patients being evaluated for unstable angina or to rule out unstable angina should have a lung examination.	C	D	P	3	36	95	86	20	20	86
Patients being evaluated for unstable angina or to rule out unstable angina should have 12-lead ECG.	C	D	L	3	36	95	65	20	20	59
Patients admitted with unstable angina should receive cardiac monitoring (i.e., telemetry).	C	D	L	3	37	80	61	30	28	90
Patients admitted with unstable angina should have repeated ECG 12 to 36 hours after admission.	C	D	L	3	34	72	47	30	28	80
Patients admitted with unstable angina who have any of the conditions below should have a measurement of LVEF by echocardiography, radionuclide scan, or ventriculography during their hospitalization or within 10 days of discharge unless a previous LVEF is documented in the past year: a history of MI, left bundle-branch block on resting ECG, cardiomegaly by examination, cardiomegaly on chest radiography, or a diagnosis of heart failure.	C	D	L	3	13	23	39	11	13	51

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients hospitalized for the diagnosis of MI or to rule out MI should have blood pressure measured.	C	D	P	3	25	48	82	27	22	100
Patients hospitalized for the diagnosis of MI or to rule out MI should have heart rate documented.	C	D	P	3	25	48	82	27	22	97
Patients hospitalized for the diagnosis of MI or to rule out MI should have a heart examination.	C	D	P	3	25	48	82	27	22	93
Patients hospitalized for the diagnosis of an MI or to rule out MI should have a lung examination.	C	D	P	3	25	48	82	27	22	100
Patients hospitalized with MI should have an assessment of LVEF before discharge if they have any risk factors for low LVEF (unless it is noted during hospitalization that before admission LVEF was ≤0.4).	C	D	L	3	1	2	0	2	2	32
Patients hospitalized with an MI who have a history of MI but no risk factors for low LVEF should have an assessment of LVEF during the hospitalization or within 2 weeks of discharge (unless it is noted during hospitalization that before admission LVEF was ≤0.4).	C	D	L	3	3	4	100	1	1	100
Patients <75 years of age with an MI should be offered symptom-limited stress testing or coronary angiography within 8 weeks of the MI (unless they have contraindications to revascularization).	C	D	L	3	6	7	90	3	3	53
Patients <75 years of age who are admitted after cardiac arrest and have positive results on a stress test during hospitalization should be offered coronary angiography before discharge (unless revascularization is contraindicated).	C	D	L	3	2	2	100	2	2	100
Depression										
Clinicians should ask about the presence or absence of depression or depressive symptoms in any person with any of the following risk factors: history of depression, death in family in past 6 months, or alcohol or other drug abuse.	C	S	H	3	123	167	66	94	91	87

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If depression is diagnosed, the presence or absence of alcohol or other drug abuse should be documented.	C	D	H	3	32	36	37	14	15	78
If depression is diagnosed, medication use should be documented.	C	D	H	3	32	36	76	14	15	100
If depression is diagnosed, general medical comorbid conditions should be elicited and documented in the chart.	C	D	H	3	32	36	81	14	15	100
Once major depression has been diagnosed, treatment with antidepressant medication and/or psychotherapy should begin within 2 weeks.	C	T	M	1	32	34	84	14	15	86
Presence or absence of suicidal ideation should be documented during the first or second diagnostic visit.	C	D	H	3	42	49	17	16	17	70
Persons with suicidality should be asked if they have specific plans to carry out suicide.	C	D	H	3	11	8	77	11	12	52
Persons with suicidality and any of the following risk factors should be hospitalized: psychosis, current alcohol or drug abuse or dependency, or specific plans to carry out suicide (e.g., obtaining a weapon, putting affairs in order, writing a suicide note).	C	T	O	3	5	4	27	5	4	78
Antidepressants should be prescribed at appropriate dosages.	C	T	M	1	28	31	71	13	13	63
Antianxiety agents should not be prescribed as a sole means of treating depression.	C	T	M	1	32	35	100	9	11	100
Medication treatment visits or telephone contacts should occur at least once in the 2 weeks following initial diagnosis.	C	F	O	3	28	31	32	13	13	73
Persons hospitalized for depression should have follow-up with a mental health specialist or their primary care physician within 2 weeks of discharge.	C	F	O	3	14	21	49	19	26	57
Patients with major depression who have medical record documentation of improvement of symptoms within 6 weeks of starting antidepressant treatment should be continued on an antidepressant for ≥4 additional months.	C	F	M	1	28	31	45	13	13	92

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At each visit during which depression is discussed during the first year of treatment, degree of response or remission and side effects of medications should be assessed and documented.	C	F	H	3	12	9	58	10	11	83
Diabetes										
Patients <75 years of age with ≥1 fasting blood glucose level >6.99 mmol/L (>126 mg/dL) or postprandial blood glucose level >11.1 mmol/L (>200 mg/dL) should have a diagnosis of diabetes noted in progress notes or problem list.	C	D	L	3	83	133	93	95	71	98
Patients with diabetes should have glycosylated hemoglobin or fructosamine levels measured every 6 months.	C	F	L	1	155	245	32	205	156	56
Patients with diabetes should have an annual eye and vision examination.	C	F	P	1	155	245	26	205	156	36
Patients with diabetes should have total serum cholesterol and HDL cholesterol tests documented.	C	F	L	3	155	245	63	205	156	81
Patients with diabetes should have measurement of urine protein (annual) documented.	C	F	L	3	155	245	33	205	156	57
Patients with diabetes should have an examination of their feet at least twice per year.	C	F	P	3	155	245	56	205	156	72
Patients with diabetes should have a measurement of blood pressure at every visit.	C	F	P	3	155	245	65	205	156	67
Patients taking insulin should monitor their glucose levels at home unless documented to be unable or unwilling.	C	F	L	3	63	103	54	108	74	85
Patients with newly diagnosed diabetes should receive dietary and exercise counseling.	C	T	E	2	42	67	42	26	20	64
Patients with type 2 diabetes mellitus in whom dietary therapy has failed should receive oral hypoglycemic therapy.	C	T	M	3	6	10	51	10	7	13
Patients with type 2 diabetes mellitus in whom oral hypoglycemic agents have failed should be offered insulin.	C	T	M	3	6	10	61	5	3	55
Patients with diabetes and proteinuria should be offered an ACE inhibitor within 3 months of the notation of proteinuria unless contraindicated.	C	T	M	1	24	35	67	69	50	70

