JAMA Internal Medicine | **Original Investigation**

The Quality of Outpatient Care Delivered to Adults in the United States, 2002 to 2013

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IMPORTANCE Widespread deficits in the quality of US health care were described over a decade ago. Since then, local, regional, and national efforts have sought to improve quality and patient experience, but there is incomplete information about whether such efforts have been successful.

OBJECTIVE To measure changes in outpatient quality and patient experience in the United States from 2002 to 2013.

DESIGN, SETTING, AND PARTICIPANTS We analyzed temporal trends from 2002 to 2013 using quality measures constructed from the Medical Expenditure Panel Survey (MEPS), a nationally representative annual survey of the US population that collects data from individual respondents as well as respondents' clinicians, hospitals, pharmacies, and employers. Participants were noninstitutionalized US adults 18 years or older (range, 20 679-26 509 individuals each year).

MEASURES Outpatient quality measures were compiled through a structured review of prior studies and measures endorsed by national organizations. Nine clinical quality composites (5 "underuse" composites, eg, recommended medical treatment; 4 "overuse" composites, eg, avoidance of inappropriate imaging) based on 39 quality measures; an overall patient experience rating; and 2 patient experience composites (physician communication and access) based on 6 measures.

RESULTS From 2002 to 2013 (MEPS sample size, 20 679-26 509), 4 clinical quality composites improved: recommended medical treatment (from 36% to 42%; $P < .01$), recommended counseling (from 43% to 50%; $P < .01$), recommended cancer screening (from 73% to 75%; $P < .01$), and avoidance of inappropriate cancer screening (from 47% to 51%; $P = .02$). Two clinical quality composites worsened: avoidance of inappropriate medical treatments (from 92% to 89%) and avoidance of inappropriate antibiotic use (from 50% to 44%; $P < .01$ for both comparisons). Three clinical quality measures were unchanged: recommended diagnostic and preventive testing (76%), recommended diabetes care (68%), and inappropriate imaging avoidance (90%). The proportion of participants highly rating their care experience improved for overall care (from 72% to 77%), physician communication (from 55% to 63%), and access to care (from 48% to 58%; $P < .01$ for all comparisons).

CONCLUSIONS AND RELEVANCE Despite more than a decade of efforts, the clinical quality of outpatient care delivered to American adults has not consistently improved. Patient experience has improved. Deficits in care continue to pose serious hazards to the health of the American public.

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Over a decade ago, McGlynn and colleagues[1] reported that adults in the United States received just over half of recommended health care services. Since then, there have been local, regional, and national efforts to improve the quality of health care, including expanded quality measurement and public reporting programs[2,3]; increased adoption of pay-for-performance[4]; increased adoption of value-based purchasing by private and public payers; broad encouragement of electronic health record use[5]; improved coverage for recommended services[6]; and expansion of patient-centered medical homes.[7] In recent years, these efforts have been complemented by an increasing focus on overuse through programs such as the American Board of Internal Medicine Foundation's Choosing Wisely initiative[8] and increasing attention to patient-reported outcomes.[9-11]

Despite these efforts, there are few national data to gauge whether the quality of care in the United States is improving. Studies to date have been limited by reliance on a small number of quality measures,[12,13] attention to specific diseases,[14-17] modest measurement of overuse,[18] or reduced generalizability by focusing on Medicare[19-22] or only those with a usual source of care.[1,23] Most have yielded only year-long snapshots of quality, precluding a broad appraisal of change.[24] Some harbor cautious optimism that care is improving, while others express frustration at the perceived slow pace of improvement.[25,26]

To determine whether efforts to improve outpatient quality have been successful, we measured 46 indicators of the quality of outpatient care delivered to adults in the United States over the past decade in the areas of recommended care, inappropriate care, and patient experience. Evaluation of care quality performance may enable policymakers, clinicians, and health system leaders to target key areas for attention and improvement.

Methods

The Harvard Medical School institutional review board determined this study to not be human subject research and therefore exempt from approval.

Data Source and Study Population

We analyzed data from the 2002 to 2013 Medical Expenditure Panel Survey (MEPS), a nationally representative annual survey of repeated cross sections of the noninstitutionalized United States civilian population.[27] The MEPS sample is drawn from respondents to the annual National Health Interview Survey. The MEPS uses a complex survey design that delivers English or Spanish computer-assisted personal interviews to collect detailed data on demographic characteristics, health conditions, health status, medical services utilization, medications, cost, source of payments, health insurance coverage, income, employment, experience with care, and access to care. Overall annual response rates ranged from 50% to 65% (mean, 59%).

The MEPS then supplements self-reported information by contacting respondents' clinicians (mean response rate, 86%), hospitals (91%), pharmacies (75%), and employers (86%). Of those contacted, the MEPS records any and all encounters with

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Key Points

Question How has the quality of outpatient care delivered to adults in the United States changed from 2002 to 2013?

Findings Analyses of a nationally representative cross-sectional survey show that the quality of outpatient care inconsistently improved. From 2002 to 2013, 4 clinical quality composites improved, 2 worsened, and 3 were unchanged. Patient experience improved. Most composites continued to demonstrate disappointingly low absolute rates, even when improvement occurred.

Meaning Deficits in care continue to pose serious hazards to the health of the American public.

these entities. Clinicians specify details regarding office visits (eg, diagnostic tests, cost); hospitals specify admissions (eg, cost); pharmacies specify individual medications dispensed (eg, dose, formulation, cost); and employers specify details about insurance coverage. For each encounter, the clinician, hospital, or pharmacy has the option to complete a computer-assisted telephone interview (CATI) or can send medical and billing records that are abstracted via the same CATI procedure. For example, if a patient reported visiting a physician for back pain and receiving an opioid prescription, the physician would corroborate that a medication was prescribed, and the pharmacy would corroborate the formulation, dose, and frequency of the opioid prescription. In cases of discrepancy between respondents' self-report and other sources, the MEPS use the other sources, although the MEPS does not reveal how frequently this occurs.