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Patients with diabetes should have a follow-up visit at least every 6 months.	C	F	O	3	155	245	68	205	156	89
Dyspepsia and peptic ulcer disease										
Patients presenting with a new episode of dyspepsia should have the presence or absence of NSAID use noted in the medical record on the date of presentation.	C	D	H	2	45	39	37	17	16	24
Patients with new dyspepsia who have significant unintentional weight loss (>15 lb in the past 3 months), guaiac-positive stool if not taking NSAIDs, and dysphagia on the date of presentation should have endoscopy performed within 1 month, unless endoscopy has been performed in the previous 6 months.	C	D	L	2	6	6	48	0	0	NA
For patients with documented peptic ulcer disease who have been noted to use NSAIDs or aspirin within 2 months before diagnosis, the medical record should indicate a reason why NSAIDs or aspirin will be continued or advice to the patient to discontinue NSAIDs or aspirin at diagnosis.	C	T	M	2	4	8	71	1	1	0
Patients with a gastric ulcer confirmed by endoscopy should have ≥3 biopsies during endoscopy and/or follow-up endoscopy within 3 months.	C	T	L	3	2	3	0	1	1	0
Patients with endoscopically documented peptic ulcer disease should be offered endoscopic treatment or surgery within the next 24 hours if continued oozing, bleeding, or spurting of blood or a visible vessel (or pigmented protuberance) are documented in the endoscopy note.	C	T	S	1	1	3	100	0	0	NA
Patients with a documented peptic ulcer disease complication who have had a positive test result for *Helicobacter pylori* (by biopsy, breath test, or positive serologic results not previously treated) within 3 months after the complication should be started on an *H. pylori* eradication regimen within 1 month of the positive test result.	C	T	M	1	0	0	NA	1	1	100

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Patients with endoscopically confirmed peptic ulcer disease whose symptoms of dyspepsia or documented ulcers recur within 6 months after eradication therapy for *H. pylori* should receive confirmatory testing for successful *H. pylori* cure by endoscopic biopsy or urease breath test within 1 month of symptom recurrence.	C	F	L	2	1	2	0	0	0	NA
Patients with a history of peptic ulcer disease complications in the past year should have results of *H. pylori* testing documented in the medical record in the same time period.	C	F	L	1	5	5	0	3	3	29
Headache										
Patients with new-onset headache should be asked about the location of the pain.	A	D	H	3	50	66	52	25	29	64
Patients with new-onset headache should be asked about associated symptoms.	A	D	H	3	50	66	43	25	29	50
Patients with new-onset headache should be asked about their temporal profile.	A	D	H	3	50	66	50	25	29	46
Patients with new-onset headache should be asked about the degree of severity of the headache.	A	D	H	3	50	66	34	25	29	38
Patients with new-onset headache should be asked about family history of headache.	A	D	H	3	50	66	2	25	29	2
Patients with new-onset headache should be asked about any possible aggravating or alleviating factors.	A	D	H	3	50	66	40	25	29	31
Patients with new-onset headache should have an examination evaluating the cranial nerves.	A	D	P	3	50	66	36	25	29	42
Patients with new-onset headache should have an examination evaluating the fundi.	A	D	P	3	50	66	25	25	29	14
Patients with new-onset headache should have an examination evaluating deep tendon reflexes.	A	D	P	3	50	66	25	25	29	14
Patients with new-onset headache should have an examination evaluating their blood pressure.	A	D	P	3	50	66	70	25	29	73
CT or MRI scanning is indicated in patients with new-onset headache and abnormal results on neurologic examination.	A	D	L	3	6	7	51	2	3	0

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CT or MRI scanning is indicated in patients with new-onset headache and a severe headache.	A	D	L	3	8	9	31	4	4	19
Skull radiography should not be part of an evaluation for headache.	A	D	L	2	86	78	98	58	60	98
Patients with acute mild migraine or tension headache should have tried aspirin, acetaminophen, or other NSAIDs before being offered any other medication.	A	T	M	1	22	19	79	11	10	84
For patients with acute, moderate, or severe migraine headache, 1 of the following should have been tried before any other agent is offered: ketorolac, sumatriptan, dihydroergotamine, ergotamine, chlorpromazine, or metoclopramide.	A	T	M	1	3	2	43	2	2	38
Recurrent moderate or severe tension headaches should be treated with a trial of tricyclic antidepressant agents, if there are no medical contraindications to use.	A	T	M	1	2	1	0	0	0	NA
If a patient has >2 moderate to severe migraine headaches each month, then prophylactic treatment with 1 of the following agents should be offered: β-blockers, calcium-channel blockers, tricyclic antidepressants, naproxen, aspirin, fluoxetine, valproate, or cyproheptadine.	A	T	M	1	2	1	76	0	0	NA
Sumatriptan and ergotamine should not be concurrently administered.	A	T	M	3	8	4	79	8	9	97
Opioid agonists and barbiturates should not be first-line therapy for migraine or tension headaches.	A	T	M	3	28	26	92	14	13	90
Sumatriptan and ergotamine should not be given in patients with a history of uncontrolled hypertension.	A	T	M	2	1	1	100	5	4	100
Sumatriptan and ergotamine should not be given in patients with a history of ischemic heart disease or angina.	A	T	M	2	16	21	100	18	16	87
Congestive heart failure										
Patients with newly diagnosed heart failure who are beginning medical treatment should have ejection fraction evaluated within 1 month of the start of treatment.	C	D	L	3	12	23	27	14	11	47

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients with newly diagnosed heart failure should have a history at diagnosis documenting the presence or absence of previous MI or cardiac disease.	C	D	H	3	19	34	53	19	14	80
Patients with newly diagnosed heart failure should have a history at diagnosis documenting the presence or absence of current symptoms of chest discomfort or angina.	C	D	H	3	19	34	63	19	14	87
Patients with newly diagnosed heart failure should have the presence or absence of a history of hypertension documented.	C	D	H	3	19	34	65	19	14	76
Patients with newly diagnosed heart failure should have a history of diabetes documented.	C	D	H	3	19	34	56	19	14	73
Patients with newly diagnosed heart failure should have current medications documented.	C	D	H	3	19	34	65	19	14	87
Patients with newly diagnosed heart failure should have alcohol use documented.	C	D	H	3	19	34	53	19	14	98
Patients with newly diagnosed heart failure should have smoking status documented.	C	D	H	3	19	34	50	19	14	57
Patients with newly diagnosed heart failure should have their weight documented at presentation.	C	D	P	3	12	24	86	15	11	78
Patients with newly diagnosed heart failure should have blood pressure documented at presentation.	C	D	P	3	12	24	100	15	11	100
Patients with newly diagnosed heart failure should have lung examination documented at presentation.	C	D	P	3	12	24	83	15	11	88
Patients with newly diagnosed heart failure should have cardiac examination documented at presentation.	C	D	P	3	12	24	83	15	11	82
Patients with newly diagnosed heart failure should have abdominal examination documented at presentation.	C	D	P	3	12	24	46	15	11	57
Patients with newly diagnosed heart failure should have lower-extremity examination documented at presentation.	C	D	P	3	12	24	57	15	11	70
Patients with newly diagnosed heart failure should have an examination of neck veins documented at presentation.	C	D	P	3	12	24	14	15	11	62

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients with newly diagnosed heart failure should have heart rate documented at presentation.	C	D	P	3	12	24	83	15	11	82
Patients with newly diagnosed heart failure should be offered chest radiography within 1 month of diagnosis (unless performed within the previous 3 months).	C	D	L	3	8	18	9	11	8	89
Patients with newly diagnosed heart failure should be offered ECG within 1 month of diagnosis (unless performed within the previous 3 months).	C	D	L	3	8	18	40	11	8	80
Patients with newly diagnosed heart failure should be offered a complete blood count within 1 month of diagnosis (unless performed within the previous 3 months).	C	D	L	3	8	18	44	11	8	81
Patients with newly diagnosed heart failure should be offered a serum sodium, potassium, and bicarbonate test within 1 month of diagnosis (unless performed within the previous 3 months).	C	D	L	3	8	18	78	11	8	100
Patients with newly diagnosed heart failure should be offered a serum creatinine test within 1 month of diagnosis (unless performed within the previous 3 months).	C	D	L	3	8	18	78	11	8	100
Patients who are hospitalized for symptoms of heart failure should have their weight documented on the day of hospitalization.	C	D	P	3	23	53	29	24	34	63
Patients who are hospitalized for symptoms of heart failure should have their blood pressure documented on the day of hospitalization.	C	D	P	3	23	53	74	24	34	97
Patients who are hospitalized for symptoms of heart failure should have their lung examination documented on the day of hospitalization.	C	D	P	3	23	53	82	24	34	88
Patients who are hospitalized for symptoms of heart failure should have their cardiac examination documented on the day of hospitalization.	C	D	P	3	23	53	82	24	34	84

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients who are hospitalized for symptoms of heart failure should have their abdominal examination documented on the day of hospitalization.	C	D	P	3	23	53	79	24	34	86
Patients who are hospitalized for symptoms of heart failure should have their lower-extremity examination documented on the day of hospitalization.	C	D	P	3	23	53	82	24	34	81
Patients who are hospitalized for symptoms of heart failure should have an examination of their neck veins documented on the day of hospitalization.	C	D	P	3	23	53	65	24	34	74
Patients who are hospitalized for symptoms of heart failure should have their heart rate documented on the day of hospitalization.	C	D	P	3	23	53	70	24	34	86
Patients who are hospitalized for heart failure should have serum electrolyte levels assessed within 1 day of hospitalization.	C	D	L	3	23	53	53	24	34	84
Patients who are hospitalized for heart failure should have a serum creatinine test within 1 day of hospitalization.	C	D	L	3	23	53	53	24	34	84
Patients with a diagnosis of heart failure who have an ejection fraction <0.4 and no contraindications to ACE inhibitors should be receiving an ACE inhibitor.	C	T	M	1	11	18	100	10	10	100
Patients with the diagnosis of heart failure who are taking an ACE inhibitor should have serum potassium levels checked every year.	C	F	L	3	24	42	80	53	49	88
Patients with the diagnosis of heart failure who are taking an ACE inhibitor should have serum creatinine concentration checked every year.	C	F	L	3	24	42	71	53	49	88
Patients with a new diagnosis of heart failure who are started on medical treatment for heart failure should have dietary counseling within 1 month of the start of medical treatment.	C	T	E	2	12	23	7	13	10	56
Patients who have been hospitalized for heart failure should have follow-up contact within 4 weeks of discharge.	C	F	O	3	17	28	65	18	15	85

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Hip fracture										
Patients who have had surgical repair of a hip fracture should receive a complete blood count preoperatively.	A	D	L	3	0	0	NA	0	0	NA
Patients who have had surgical repair of a hip fracture should receive a coagulation test preoperatively.	A	D	L	3	0	0	NA	0	0	NA
Patients who have had surgical repair of a hip fracture should have received a chemistry panel preoperatively.	A	D	L	3	0	0	NA	0	0	NA
Patients who have had surgical repair of a hip fracture should have preoperative urinalysis.	A	D	L	3	0	0	NA	0	0	NA
Patients who have had surgical repair of a hip fracture should have preoperative ECG.	A	D	L	3	0	0	NA	0	0	NA
Patients who have had surgical repair of a hip fracture should have received antibiotics prophylactically on the same day that surgery was performed.	A	T	M	1	0	0	NA	0	0	NA
Persons with hip fractures should be given prophylactic antithrombotic agents at hospital admission.	A	T	M	1	1	1	100	0	0	NA
Patients who have had a hip fracture should have documented within 2 months (before or after) the presence or absence of ≥1 modifiable risk factor for subsequent hip fracture.	A	F	H	3	1	2	0	0	0	NA
Patients >65 years of age who report falling should be assessed for ≥2 modifiable risk factors within 3 months of the report.	A	F	H	3	26	63	6	20	23	45
Menopause management										
Women with a new diagnosis of menopause should receive counseling about the risks and benefits of HRT within 1 year of diagnosis.	C	T	E	3		Excluded			Excluded	
Postmenopausal women beginning HRT should receive counseling about the risks and benefits of HRT within 1 year before initiation.	C	T	E	3		Excluded			Excluded	
Hyperlipidemia										
Persons <75 years of age with preexisting heart disease who are not taking pharmacologic therapy for hyperlipidemia should have levels of total, HDL, and LDL cholesterol documented at least every 5 years.	C	D	L	3	98	141	55	53	45	96

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Persons <75 years of age with newly diagnosed coronary disease should have had total, HDL, and LDL cholesterol levels documented within 2 years before or within 4 months after the diagnosis was first noted in the medical record.	C	D	L	3	24	35	65	10	9	80
Patients without preexisting coronary disease who are started on pharmacologic treatment for hyperlipidemia should have had ≥2 measurements of cholesterol levels (total or LDL) documented in the year before the start of pharmacologic treatment.	C	D	L	3	19	20	48	6	5	47
Patients <75 years of age with preexisting coronary disease who have an untreated LDL cholesterol level >3.37 mmol/L (>130 mg/dL) should begin diet or drug therapy within 3 months of the high LDL measurement.	C	T	M	1	22	37	46	10	10	60
Patients <75 years of age with preexisting coronary disease who have an LDL level >3.37 mmol/L (>130 mg/dL) after 6 months of dietary cholesterol-lowering treatment should receive pharmacologic therapy for hyperlipidemia within 2 months of measurement.	C	T	M	3	2	4	33	5	5	40
Patients in whom pharmacologic therapy for hyperlipidemia has been initiated should have total, HDL, and LDL cholesterol levels rechecked within 4 months.	C	F	L	3	50	56	39	33	33	41
Patients receiving pharmacologic therapy for hyperlipidemia who have had a dosage or medication change should have total, HDL, and LDL cholesterol levels rechecked within 4 months of the change.	C	F	L	3	64	161	50	69	138	61
Hypertension										
All patients with average blood pressures of stage 1 or greater as determined on ≥3 separate visits should have a diagnosis of hypertension documented in the record.	C	D	P	3	262	360	73	255	242	89