The MEPS includes 2 additional mail-back surveys: the adult self-administered questionnaire (SAQ) and the diabetes care survey (DCS). The SAQ, administered to all adult respondents, includes items from the Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey, the 12-item Short Form (SF-12), and additional items measuring respondents' attitudes about health care (annual response rate range, 91%-94%). The DCS, administered only to respondents with self-reported diabetes, includes items related to care for diabetes (annual response rate range, 88%-97%).

We restricted our analyses to the adult population ages 18 years or older. Sample sizes ranged from 20 679 to 26 509 respondents per year.

Clinical Quality Measures

We reviewed all Healthcare Effectiveness Data and Information Set (HEDIS) measures[23]; all ambulatory process measures endorsed by the National Quality Forum (representing measures from numerous advisory/governing bodies)[28]; all ambulatory measures from McGlynn and colleagues[1] (based on more than expert opinion and not related to cancer treatment or pregnancy); all ambulatory process measures in the National Healthcare Quality and Disparities Report[29]; all recommendations of the US Preventive Services Task Force (USPSTF)[30]; and all measures from work on overuse by Schwartz et al,[20,31] Colla et al,[32] and Choosing Wisely[33] (eAppendix in the Supplement).

We excluded duplicate measures and measures that could not be accurately and reliably constructed and assessed using the MEPS. We also excluded a small number of measures that were controversial (n = 5), such as prostate cancer screening (USPSTF grade I ["insufficient evidence"] for most of our study period)[34,35] or that had major changes over time (n = 22), such as statin use for patients with diabetes (which became an official recommendation in 2013)[36] or avoiding β-blocker use for patients with concomitant airway disease.[37] For measures with only minor changes over time (n = 4), we used consistent measure definitions to ensure valid comparison. For example, recommendations for influenza vaccination changed between 2002 and 2013.[38,39] However, the recommendation to vaccinate persons 50 years or older has remained consistent; thus, our measure examines vaccination only among persons 50 years or older. Similarly, to reconcile most breast cancer screening recommendations, we applied less stringent criteria over the time period: screening once every 2 years for women 50 to 74 years old. Thus, our measures are broadly applicable to care delivered over time and currently.

After applying the exclusion criteria, we evaluated performance over time on 39 clinical quality measures, including 25 underuse measures and 14 overuse measures (**Table 1**; eAppendix in the Supplement).

From these measures, we constructed 5 clinically meaningful underuse composites (eg, recommended cancer screening), where delivery of the service is likely of benefit to the patient, and 4 overuse composites (eg, avoidance of imaging in specific clinical situations), where delivery of the service is considered either inappropriate or of little to no benefit (Table 1). To calculate performance for each measure, we first identified those respondents who were eligible for the measure (eg, those with diabetes) and then whether or not they received the particular care (eg, eye examination). To calculate composites, we divided all instances in which recommended care was delivered (for underuse measures) or avoided (for overuse measures) by the number of times participants were eligible for care in the category, as others have done.[1] Theoretically, composites could range from 0 to 100%.

Patient Experience Measures
We evaluated MEPS measures of patient experience drawn from the CAHPS questionnaire that referred to a patient's overall health care experience in the past year (Table 1). A global rating measure asked about patient experience with all health providers (0, "worst health care possible," to 10, "best health care possible"). The physician communication composite asked 4 items (eg, "How often did the physician spend enough time with you?"), and the access to care composite included 2 items (eg, "How often did you get a medical appointment as soon as wanted?"). Responses for each item were coded from "never" (1) to "always" (4). To better discriminate changes over time, we assessed high ratings in overall care, physician communication, and access to care, similar to HEDIS analyses.[23] We dichotomized all measures such that a positive response included 8, 9, or 10 for the items scored from 0 to 10 and 4 for the items scored from 1 to 4 (Table 1). As a sensitivity analy-

sis, we also rescaled 1 to 4 measures to a 0 to 10 scale, as others have done (eFigure in the Supplement).[68] We calculated each composite by first computing the mean for each respondent and then taking the mean for all respondents.

Statistical Analysis
In all analyses we accounted for the complex design of the MEPS, applying survey estimation weights, primary sampling unit clusters, and sampling strata to allow for national estimates adjusted for nonresponse, as recommended by the Agency for Healthcare Research and Quality.[69,70] We present weighted percentages. To examine whether performance was improved at the end of the study period compared with the beginning, we compared composites in 2002 and 2013 with χ^2 tests adjusting for the complex survey design.[71] We performed all analyses with SAS statistical software (version 9.4). We considered 2-sided $P < .05$ to be significant.

Results

From 2002 to 2013, the US adult population aged (mean age increased from 45 to 47 years; $P < .01$), became less white (from 71% to 65%; $P < .01$), more Hispanic (from 12% to 15%; $P < .01$), more likely to have graduated college (from 15% to 18%; $P < .01$), and less likely to smoke cigarettes (from 21% to 16%; $P < .01$) (**Table 2**; eTable 1 in the Supplement). There were decreases in private insurance coverage (from 74% to 66%; $P < .01$), having a usual source of care (from 77% to 74%; $P < .01$), and employment (from 72% to 69%; $P < .01$). Rates of chronic diseases increased. In 2002, 8% of Americans had 3 or more chronic diseases compared with 18% in 2013 ($P < .01$). No changes occurred in perceived health status (27% reported their overall health as excellent) or activities of daily living.