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Patients with a new diagnosis of stage 1 to 3 hypertension should have ≥3 measurements on separate visits with a mean SBP >140 mm Hg or a mean DBP >90 mm Hg.	C	D	P	3	47	59	41	19	19	44
Initial history and physical of patients with hypertension should document assessment of ≥2 of the following items by the third visit: medication and substance abuse, personal history of tobacco abuse, alcohol abuse, or medications that may cause hypertension.	C	D	H	3	42	56	21	16	16	78
Initial history and physical of patients with hypertension should document a physical examination of the fundi by the third visit.	C	D	P	3	48	65	15	17	17	9
Initial history and physical of patients with hypertension should document heart sounds by the third visit	C	D	P	3	48	65	66	17	17	45
Initial history and physical of patients with hypertension should document assessment of the abdomen for bruits by the third visit.	C	D	P	3	48	65	48	17	17	16
Initial history and physical of patients with hypertension should document assessment of peripheral arterial pulses by the third visit.	C	D	P	3	48	65	37	17	17	8
Initial history and physical of patients with hypertension should document a neurologic examination by the third visit.	C	D	P	3	48	65	30	17	17	14
Initial laboratory tests should include urinalysis.	C	D	L	3	56	74	33	22	21	80
Initial laboratory tests should include serum, plasma, or blood glucose levels.	C	D	L	3	56	74	69	22	21	90
Initial laboratory tests should include serum potassium level.	C	D	L	3	56	74	61	22	21	90
Initial laboratory tests should include serum cholesterol level.	C	D	L	3	56	74	65	22	21	73
Initial laboratory tests should include triglyceride level.	C	D	L	3	56	74	63	22	21	67
Initial laboratory tests should include creatinine concentration.	C	D	L	3	56	74	64	22	21	90

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First-line treatment for patients in risk group A or B is lifestyle modification. The medical record should indicate counseling for ≥1 of the following interventions before initiating pharmacotherapy: weight reduction (if obese), increased physical activity (if sedentary), or a low-sodium diet.	C	T	E	1	3	4	0	1	1	0
First-line treatment for patients with stage 1A hypertension is lifestyle modification. The medical record should indicate counseling for ≥1 of the following interventions before initiating pharmacotherapy: weight reduction (if obese), increased physical activity (if sedentary), or a low-sodium diet.	C	T	E	1	0	0	NA	0	0	NA
Treatment for stage 1B and 1C and stages 2 and 3 hypertension should include lifestyle modification. The medical record should indicate counseling for ≥1 of the following interventions: weight reduction (if obese), increased physical activity (if sedentary), or a low-sodium diet.	C	T	E	1	44	54	37	19	19	58
Patients with stage 1B hypertension whose blood pressure remains stage 1 after 6 months of lifestyle modification should be offered pharmacotherapy.	C	T	M	1	42	55	28	10	10	30
Patients with stage 1A hypertension whose blood pressure remains stage 1 after 12 months of lifestyle modification should be offered pharmacotherapy.	C	T	M	1	0	0	NA	0	0	NA
Patients in any risk group with stage 2 to 3 hypertension should be offered pharmacotherapy.	C	T	M	1	77	114	75	52	48	94
Patients in risk group C should be offered pharmacotherapy.	C	T	M	1	118	174	73	96	86	88
Patients in risk group C with stage 1 hypertension should be offered pharmacotherapy.	C	T	M	1	132	195	82	148	133	92
Hypertensive patients should visit the provider at least once each year.	C	F	O	3		Excluded			Excluded	
Patients with newly diagnosed stage 1 hypertension should be evaluated by the provider within 4 months of their initial visit.	C	F	O	3	29	34	74	11	11	100

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Patients with newly diagnosed stage 2 hypertension should be evaluated by the provider within 2 months of their initial visit.	C	F	O	3	15	21	61	5	6	63
Patients with newly diagnosed stage 3 hypertension should be evaluated by the provider within 2 weeks of their initial visit.	C	F	O	3	3	4	0	3	3	17
Patients with hypertension and consistent average SBP >140 mm Hg or DBP >90 mm Hg over 6 months should have 1 of the following interventions recorded in the medical record: a change in dose or regimen of antihypertensive agents or repeated education regarding lifestyle modifications.	C	F	M	3	291	401	79	322	310	90
Hysterectomy										
If a woman has a hysterectomy with the indication of fibroid uterus, ≥1 of the following should be recorded in the medical record: The uterus is significantly enlarged and the patient is concerned about the fibroids, excessive menstrual bleeding, pelvic discomfort, or bladder pressure with urinary frequency.	A	D	H	3		Excluded			Excluded	
If a pre- or perimenopausal woman has a hysterectomy with the indication of abnormal uterine bleeding, then the medical record should indicate that ≥1 month of medical therapy was offered in the 6 months before the hysterectomy without relief of symptoms.	A	T	M	3		Excluded			Excluded	
Women who have a hysterectomy for postmenopausal bleeding should have been offered a biopsy of the endometrium within 6 months before the procedure.	A	D	S	3		Excluded			Excluded	
Women with postmenopausal bleeding should be offered an office endometrial biopsy within 3 months of presentation.	A	D	S	3		Excluded			Excluded	

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Low back pain										
Patients presenting with acute low back pain should receive a focused medical history and physical examination. The history should include questions about red flags in ≥1 of the following areas: spine fracture (trauma, prolonged use of steroids), cancer (history of cancer, unexplained weight loss, immunosuppression), infection (fever, IV drug use). Red flags for the cauda equina syndrome or rapidly progressing neurologic deficit are acute onset of urinary retention or overflow incontinence, loss of anal sphincter tone or fecal incontinence, saddle anesthesia, and global progressive motor weakness in the lower limbs.	A	D	H	3	103	111	33	18	16	80
Patients presenting with acute low back pain should have neurologic screening.	A	D	P	3	103	111	47	18	16	53
Patients presenting with acute low back pain should have a test of straight-leg raising.	A	D	P	3	103	111	39	18	16	25
Patients should not be taking any of the following medications for treatment of acute low back pain: phenylbutazone, dexamethasone, other oral steroids, colchicine, or antidepressants.	A	T	M	3	102	108	95	18	16	97
Patients should not be prescribed any of the following physical treatments for acute low back pain: transcutaneous electrical nerve stimulation, lumbar corsets and support belts, or spinal traction.	A	T	O	1	103	111	95	18	16	100
Prolonged bed rest (>4 days) should not be recommended for patients with acute low back pain.	A	T	O	1	103	111	100	18	16	100
Orthopedic conditions										
Patients with a diagnosis of the impingement syndrome should be offered ≥1 of the following within 2 weeks: NSAIDs (including aspirin), steroid injection, avoidance of inciting activities, physical therapy, and instructions for a home exercise program.	A	T	M	1	35	45	62	8	8	68