Provision of Recommended Care
Rates of recommended medical treatment delivery improved from 36% in 2002 to 42% in 2013 ($P < .01$) (**Table 3**; **Figure**, A). The most pronounced improvements in this composite were improvements in the use of β-blockers for heart failure (41% to 65%; $P < .01$) and statins for stroke (34% to 57%; $P < .01$). Declines occurred in the use of an angiotensin-converting enzyme inhibitor or angiotensin receptor blocker (ACEi/ARB) in patients with concomitant diabetes and hypertension (from 64% to 58%; $P < .01$) and controller medications among patients with poorly controlled asthma (from 71% to 59%; $P < .01$). Rates of recommended counseling delivery improved from 43% in 2002 to 50% in 2013 ($P < .01$), driven most by smoking cessation counseling (from 49% to 61%; $P < .01$). Recommended cancer screening improved minimally (from 73% to 75%; $P < .01$), with marked improvement in colorectal cancer screening (from 48% to 63%; $P < .01$), offset by decreasing rates of breast cancer screening (from 81% to 77%; $P < .01$) and cervical cancer screening (from 90% to 86%; $P < .01$).

Other underuse composites (diagnostic and preventive testing [76%; $P = .05$] and diabetes care [68%; $P = .21$]) were unchanged (Table 3; Figure, A).

Table 1. Clinical and Patient Experience Quality Measures

Measure	MEPS Data Source[a]	Reference[b]	Numerator	Denominator[c]
Recommended Clinical Care				
Recommended cancer screening				
Cervical cancer screening	SR	Vesco et al[40]	Papanicolaou smear within past 3 y	Women, age 21-65 y, no hysterectomy
Breast cancer screening	SR	Siu[41]	Mammogram within past 2 y	Women, age 50-74 y
Colorectal cancer screening	SR	Whitlock et al[42]	Colonoscopy within past 10 y, sigmoidoscopy within past 5 y, or hemoccult test within past year[d]	Age 50-75 y
Recommended diagnostic and preventive testing				
Dental care	SR	Giannobile et al[43]	Dental visit within 1 y	All
Blood pressure measurement	SR	Piper et al[44]	Blood pressure measurement within 2 y	All
Cholesterol measurement	SR	Helfand and Carson[45]	Cholesterol measurement within any interval	Age ≥35 y
Influenza vaccine	SR	Grohskopf et al[46]	Influenza vaccine within 1 y	Age ≥50 y
Recommended diabetes care				
HgA$_{1c}$ measurement	DCS	American Diabetes Association[47]	HgA$_{1c}$ measurement at least twice yearly	All with diabetes
Foot examination	DCS	American Diabetes Association[47]	Foot examination within 1 y	All with diabetes
Eye examination	DCS	American Diabetes Association[47]	Retinal examination within 1 y	All with diabetes
Recommended counseling				
Weight loss counseling	SR	US Preventive Services Task Force[48]	Within 1 y	All overweight/obese
Exercise counseling	SR	US Preventive Services Task Force[48]	Within 1 y	All overweight/obese
Smoking cessation counseling	SR	Patnode et al[49]	Within 1 y	All smokers
Recommended medical treatment				
Anticoagulation for atrial fibrillation	SR, C, P	January et al[50]	Anticoagulant prescription	Atrial fibrillation
ACEi/ARB for heart failure	SR, C, P	Yancy et al[51]	ACEi/ARB prescription	Heart failure
β-Blocker for heart failure	SR, C, P	Yancy et al[51]	β-Blocker prescription	Heart failure
Salicylates and/or platelet aggregation inhibitors for CAD/MI	SR, C, P	Fihn et al[52]	Salicylates and/or platelet aggregation inhibitor prescription	CAD/MI
β-Blocker for CAD/MI	SR, C, P	Fihn et al[52]	β-Blocker prescription	CAD/MI
Statin for CAD/MI	SR, C, P	Fihn et al[52]	Statin prescription	CAD/MI
Statin for dyslipidemia	SR, C, P	NCEP Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults[53]	Statin prescription	Dyslipidemia
ACEi/ARB for diabetes & hypertension	SR, C, P	American Diabetes Association[47]	ACEi/ARB prescription	Diabetes + hypertension
Statin for CVA	SR, C, P	Kernan et al[54]	Statin prescription	CVA
Antiplatelet for CVA	SR, C, P	Kernan et al[54]	Antiplatelet prescription	CVA
Controller medication for poorly controlled asthma	SR, C, P	Global Strategy for Asthma Management and Prevention[55]	ICS or ICS+LABA	Asthma + systemic steroid in past year
Controller medication for poorly controlled COPD	SR, C, P	Global Strategy for Diagnosis, Management, and Prevention of COPD[56]	ICS+LABA or LAMA+LABA or ICS+LAMA+LABA	COPD + systemic steroid in past year
Inappropriate Clinical Care Avoidance				
Inappropriate cancer screening avoidance				
Cervical cancer screening in older adults	SR	Vesco et al[40]	Papanicolaou smear	Women, age >65 y
Colorectal cancer screening in older adults	SR	Whitlock et al[42]	Colonoscopy, sigmoidoscopy, or hemoccult test[d]	Age >75 y
Prostate cancer screening in older adults	SR	Lin et al[57]	Prostate-specific antigen test	Men, age >75 y
Inappropriate antibiotic use avoidance				
Antibiotics for acute bronchitis	SR, C, P	National Committee for Quality Assurance,[23] Cooper et al,[58] Harris et al[59]	Antibiotic prescription during visit	Acute bronchitis visit
Antibiotics for acute URI	SR, C, P	Cooper et al,[58] Harris et al[59]	Antibiotic prescription during visit	Acute URI visit
Antibiotics for influenza	SR, C, P	Cooper et al[58]	Antibiotic prescription during visit	Influenza visit

(continued)

Table 1. Clinical and Patient Experience Quality Measures (continued)

Measure	MEPS Data Source[a]	Reference[b]	Numerator	Denominator[c]
Inappropriate medical treatment avoidance				
Inappropriate medications in older adults	SR, P	American Geriatrics Society 2012 Beers Criteria Update Expert Panel[60]	Anxiolytic, sedative, or hypnotic prescription	Age >65 y
Benzodiazepine for depression	SR, P	Mitchell et al[61]	Benzodiazepine prescription	Depression
Opioid for headache	SR, C, P	American Headache Society[62]	Opioid prescription during visit	Headache visit
Opioid for back pain	SR, C, P	American Society of Anesthesiologists[63]	Opioid prescription during visit	Back pain visit
NSAID use for hypertension, heart failure, or kidney disease	SR, C, P	American Society of Nephrology[64]	NSAID prescription	Hypertension, heart failure, or kidney disease
Inappropriate imaging avoidance				
MRI/CT for back pain	C	Chou et al[65]	MRI/CT within 1 mo of visit[e]	Back pain visit
Radiograph for back pain	C	Chou et al[65]	Radiograph within 1 mo of visit[e]	Back pain visit
MRI/CT for headache	C	American College of Radiology[66]	MRI/CT during visit	Headache visit
Patient Experience				
Global rating of health care				
Global rating of health care (0 = "worst" to 10 = "best")	SAQ	CAHPS	Top-coded 8, 9, or 10[f]	All
Physician communication				
Physician listened to you (1 = "never" to 4 = "always")	SAQ	CAHPS	Top-coded 4[f]	All
Physician explained so you understood (1-4)	SAQ	CAHPS	Top-coded 4[f]	All
Physician showed respect (1-4)	SAQ	CAHPS	Top-coded 4[f]	All
Physician spent enough time with you (1-4)	SAQ	CAHPS	Top-coded 4[f]	All
Access to care				
Got care when ill or injured as soon as wanted (1-4)	SAQ	CAHPS	Top-coded 4[f]	All
Got medical appointment as soon as wanted (1-4)	SAQ	CAHPS	Top-coded 4[f]	All

Abbreviations: ACEi, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; C, clinician; CAD/MI, coronary artery disease/myocardial infarction; CAHPS, Consumer Assessment of Healthcare Providers and Systems; COPD, chronic obstructive pulmonary disease; CT, computed tomography; CVA, cerebral vascular accident; DCS, diabetes care survey; HgA$_{1c}$, hemoglobin A$_{1c}$; ICS, inhaled corticosteroid; LABA, long-acting β-agonist; LAMA, long-acting muscarinic antagonist; MEPS, Medical Expenditure Panel Survey; MRI, magnetic resonance imaging; NCEP, National Cholesterol Education Program; NSAID, nonsteroidal anti-inflammatory drug; P, pharmacy; SAQ, self-administered questionnaire; SR, self-report of household; URI, upper respiratory infection.

[a] The MEPS combines multiple data sources (see Methods for details): clinician; diabetes care survey; pharmacy; self-administered questionnaire; self-report of household. Please note that the DCS and SAQ are self-report surveys.

[b] Where possible, these references refer to a detailed discussion of the clinical area that supports each measure. The National Quality Forum and other organizations have adopted these discussions to a measure definition with numerators and denominators (eAppendix in the Supplement for further details). Also, because clinical recommendations change over time, we used consistent measure definitions to ensure valid comparison (see Methods for details).

[c] See eAppendix in the Supplement for details and sensitivity analyses regarding identification of visit types.

[d] From 2009 to 2013, we were able to extract the numerator as given. From 2002 to 2008, we were not able to distinguish between colonoscopy and sigmoidoscopy, nor between a 5-year or 10-year screening interval, nor between screening vs diagnostic procedure. The change in phrasing of these questions likely follows the change in recommendations.[67]

[e] Most measures recommend a 6-week delay, but the MEPS only consistently separates visits by month.

[f] "Top-coded" indicates that a response was dichotomized as follows: response of 4 on a Likert scale of 1-4 or responses of 8, 9, or 10 on a Likert scale of 1-10 were counted as positive. For comparison, we present linear measures rescaled 0 to 10 in eFigure in the Supplement.

Avoidance of Inappropriate Care

Avoidance of inappropriate cancer screening improved from 47% in 2002 to 51% in 2013 (P = .02) (Table 3; Figure, B). Avoidance of inappropriate cervical cancer screening in women older than 65 years improved from 38% to 51% (P < .01), but avoidance of inappropriate colorectal cancer screening in those older than 75 years worsened from 70% to 61% (P < .01).

Avoidance of inappropriate antibiotic prescribing worsened from 50% to 44% (P < .01), as did avoidance of inappropriate medical treatments (from 92% to 89%; P < .01). For instance, avoidance of inappropriate medications in older adults (from 93% to 91%; P < .01), opioids for back pain (from 98% to 95%; P < .01), and nonsteroidal anti-inflammatory drugs in hypertension, heart failure, or kidney disease (from 88% to 85%; P < .01) all worsened. Avoidance of inappropriate imaging was unchanged (90%; P = .64).

Patient Experience

The percentage of respondents rating their global experience with care an 8, 9, or 10 out of 10 increased from 72% in 2002 to 77% in 2013 (P < .01; Table 3; Figure, C). On a 0 to 10 scale, global rating improved from 8.1 in 2002 to 8.3 in 2013 (P < .01;