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Patients presenting with new-onset knee pain after injury to their knee should undergo ≥2 of the following maneuvers during physical examination within 1 month of initial presentation: the Lachman test, anterior drawer test, posterior drawer test, posterior sag test, joint line palpation, the McMurray test, valgus stress, varus stress.	A	D	P	3	25	32	27	7	10	33
Patients presenting with new-onset knee effusion should have a history taken at initial presentation that includes duration of swelling.	A	D	H	3	18	21	55	8	12	27
Patients presenting with new-onset knee effusion should have a history taken at initial presentation that includes a history of trauma and injury.	A	D	H	3	18	21	59	8	12	85
Patients presenting with new-onset knee effusion should have a history taken at initial presentation that includes the presence or absence of fever.	A	D	H	3	18	21	19	8	12	42
Patients who have arthrocentesis for new-onset knee effusion should have the fluid analyzed for cell count.	A	D	L	3	3	5	94	2	3	100
Patients who have arthrocentesis for new-onset knee effusion should have the fluid analyzed with a Gram stain.	A	D	L	3	3	5	39	2	3	0
Patients who have arthrocentesis for new-onset knee effusion should have the fluid analyzed for crystals.	A	D	L	3	3	5	94	2	3	100
Patients with a diagnosed ACL rupture should have surgical options discussed within 2 weeks of the rupture unless documented as not a surgical candidate.	A	T	E	3	4	3	78	1	1	0
Patients who report having ≥6 months of knee pain that limits function, despite regular use of NSAIDs and/or intraarticular steroid joint injection, should have physical therapy (if not already tried) and surgery/arthroscopy offered or discussed within 1 month of the report of continued pain.	A	T	O	3	1		100	1	1	0

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Osteoarthritis										
Providers caring for patients with symptoms of osteoarthritis should document all of the following at least once in 2 years: the location of symptoms and/or the presence or absence of limitations in daily activities.	C	D	H	3	122	147	80	165	164	80
Patients with a new diagnosis of osteoarthritis who wish to take medication for joint symptoms should be offered a trial of acetaminophen.	C	T	M	1	40	49	20	8	8	73
Providers caring for patients with symptoms of hip or knee osteoarthritis should recommend exercise programs at least once in 2 years.	C	T	E	1	54	58	26	70	70	27
Preventive care										
All patients should be screened for problem drinking. This assessment of pattern of alcohol use should include ≥1 of the following: use of a validated screening questionnaire (such as AUDIT, MAST, or CAGE), quantity (e.g., drinks per day), binge drinking (e.g., >5 drinks in a day in the last month).	P	S	H	3	980	979	58	514	523	79
Women age 50 to 70 years should have had a screening mammography performed at least every 2 years.	P	D	P	3		Excluded			Excluded	
All average-risk adults age 50 to 80 years should be offered ≥1 of the following colon cancer screening tests: FOBT (if not done in the past 2 years), sigmoidoscopy (if not done in the past 5 years), colonoscopy (if not done in the past 10 years), double-contrast barium enema (if not done in the past 5 years).	P	S	L	1	634	772	45	448	478	58
The smoking status of women prescribed combination oral contraceptives should be documented in the medical record.	P	S	L	2		Excluded			Excluded	
SBP and DBP should be measured in patients otherwise presenting for care at least once each year.	P	T	H	2	991	989	94	594	593	100

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For patients <50 years of age, notation of the date that a tetanus–diphtheria booster was received within the past 10 years should be included in the medical record.	P	T	I	3	281	148	19	68	76	39
The medical record should show that patients >50 years of age were offered a tetanus–diphtheria booster after their 50th birthday or in the past 10 years.	P	T	I	3	703	833	17	523	516	40
All patients ≥65 years of age should have been offered influenza vaccine annually or have documentation that they received it elsewhere.	P	T	I	1	313	453	42	286	273	69
All patients <65 years of age with any of the following conditions should have been offered influenza vaccination annually: residence in a nursing home, COPD, chronic cardiovascular disorders, renal failure, immunosuppression, diabetes mellitus, hemoglobinopathies (e.g., sickle cell).	P	T	I	1	247	285	28	212	193	46
There should be documentation that all patients ≥65 years of age presenting for care were offered pneumococcal vaccine at least once.	P	T	I	1	313	453	22	285	272	59
There should be documentation that all patients in the following groups and otherwise presenting for care were offered pneumococcal vaccine at least once: chronic cardiac or pulmonary disease, diabetes mellitus, anatomic asplenia, and institutionalized persons >50 years of age.	P	T	I	1	203	255	14	197	173	42
All Mantoux test results read as positive or reactive should document both of the following: the presence of induration and the diameter of the induration in millimeters.	P	D	P	3	1	1	100	2	2	100
Mantoux tests should be read by a health professional or other trained personnel within 48 to 72 hours.	P	D	P	3	9	8	83	17	18	72

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients ≥65 years of age noted to have a hearing problem or symptom that has no reversible cause or persists despite treatment for reversible cause should have formal evaluation for amplification offered or discussed.	P	T	O	3	11	16	63	14	13	84
The medical record should include measurements of height at least once.	P	S	P	3	205	205	44	39	41	95
The medical record should include measurements of weight at least once.	P	S	P	3	205	205	64	39	41	100
Patients otherwise presenting for care should be counseled on the use of seat belts on ≥1 occasion.	P	T	E	3	205	205	4	39	41	34
Patients should be asked if they have ever been sexually active.	P	S	H	3	205	205	67	39	41	68
Patients should be asked about current or past use of IV drugs at least once.	P	S	H	3	205	205	11	39	41	43
Patients who are sexually active and not in a monogamous relationship, who have a history of STDs, or who have used IV drugs should be counseled about the prevention and transmission of HIV infection and other STDs.	P	T	E	3	27	21	36	11	9	21
Patients with the following past HIV risk factors should have HIV testing offered or discussed at the visit in which the past risk factor is noted (unless HIV status has been documented since termination of the risk factor): past injection drug use, having had sex with >1 partner in a 6-month period, having exchanged sex for money or drugs in the past, and having past sexual partners who were HIV infected or injection drug users.	P	S	L	3	4	5	100	2	1	0
Patients with the following past HIV risk factors should have HIV testing offered or discussed at the visit in which the past risk factor is noted (unless HIV status has been documented since termination of the risk factor): past injection drug use, having had sex with >1 partner in a 6-month period, having exchanged sex for money or drugs in the past, and having past sexual partners who were HIV infected or injection drug users.	P	S	L	3	4	3	46	17	17	41

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Patients >65 years of age should be asked about hearing difficulties at least every 2 years.	P	S	H	3	313	453	23	285	272	28
The medical record should contain the date and result of the last Pap smear.	P	S	L	2		Excluded			Excluded	
Women who have not had a Pap smear within the past 3 years should have one performed (unless never sexually active with men or had a hysterectomy for benign indications).	P	S	L	2		Excluded			Excluded	
Women with a history of cervical dysplasia or carcinoma in situ or HIV infection who have not had a Pap smear within the past year should have one performed.	P	S	L	3		Excluded			Excluded	
Women with a severely abnormal Pap smear should have colposcopy performed within 3 months of the Pap smear date.	C	D	S	3		Excluded			Excluded	
If a woman has a Pap smear that shows a low-grade lesion (ASCUS or LGSIL), then 1 of the following should occur within 6 months of the initial Pap: repeated Pap smear or colposcopy.	C	D	L	3		Excluded			Excluded	
Smoking status should be documented at least once for all patients.	P	S	H	3	991	2633	45	596	596	94
Patients documented to be smokers should have their smoking status indicated on >50% of all office visits.	P	S	H	3	195	208	48	194	192	30
There should be documentation that advice to quit smoking was given to all smokers at least once during the course of a year.	P	T	E	1	195	208	29	194	192	56
All smokers identified as attempting to quit should be offered ≥1 additional smoking cessation counseling visit within 3 months.	P	T	O	1	68	76	41	89	89	39
All smokers attempting to quit who smoke >10 cigarettes/d should be offered pharmacotherapy, except in the presence of serious medical precautions.	P	T	M	1	36	45	13	68	69	20
All patients who receive a smoking cessation intervention should have their abstinence status documented within 4 weeks of the completion of treatment.	P	F	H	1	6	11	87	13	13	88