Table 2. Characteristics of the Medical Expenditure Panel Survey Participants, 2002–2013

| Characteristic[a] | % (95% CI)[b] | | |
	2002 (n = 26 043)	2007 (n = 20 679)	2013 (n = 24 968)
Age, mean (95% CI), y	45.4 (45.0-45.8)	46.1 (45.7-46.5)	47.0 (46.6-47.5)
Female	51.9 (51.4-52.5)	51.5 (50.9-52.1)	51.7 (51.1-52.3)
Race/ethnicity			
Non-Hispanic white	70.7 (69.1-72.2)	68.5 (66.9-70.0)	65.3 (63.3-67.3)
Hispanic	12.2 (11.0-13.3)	13.5 (12.4-14.7)	15.2 (13.6-16.8)
Non-Hispanic black	11.1 (10.1-12.1)	11.4 (10.4-12.3)	11.6 (10.2-12.9)
Non-Hispanic Asian	4.1 (3.5-4.7)	4.6 (3.9-5.2)	5.5 (4.7-6.3)
Non-Hispanic other or multiple	1.9 (1.5-2.3)	2.1 (1.7-2.4)	2.5 (2.0-2.9)
Married/partnered	55.9 (54.9-57.0)	54.6 (53.5-55.6)	52.4 (51.1-53.7)
Education			
<High school	21.4 (20.6-22.3)	18.4 (17.6-19.2)	14.7 (13.9-15.6)
High school/GED/Some college	54.5 (53.6-55.4)	54.3 (53.3-55.3)	57.1 (55.8-58.3)
Bachelor's degree	14.6 (13.9-15.3)	16.7 (15.9-17.5)	17.6 (16.6-18.5)
>Bachelor's	9.4 (8.8-10.0)	10.6 (9.9-11.3)	10.6 (9.9-11.4)
Health insurance coverage			
Any private	73.5 (72.4-74.6)	69.6 (68.5-70.6)	66.2 (64.7-67.7)
Public only	13.4 (12.6-14.2)	15.4 (14.6-16.1)	18.4 (17.4-19.4)
Uninsured	13.1 (12.4-13.9)	15.1 (14.3-15.8)	15.3 (14.3-16.4)
Perceived health status			
Excellent	26.5 (25.6-27.4)	27.0 (26-27.9)	27.1 (26.1-28.1)
Very good	33.3 (32.5-34.2)	32.4 (31.6-33.3)	33.3 (32.3-34.3)
Good	27.0 (26.2-27.8)	27.1 (26.3-28)	26.7 (25.8-27.6)
Fair	9.6 (9.1-10.1)	10.2 (9.6-10.7)	9.8 (9.2-10.4)
Poor	3.5 (3.2-3.9)	3.3 (3-3.6.0)	3.1 (2.8-3.4)
Employed	72.3 (71.4-73.2)	72.6 (71.7-73.5)	69.0 (68.0-70.1)
Currently smoke	20.6 (19.9-21.3)	18.4 (17.6-19.3)	15.6 (14.7-16.4)
Family income <100% of federal poverty line	10.9 (10.2-11.6)	11 (10.3-11.7)	13.0 (12.2-13.9)
Chronic diseases[c]			
0	59.5 (58.6-60.5)	54.7 (53.7-55.7)	51.4 (50.3-52.4)
1	22.2 (21.6-22.8)	20.2 (19.5-20.9)	19.1 (18.4-19.8)
2	10.2 (9.8-10.7)	11.5 (11.0-12.0)	11.9 (11.2-12.5)
≥3	8.0 (7.5-8.6)	13.7 (13.0-14.3)	17.7 (17.0-18.4)
BMI, mean (95% CI)	27.0 (26.9-27.1)	27.4 (27.3-27.5)	27.9 (27.7-28.0)

Abbreviation: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared).

[a] Additional characteristics available in eTable 1 in the Supplement. All values are self-reported.

[b] Percentages are weighted to be nationally representative and account for nonresponse. Percentages may not sum to 100% due to rounding.

[c] Of the 20 conditions considered chronic by the Health and Human Services Office of the Assistant Secretary of Health.[72] More detail available in eTable 1 in the Supplement.

eFigure in the Supplement). The percentage reporting a highly positive experience (a 4 out of 4) related to physician communication improved from 55% in 2002 to 63% in 2013 (P < .01). Respondents' rating of physician communication improved from 8.1 out of 10 in 2002 to 8.5 out of 10 in 2013 (P < .01). Respondents increasingly noted their physician "always" spent enough time with them (46% to 55%; P < .01). The percentage who "always" had access to care (a 4 out of 4) increased from 48% in 2002 to 58% in 2013 (P < .01). On a scale of 0 to 10, access to care improved from 7.6 in 2002 to 8.0 in 2013 (P < .01).

Discussion

Despite local, regional, and national efforts to improve care, we found inconsistent improvements in the quality of outpatient care delivered to adults over the past decade in this large, nationally representative study. Although there were areas of improvement, including provision of recommended medical treatments, recommended counseling, and avoidance of inappropriate cancer screening, there were also areas of decline, including avoidance of inappropriate antibiotic prescribing and avoidance of

Table 3. The Quality of Outpatient Care Delivered to Adults in the United States, 2002–2013

Measure or Composite	2002 (n = 26 043)		2007 (n = 20 679)		2013 (n = 24 968)	
	No.	Mean (95% CI)	No.	Mean (95% CI)	No.	Mean (95% CI)
Recommended Clinical Care						
Recommended cancer screening composite	14 826	73 (72-74)	12 027	74 (73-75)	14 682	75 (74-76)
Cervical	8868	90 (89-91)	7013	88 (87-89)	8677	86 (85-87)
Breast	4160	81 (80-82)	3522	79 (77-80)	4320	77 (75-79)
Colorectal	7923	48 (46-49)	6837	56 (55-58)	8245	63 (61-64)
Recommended diagnostic and preventive testing composite	25 873	76 (75-76)	20 451	76 (75-76)	24 672	76 (76-77)
Dental checkup	25 794	62 (61-63)	20 347	62 (61-63)	24 562	61 (60-62)
Blood pressure measurement	25 370	91 (90-91)	19 974	90 (89-91)	24 150	91 (90-91)
Cholesterol measurement	16 906	90 (89-91)	13 625	92 (92-93)	15 928	95 (94-95)
Influenza vaccine	9595	50 (49-52)	8219	53 (51-54)	9700	58 (57-60)
Recommended diabetes care composite	1773	70 (68-71)	1743	67 (66-69)	2211	68 (66-70)
HgA$_{1c}$ measurement	1388	79 (77-81)	1243	75 (72-78)	1479	75 (72-78)
Foot examination	1699	72 (69-74)	1679	68 (65-70)	2175	69 (66-71)
Eye examination	1761	62 (59-65)	1722	63 (61-66)	2187	64 (62-67)
Recommended counseling composite	17 874	43 (42-44)	13 841	47 (46-48)	16 962	50 (48-51)
Weight loss counseling	15 597	39 (38-40)	12 721	43 (41-44)	15 793	44 (43-46)
Exercise counseling	15 596	43 (42-44)	12 747	47 (46-49)	15 821	52 (51-53)
Smoking cessation counseling	5146	49 (47-50)	2777	60 (58-63)	3110	61 (59-63)
Recommended medical treatment composite	6034	36 (34-37)	6113	38 (36-39)	7486	42 (41-43)
Anticoagulation for atrial fibrillation	586	30 (27-34)	480	28 (25-32)	577	36 (31-40)
ACEi/ARB for heart failure	198	62 (57-67)	148	63 (60-67)	167	57 (50-63)
β-Blocker for heart failure	198	41 (35-47)	148	66 (62-71)	167	65 (58-72)
Salicylates and/or platelet aggregation inhibitors for CAD/MI	1195	23 (20-26)	1134	29 (27-32)	1416	31 (28-35)
β-Blocker for CAD/MI	1195	51 (48-54)	1134	61 (58-63)	1416	60 (56-63)
Statin for CAD/MI	1195	52 (49-56)	1134	57 (54-60)	1416	64 (61-67)
Statin for dyslipidemia	2433	76 (74-78)	3686	66 (64-67)	4899	72 (71-74)
ACEi/ARB for diabetes and hypertension	1121	64 (61-68)	1431	58 (56-61)	2031	58 (55-61)
Statin for CVA	302	34 (29-39)	314	45 (41-48)	394	57 (51-63)
Antiplatelet for CVA	302	27 (23-31)	314	32 (27-36)	394	35 (30-40)
Controller medication for poorly controlled asthma	258	71 (65-77)	177	61 (57-65)	263	59 (54-65)
Controller medication for poorly controlled COPD	185	26 (23-29)	154	33 (28-38)	253	35 (30-40)
Inappropriate Clinical Care Avoidance						
Inappropriate cancer screening avoidance composite	2834	47 (45-49)	2284	49 (47-51)	2469	51 (49-53)
Cervical cancer screening in older adults	2156	38 (35-41)	1682	46 (43-48)	1876	51 (49-54)
Colorectal cancer screening in older adults	1640	70 (67-73)	1345	62 (59-64)	1299	61 (57-64)
Prostate cancer screening in older adults	589	29 (26-33)	515	25 (21-28)	508	29 (25-33)
Inappropriate antibiotic use avoidance composite	1885	50 (48-53)	1271	38 (35-41)	1432	44 (40-47)
Antibiotics for acute bronchitis[a]	17	71 (51-91)	19	40 (16-64)	29	35 (0-83)
Antibiotics for acute upper respiratory infection	1666	48 (45-51)	1152	37 (34-39)	1077	38 (34-41)
Antibiotics for influenza	223	67 (62-72)	108	50 (47-54)	351	67 (61-72)
Inappropriate medical treatment avoidance composite	9331	92 (91-93)	8200	91 (90-92)	9512	89 (89-90)
Anxiolytics, sedatives, and hypnotics in older adults	3881	93 (92-94)	3210	92 (91-93)	3578	91 (90-92)
Benzodiazepine for depression	2213	91 (90-93)	1974	91 (90-93)	2228	90 (89-92)
Opioid for headache	417	99 (98-99)	288	98 (96-100)	307	99 (99-99)
Opioid for back pain	1488	98 (97-98)	1212	97 (96-98)	1282	95 (93-96)
NSAID use for hypertension, heart failure, or kidney disease	5002	88 (87-89)	5257	87 (85-88)	6556	85 (84-86)

(continued)

Table 3. The Quality of Outpatient Care Delivered to Adults in the United States, 2002–2013 (continued)

Measure or Composite	2002 (n = 26 043)		2007 (n = 20 679)		2013 (n = 24 968)	
	No.	Mean (95% CI)	No.	Mean (95% CI)	No.	Mean (95% CI)
Inappropriate imaging avoidance composite	1850	89 (88-91)	1459	88 (86-89)	1561	90 (88-91)
MRI/CT for back pain	1488	94 (92-95)	1212	93 (92-95)	1282	93 (91-95)
Radiograph for back pain	1488	84 (81-86)	1212	84 (81-86)	1282	86 (84-89)
MRI/CT for headache	417	92 (90-93)	288	84 (81-87)	307	91 (87-94)
Patient Experience						
Global rating of health care	16 703	72 (71-73)	12 774	74 (73-75)	14 071	77 (76-78)
Physician communication composite	16 861	55 (54-55)	12 895	57 (56-58)	14 261	63 (62-64)
Physician listened to you	16 699	55 (54-56)	12 773	59 (58-60)	14 063	64 (63-65)
Physician explained so you understood	16 770	58 (57-59)	12 802	60 (59-61)	14 213	64 (63-65)
Physician showed respect	16 781	59 (58-60)	12 810	62 (61-63)	14 182	68 (67-69)
Physician spent enough time with you	16 773	46 (45-47)	12 802	49 (48-50)	14 172	55 (54-56)
Access to care composite	16 397	48 (47-49)	11 796	50 (49-51)	13 994	58 (57-60)
Got care when ill or injured as soon as wanted	7218	57 (56-59)	4911	58 (56-59)	5970	63 (61-65)
Got medical appointment as soon as wanted	14 954	46 (45-47)	10 722	48 (47-49)	12 631	57 (56-59)

Abbreviations: ACEi, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CAD/MI, coronary artery disease/myocardial infarction; COPD, chronic obstructive pulmonary disease; CT, computed tomography; CVA, cerebral vascular accident; HgA$_{1c}$, hemoglobin A$_{1c}$;

MRI, magnetic resonance imaging; NSAID, nonsteroidal anti-inflammatory drug.