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Pregnant women not immune to rubella should receive postpartum immunization within 6 weeks.	A	T	I	1		Excluded			Excluded	
Prostate cancer										
Men with a new diagnosis of prostate cancer who have not had a serum PSA test in the previous 3 months should have serum PSA level checked within 1 month after diagnosis or before any treatment, whichever is first.	C	F	L	2	16	17	100	5	6	65
Men with a new diagnosis of prostate cancer who have a PSA level >10 mg/mL should be offered a radionuclide bone scan within 1 month or before initiation of any treatment, whichever is first.	C	F	L	2	3	3	54	2	2	62
Men >60 years of age with minimal prostate cancer (stage 0/A1) should not be offered any of the following treatments: bilateral orchiectomy, LHRH analogue, and antiandrogen.	C	T	M	2	1	1	100	1	1	100
Men <65 years of age with localized prostate cancer (stage I or II/A2 or B) and a Gleason score ≤6 should have all of the following treatment options discussed within 3 months of diagnosis (unless contraindicated or enrolled in a clinical trial with documentation of informed consent): radiation therapy, prostatectomy, watchful waiting.	C	T	E	2	2	1	50	1	1	0
Men with metastatic prostate cancer (stage IV/D) should be offered ≥1 of the following androgen blockade treatments within 3 months of staging: bilateral orchiectomy and/or LHRH analogue with or without antiandrogen.	C	T	M	1	1	2	100	0	0	NA
Men <75 years of age with localized prostate cancer (stage I or II/A2 or B) and a Gleason score ≥7 should be offered both of the following treatment options within 3 months of diagnosis (unless contraindicated or enrolled in a clinical trial with documentation of informed consent): radiation therapy or radical prostatectomy.	C	T	S	3	4	4	0	2	2	0

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Senile cataract										
Patients who report difficulty with corrected visual function should receive a complete eye examination that includes a visual acuity measurement within 3 months of the report.	A	D	P	2	36	46	96	4	4	72
Patients who report difficulty with corrected visual function should receive a complete eye examination that includes an intraocular pressure measurement within 3 months of the report.	A	D	P	2	36	46	93	4	4	33
Patients who report difficulty with corrected visual function should receive a complete eye examination that includes a pupil examination within 3 months of the report.	A	D	P	2	36	46	90	4	4	33
Patients who report difficulty with corrected visual function should receive a complete eye examination that includes a slit-lamp examination within 3 months of the report.	A	D	P	2	36	46	64	4	4	33
Patients who report difficulty with corrected visual function should receive a complete eye examination that includes a dilated fundus examination within 3 months of the report.	A	D	P	2	36	46	89	4	4	33
Patients should be offered refraction in the affected eye within 4 months before surgery, unless a previous refraction made no improvement in otherwise stable vision in the past 2 years.	A	T	O	3	19	23	84	0	0	NA
Patients with cataracts should be offered surgery if any of the following situations are present: phacolytic glaucoma, lens-related uveitis, disrupted anterior lens capsule in otherwise phakic eye.	A	T	S	3	4	6	27	0	0	NA
In the absence of a medical indication for cataract surgery, the ophthalmologist should offer cataract surgery only when the following conditions are met: the patient's visual functioning is impaired, there are either normal results on a fundus examination or a statement that the surgeon believes the patient's visual function would improve after the surgery, or a lens opacity exists.	A	T	S	2	7	9	100	0	0	NA

Indicator	Type†	Function‡	Modality§	Evidence‖	Patients in the Unweighted National Sample, *n*	Eligible Events in the Weighted National Sample, *n*	Mean Score for the Weighted National Sample	Patients in the Unweighted VHA Sample, *n*	Eligible Events in the Weighted VHA Sample, *n*	Mean Score for the Weighted VHA Sample
Within 48 hours of surgery, an optometrist or ophthalmologist should offer patients who have undergone cataract extraction a complete anterior-segment eye examination, including all of the following: visual acuity measurement, intraocular pressure measurement, and a slit-lamp examination.	A	F	P	2	22	28	75	0	0	NA
Patients who have undergone cataract extraction should have their visual function assessed within 90 days of surgery.	A	F	P	3	20	25	65	0	0	NA
STDs and vaginitis										
All women presenting with a chief symptom of vaginal discharge should have a history taken of the number of male sexual partners in the previous 6 months.	A	D	H	3		Excluded			Excluded	
All women presenting with a chief symptom of vaginal discharge should have a history taken, including the presence or absence of symptoms in sexual partners.	A	D	H	3		Excluded			Excluded	
All women presenting with a chief symptom of vaginal discharge should be asked about history of STDs.	A	D	H	3		Excluded			Excluded	
In women presenting with a chief symptom of vaginal discharge, the practitioner should perform a speculum examination at initial presentation to determine whether the source of the discharge is vaginal or cervical.	A	D	P	3		Excluded			Excluded	
If 3 of the following 4 criteria are met, bacterial vaginosis or *Gardnerella* vaginitis should be diagnosed: pH >4.5, positive whiff test, clue cells on wet mount, and/or thin homogeneous discharge.	A	D	L	3		Excluded			Excluded	
Bacterial vaginosis should be treated with metronidazole (orally or vaginally) or clindamycin (orally or vaginally) at diagnosis.	A	T	M	1		Excluded			Excluded	
Trichomonas vaginalis infection should treated with oral metronidazole if the patient does not have an allergy to metronidazole or is not in first trimester of pregnancy at diagnosis.	A	T	M	1		Excluded			Excluded	

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Nonrecurrent (<3 episodes in the previous year) yeast vaginitis should be treated with topical "azole" preparations (e.g., clotrimazole, butoconazole) or with fluconazole at diagnosis.	A	T	M	1		Excluded			Excluded	
Routine testing for gonorrhea (culture) and *Chlamydia trachomatis* (antigen detection) should be performed with the routine pelvic examination for women with multiple male sexual partners (>1 during the previous 6 months).	P	S	L	3		Excluded			Excluded	
Women treated for gonorrhea should also be treated for chlamydia at presentation.	A	T	M	2		Excluded			Excluded	
If a sexually active man presents with penile discharge, he should be tested for gonorrhea at presentation.	A	D	L	3	3	2	100	2	2	67
If a sexually active man presents with penile discharge, he should be tested for chlamydia at presentation.	A	D	L	3	3	2	18	2	2	0
Women with a diagnosis of PID should receive a speculum examination at diagnosis.	A	D	P	3		Excluded			Excluded	
Women with a diagnosis of PID should receive a bi-manual examination at diagnosis.	A	D	P	3		Excluded			Excluded	
If a patient is given a diagnosis of PID, ≥2 of the following signs should be present on physical examination: lower abdominal tenderness, adnexal tenderness, and/or cervical motion tenderness.	A	D	P	3		Excluded			Excluded	
Women with PID and any of the following conditions should receive parenteral antibiotics at diagnosis: presence or suspicion of pelvic abscess, pregnancy, HIV infection, uncontrolled nausea and vomiting, and lack of clinical improvement within 72 hours of beginning therapy.	A	T	M	3		Excluded			Excluded	
Duration of total antibiotic therapy for PID should be ≥10 days.	A	T	M	3		Excluded			Excluded	
Patients receiving outpatient therapy for PID should receive follow-up contact within 72 hours of diagnosis.	A	F	O	3		Excluded			Excluded	

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All patients with genital herpes should be counseled on reducing the risk for transmission to a sexual partner.	A	T	E	3	1	1	0	0	0	NA
If a patient presents with new-onset genital ulcers, then culturing or DFA for HSV should be offered at presentation.	A	D	L	3	4	3	0	0	0	NA
If a patient presents with new-onset genital ulcers, then a blood test for syphilis should be offered at presentation.	A	D	L	3	1	1	0	0	0	NA
Patients with primary and secondary syphilis who do not have a penicillin allergy should be treated with IM-administered benzathine penicillin G.	A	T	M	1	1	1	0	0	0	NA
Women with an initial diagnosis of HPV should have a speculum examination and a Pap smear (if not performed during the preceding year).	A	D	L	3		Excluded			Excluded	
If a patient presents with an initial infection of any STD, HIV testing should be discussed and offered at presentation.	A	S	L	3	5	4	0	1	1	0
If a patient presents with any STD, a nontreponemal test (VDRL or RPR) for syphilis should be performed at presentation.	A	S	L	3	1	1	0	0	0	NA
Sexual partners of patients with new diagnoses of gonorrhea, chlamydia, chancroid, and primary or secondary syphilis should be referred for treatment as soon as possible.	A	T	R	3	1	1	0	0	0	NA
UTI										
In patients presenting with dysuria, presence or absence of fever and flank pain should be elicited.	A	D	P	3	43	61	18	29	45	25
A urine culture should be obtained for patients who have dysuria and have had several (≥3) infections in the past year.	A	D	L	3	1	1	0	1	1	0
A urine culture should be obtained for patients who have dysuria and/or diabetes or immunocompromised state.	A	D	L	3	11	18	41	13	22	45
A urine culture should be obtained for patients who have dysuria and fever, chills, and/or flank pain.	A	D	L	3	13	11	47	11	12	49

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A urine culture should be obtained for patients who have dysuria and a suspected diagnosis of pyelonephritis.	A	D	L	3	3	3	52	2	3	100
A urine culture should be obtained for patients who have dysuria and any structural or functional anomalies of the urinary tract.	A	D	L	3	3	5	14	13	22	31
A urine culture should be obtained for patients who have dysuria and a relapse of symptoms, if no culture was previously obtained.	A	D	L	3	3	4	40	0	0	NA
A urine culture should be obtained for patients who have dysuria and have had a recent invasive procedure.	A	D	L	3	2	3	0	2	2	52
Treatment with antimicrobial agents for uncomplicated lower UTIs in women <65 years of age should not exceed 7 days.	A	T	M	3		Excluded			Excluded	
At least 10 days of antimicrobial therapy should be prescribed for a suspected upper UTI (pyelonephritis).	A	T	M	3	5	5	27	5	6	79
Regimens of ≥7 days should be used for patients with lower UTIs complicated by other diseases, such as diabetes.	A	T	M	3	0	0	NA	0	0	NA
Regimens of ≥7 days should be used for patients with lower UTIs complicated by anatomic disorders, such as a functional or structural anomaly of the urinary tract.	A	T	M	3	1	1	0	4	8	41
For upper UTI, a repeated culture should be obtained within 2 weeks of finishing treatment.	A	F	L	3	4	4	0	4	4	0
Cesarean section										
For women who have delivered by cesarean section, the type of uterine incision used (transverse lower segment or vertical) should be noted in the medical record.	A	D	H	3		Excluded			Excluded	
For women with a cesarean delivery in a previous pregnancy, the number and type of previous uterine scars should be noted in the current delivery medical record. (If this information is not available, an attempt to locate it should be documented in the chart.)	A	D	H	2		Excluded			Excluded	

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Women with 1 previous transverse lower-segment cesarean should undergo a trial of labor unless another indication for cesarean delivery is present (including refusal of a trial of labor).	A	T	O	2		Excluded			Excluded	
Women with a previous classic vertical cesarean should have a scheduled repeated cesarean delivery.	A	T	S	2		Excluded			Excluded	
When failure to progress in labor is diagnosed, a woman should be in the active phase of labor.	A	D	P	3		Excluded			Excluded	
Before a cesarean delivery is used to treat failure to progress in labor, ≥2 of the following therapeutic interventions should have been tried after failure to progress was diagnosed: amniotomy, oxytocin, and/or ambulation.	A	T	O	3		Excluded			Excluded	
Women who give birth by cesarean should receive ≥1 dose of antibiotic prophylaxis.	A	T	M	1		Excluded			Excluded	
Prophylactic antibiotic regimens should include 1 of the following: broad-spectrum penicillins, broad-spectrum cephalosporins, or metronidazole.	A	T	M	1		Excluded			Excluded	
Aminoglycosides should not be used, alone or in combination, for antibiotic prophylaxis.	A	T	M	3		Excluded			Excluded	
Prenatal care										
The first prenatal visit should occur in the first trimester.	A	T	O	2		Excluded			Excluded	
The physician should accurately determine gestational age by using any 1 of the following: ultrasonography in the first or second trimester or reliable last menstrual period and size within 2 weeks indicated by dates in the first trimester. Alternately, gestational age can be determined by no first-trimester examination but reliable last menstrual period and 2 of the following: size within 2 weeks of dates in second trimester, quickening by 20 weeks, or fetal heart tones by fetoscope before 20 weeks.	A	D	L	3		Excluded			Excluded	
Pregnant women should be screened for anemia at the first prenatal visit.	A	S	L	3		Excluded			Excluded	