[a] See eAppendix in the Supplement, "Optimal Identification of Bronchitis Visits," for sensitivity analyses.

inappropriate medical treatments. Several composites continued to demonstrate disappointingly low absolute rates and small absolute changes, even when improvement occurred, such as for recommended medical treatment and inappropriate cancer screening. Patient experience with care showed consistent, significant improvements. All of this occurred in the context of an American population that became, on average, 1.6 years older, slightly poorer, and accrued more health conditions, although with unchanged self-rated general health status.

Continued deficits in recommended care have important implications for the health of Americans. About 1 in 4 eligible Americans failed to receive recommended cancer screening, diagnostic and preventive testing, or diabetes care. About 60% of eligible Americans did not receive beneficial cardiovascular and pulmonary therapies. For example, in heart failure, only 57% and 65% of eligible Americans took recommended ACEi/ARB and β-blocker medications, despite a 16% and 4% absolute reduction in mortality, respectively.[73,74] Similarly, in poorly controlled chronic obstructive pulmonary disease, only 35% of eligible Americans took a recommended controller medication in 2013, a treatment that reduces exacerbations by 25% and hospitalizations by 17%.[75]
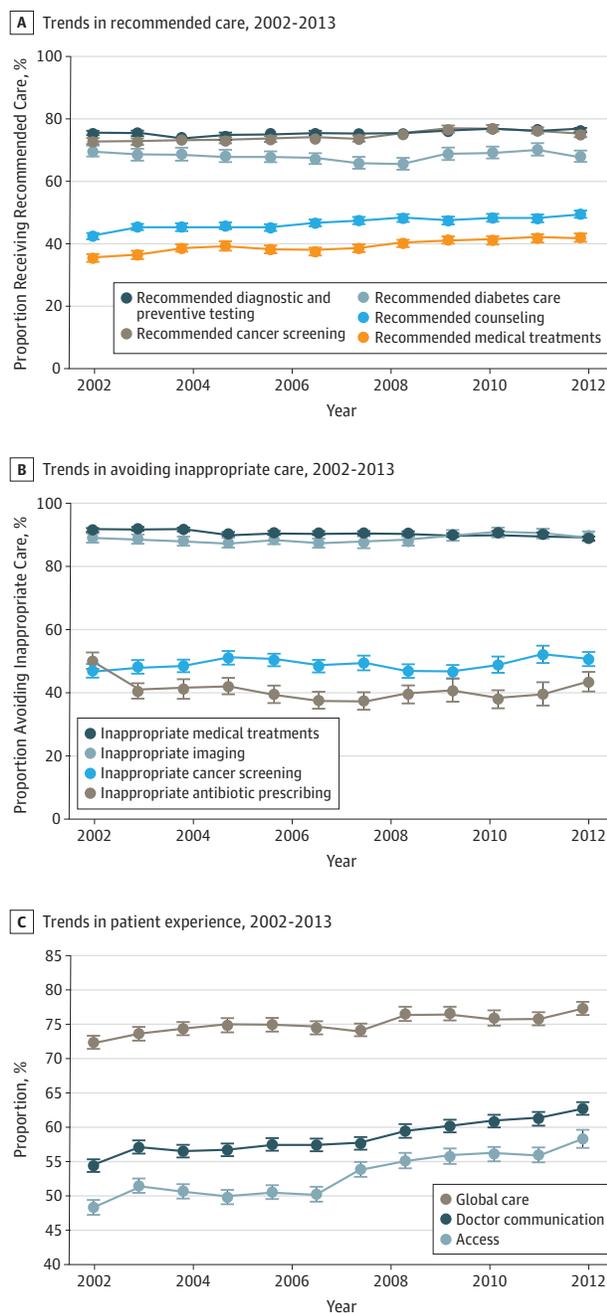
Waste and possible harm from overuse of care are also substantial. About half of older Americans received cancer screening when it was unlikely to prolong life. About half of Americans who made a visit for viral illnesses received inappropriate antibiotics, which exposes patients to adverse drug events, increases costs, and increases the prevalence of antibiotic resistant bacteria.[76] Almost 1 in 6 Americans who made a visit for back pain received an inappropriate lumbar radiograph—the largest radiation dose of any plain film examination (equivalent to 70 chest radiographs).[77] Importantly, many of these trends worsened. When considered in the context of increasing health care spending (approximately 15% of gross domes-

tic product [$5700 per person] in 2002 vs approximately 17% [$9100 per person] in 2013),[78] these areas represent prime targets for efforts to improve the value of care delivered by eliminating services that have a neutral or negative impact on health. Although early research suggests that initiatives such as Medicare's accountable care organization (ACO) programs may be impacting overuse of low-value services, we see little evidence of widespread improvements during our study.[20]

Substantial and consistent improvements were seen in patient experience. From 2002 to 2013, 5% more Americans reported excellent global experience with care and 8% more thought highly of their physician's communication, relatively large effects.[68] When first introduced, there was considerable controversy over whether experience measures were valid measures of health care quality,[10,79] yet over our study period, measurement and reporting of patient experience has become standard. In addition to being publicly reported beginning in 2007, patient experience is becoming increasingly important for reimbursement. For instance, patient experience measures are components of quality measured and rewarded in Medicare's managed care programs.[68,80] Our data likely demonstrate that health care systems have responded to these and other incentives and invested to improve patient experience. Whether other areas of care could be influenced with a similar system of reporting remains to be seen.