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Pregnant women should be rescreened for anemia after 24 weeks.	A	S	L	3		Excluded			Excluded	
A smoking history should be obtained at the first prenatal visit.	A	S	H	1		Excluded			Excluded	
An alcohol history should be obtained at the first prenatal visit.	A	S	H	2		Excluded			Excluded	
A drug history should be obtained at the first prenatal visit.	A	S	H	3		Excluded			Excluded	
A history should be taken at the first prenatal visit to elicit risk factors for STDs and HBV infection.	A	S	H	3		Excluded			Excluded	
Women should receive a urine screening test at the first prenatal visit.	A	S	L	1		Excluded			Excluded	
Women should receive a serologic test for rubella immunity before delivery.	A	S	L	2		Excluded			Excluded	
Women should be screened for HBsAg before delivery.	A	S	L	2		Excluded			Excluded	
A nontreponemal screening test (e.g., VDRL) should be performed in women at the first prenatal visit.	A	S	L	2		Excluded			Excluded	
A cervical gonorrhea culture should be performed in women at the first prenatal visit.	A	S	L	3		Excluded			Excluded	
Women at high risk (adolescents and women who are unmarried, have multiple sex partners, have low socioeconomic status, or have diagnosed STDs) should receive a cervical chlamydia culture or antigen detection at the first prenatal visit.	A	S	L	3		Excluded			Excluded	
Pregnant women should be offered HIV testing at the first prenatal visit.	A	S	L	1		Excluded			Excluded	
Women should be offered AFP testing; this should be performed between 15 and 20 weeks.	A	S	L	2		Excluded			Excluded	
Women who are African American or have a family history of sickle-cell disease should be offered screening at the first prenatal visit, if status is unknown.	A	S	L	2		Excluded			Excluded	
For women with the sickle-cell trait, the baby's father should be offered screening.	A	S	L	2		Excluded			Excluded	
Women should receive an Rh factor and antibody screening test at the first prenatal visit.	A	S	L	2		Excluded			Excluded	

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The symphysis–fundal height should be measured at each visit from 20 to 32 weeks.	A	S	P	3		Excluded			Excluded	
Blood pressure measurements should be taken at each visit.	A	S	P	2		Excluded			Excluded	
A 1-hour, 50-g glucose challenge test should be performed on women with risk factors at 24 to 28 weeks.	A	S	L	1		Excluded			Excluded	
Women with an abnormal serum AFP level should have ultrasonography to evaluate gestational age and possible multiple gestation.	A	D	L	2		Excluded			Excluded	
Women with the sickle-cell trait should be offered either amniocentesis or chorionic villus sampling, unless the baby's father is known to be negative for the sickle-cell trait.	A	D	L	2		Excluded			Excluded	
Women whose symphysis–fundal height is 4 cm less than indicated by gestational age between 20 to 32 weeks should have ultrasonography.	A	D	L	3		Excluded			Excluded	
In women without a previous diagnosis of chronic hypertension who have elevated blood pressure (SBP >140 mm Hg or DBP >90 mm Hg at ≥20 weeks, or >30–mm Hg increase in SBP or >15–mm Hg increase in DBP), proteinuria and peripheral edema should be assessed.	A	D	L	2		Excluded			Excluded	
In women without a previous diagnosis of chronic hypertension who have elevated blood pressure and either proteinuria (1+ or more) or edema (>trace), PIH should be diagnosed.	A	D	L	2		Excluded			Excluded	
Pregnant women with abnormal results on glucose challenge tests (≥7.8 mmol/L [≥140 mg/dL]) should have a 3-hour plasma glucose tolerance test performed.	A	D	L	1		Excluded			Excluded	
Pregnant women identified as smokers should receive counseling from their physician to stop smoking.	A	T	E	1		Excluded			Excluded	
Pregnant women who indicate they use any amount of alcohol should be counseled to eliminate alcohol consumption during pregnancy and should be referred for treatment if appropriate.	A	T	E	2		Excluded			Excluded	

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Pregnant women who indicate they use drugs should be counseled by their physician to cease use during pregnancy and should be referred for treatment if appropriate.	A	T	E	2		Excluded			Excluded	
Pregnant women with positive cultures (>100 000 bacteria/mL) should receive an appropriate antibiotic.	A	T	M	1		Excluded			Excluded	
Pregnant women with abnormal serum AFP levels for gestational age and normal results on ultrasonography should be offered amniocentesis counseling.	A	T	L	2		Excluded			Excluded	
Labor should be induced when monitoring shows nonreassuring fetal status or oligohydramnios.	A	T	M	3		Excluded			Excluded	
If PIH is diagnosed and the patient is not hospitalized, bed rest should be recommended and a return visit should occur within 1 week.	A	T	O	2		Excluded			Excluded	
If PIH is diagnosed and pregnancy is at term (≥37 weeks), labor should be induced or delivery by cesarean section should take place.	A	T	S	2		Excluded			Excluded	
Pregnant women with abnormal results on 3-hour glucose tolerance tests should receive dietary counseling and have glucose monitoring.	A	T	L	1		Excluded			Excluded	
An oral agent should not be used in diabetic pregnant women.	A	T	M	1		Excluded			Excluded	
Women treated for positive cultures should receive a post-treatment follow-up culture within 1 month of completing treatment.	A	F	L	1		Excluded			Excluded	

* Excluded indicators were excluded from analysis a priori because they were inapplicable to male patients or because of implementation problems (required survey data unavailable in VHA data set or indicator called for ≥1 visit and sampling requires ≥2 visits). 5-FU = 5-fluorouracil; 5-HT = 5-hydroxytryptamine; AA = Alcoholics Anonymous; ACE = angiotensin-converting enzyme inhibitor; ACL = anterior cruciate ligament; AFP = α-fetoprotein; APSAC = anisoylated plasminogen streptokinase activator complex; ASCUS = atypical squamous cell of undetermined significance; AUDIT = Alcohol Use Disorders Identification Test; BUN = blood urea nitrogen; CAD = coronary artery disease; 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?; COPD = chronic obstructive pulmonary disease; CT = computed tomography; DBP = diastolic blood pressure; DFA = direct fluorescent antibody; ECG = electrocardiography; FOBT = fecal occult blood test; FNA = fine-needle aspiration; HBsAg = hepatitis B surface antigen; HBV = hepatitis B virus; HDL = high density lipoprotein; HPV = human papillomavirus; HRT = hormone replacement therapy; HSV = herpes simplex virus; IM = intramuscular; INR = international normalized ratio; IV = intravenous; LDL = low-density lipoprotein; LGSIL = low-grade squamous intraepithelial lesion; LHRH = luteinizing hormone–releasing hormone; LMWH = low-molecular-weight heparin; LVEF = left ventricular ejection fraction; MAST = Michigan Alcoholism Screening Test; MDI = metered-dose inhaler; MI = myocardial infarction; MRI = magnetic resonance imaging; NA = not applicable; NSAID = nonsteroidal anti-inflammatory drug; Pap = Papanicolaou; P_{CO_2} = partial pressure of carbon dioxide; PEF = peak expiratory flow; PID = pelvic inflammatory disease; PIH = pregnancy-induced hypertension; PSA = prostate-specific antigen; PTCA = percutaneous transluminal coronary angioplasty; RPR = rapid plasma reagent; SBP = systolic blood pressure; STD = sexually transmitted disease; TIA = transient ischemic attack; UTI = urinary tract infection; VDRL = Venereal Disease Research Laboratory; WBC = white blood count.
† A = acute; C = chronic; P = preventive.
‡ D = diagnosis; F = follow-up; S = screening; T = treatment.
§ C = counseling/education; E = encounter or other intervention; H = history; I = immunization; L = laboratory/radiology; M = medication; P = physical examination.
‖ 1 = randomized, controlled trial; 2 = nonrandomized controlled trial (e.g., case–control); 3 = observational studies or expert opinion.