Similarly, Americans who reported always having access to care improved by 10%. Access improved despite increased proportions of adults who were uninsured or used public insurance, key factors associated with worse access to primary care.[81] However, we specifically did not examine primary care access measures, but instead examined access to any medical care. Therefore, use of emergency departments, retail clinics, and other nontraditional medical establishments may have improved Americans' perception regarding access.[82]

Figure. Trends in Care and Patient Experience, 2002 to 2013

A Trends in recommended care, 2002-2013

B Trends in avoiding inappropriate care, 2002-2013

C Trends in patient experience, 2002-2013

A, Recommended clinical care composites. Comparison of 2002 and 2013: recommended cancer screening (*P* < .01), recommended diagnostic and preventive testing (*P* = .05), recommended diabetes care (*P* = .21), recommended counseling (*P* < .01), and recommended medical treatment (*P* < .01). B, Avoidance of inappropriate clinical care composites. Comparison of 2002 and 2013: inappropriate medical treatment avoidance (*P* < .01), inappropriate imaging avoidance (*P* = .64), inappropriate cancer screening avoidance (*P* = .02), and inappropriate antibiotic avoidance (*P* < .01). C, Patient experience measures were dichotomized as follows: response of 4 on a Likert scale of 1 to 4 (physician communication and access) or responses of 8, 9, or 10 on a Likert scale of 0 to 10 (global care) were counted as positive. Comparison of 2002 and 2013: global care (*P* < .01), physician communication (*P* < .01), and access (*P* < .01). Error bars indicate 95% CIs. See the eFigure in the Supplement for linear representation on a 0 to 10 scale.

For quality of care, several possibilities exist for the inconsistent gains and disappointing absolute rates observed. First, despite recent efforts to transition to alternative payment models such as value-based purchasing, fee-for-service remains dominant in the US.[83] Although data are mixed, fee-for-service incentives may run counter to efforts to improve the global delivery of recommended care and to avoid inappropriate care, as payments are not linked to appropriateness or quality.[84] Moreover, most standalone pay-for-performance programs used to mitigate fee-for-service incentives have had little to no impact on quality. In contrast, integrated care networks that operate on a global budget and take a population health approach to achieving quality,[85,86] programs that include integrated pay-for-quality,[87-89] and institutions that engage in substantive quality improvement,[90,91] have shown improvements in the quality of outpatient care.

Second, most quality measures, including many of those we examined, are focused on the provision of primary care, but the United States underinvests in primary care.[92] Comprehensive primary care is associated with lower costs, improved health outcomes, greater efficiency, and reduced disparities.[93] Primary care spending in the United States accounts for only 6% to 8% of total medical expenditures, a number likely unchanged for over a decade.[94] Current efforts to improve the delivery of primary care through the patient-centered medical home have yielded inconsistent effects on quality, though these efforts may evolve and strengthen over time.[95]

Third, broad policy changes and reform efforts may be necessary but not sufficient to improve quality. Many inputs affect, for example, whether an individual obtains colorectal cancer screening. Perhaps social determinants of health create barriers, or perhaps personal health beliefs impact the decision. The complexity and interconnectedness of health care mean that a single policy or national improvement initiative may be insufficient to bolster quality.

Fourth, changes resulting from the Affordable Care Act (ACA) are not reflected in our data, as key insurance provisions began in October 2013.[96] The ACA may be crucial to the requisite multipronged effort to align payers, clinicians, and patients. It has encouraged organizational changes through ACOs and renewed investment in primary care through programs such as the Comprehensive Primary Care Initiative and National Health Service Corps. The ACA has also accelerated efforts to move away from fee-for-service toward pay-for-value and bundled payment programs. Perhaps most importantly, 30 million more Americans now have health insurance. Whether these efforts will lead to measurable improvements in national quality remains to be seen.

Limitations

Our study has limitations. First, we could not always measure all potential relevant exclusions when calculating quality measures (eg, bilateral mastectomy for breast cancer screening). However, others have shown only small differences when accounting for multiple exclusions with billing data.[31] The MEPS does not rely on administrative data but instead on a rich combination of self-report and clinical data,

and our estimates are often comparable with others (eTable 2 in the Supplement). We consciously chose not to adjust for population characteristic changes in an effort to demonstrate actual care delivery. Most important, our measures are internally consistent over time so changes in rates are likely to reflect true changes.

Second, our quality measures do not address all outpatient care. However, to our knowledge, the MEPS represents one of the largest nationally representative sets of consistently collected quality measures available for more than a decade. The study by McGlynn and colleagues[1] from over a decade ago was seminal work covering 18 outpatient categories (excluding cancer treatment and pregnancy) with 81 measures (excluding those based only on expert opinion). However, it was a single point in time, included only people seeking medical care in 12 metropolitan areas, had a response rate of 34%, and had denominators with fewer than 30 individuals for half of the 81 measures (eTable 3 in the Supplement). Our present analysis builds on the work of McGlynn and colleagues[1] with a nationally representative population-based sample; 15 outpatient categories encompassing 46 measures; additional measures of medication safety, overuse, and patient experience; 50% to 65% response rates; and higher sample sizes (most measures with denominators >1000; just 1 measure with denominator <30). Like McGlynn et al,[1] we focused on process and structure measures to identify portions of the health care system in need of improvement. These measures are most often under the control of clinicians and the health care system.[97] Because of our structured search and ex-

clusion criteria, our measures capture clinically important care that has been the focus of improvement efforts and have remained relevant for over a decade.

Third, although our composites capture change in the aggregate, they are not meant to enable comparison between, for example, diabetes care and cardiovascular care, because some individual measures might be easier to achieve than others. Similarly, the complexity of health care limits our ability to determine exact reasons for such inconsistent improvements in quality.

Fourth, whereas most measures were corroborated by a second or third source, 16 clinical measures relied only on self-report (Table 1). Although self-report has been shown to have reasonable concordance with electronic medical records and administrative sources, this can vary by item.[98,99] Any bias would be internally consistent over time.

Conclusions

Despite more than a decade of efforts to improve the quality of health care in the United States, the quality of outpatient care delivered to adults has not consistently improved. There have been improvements in patient experience. Current deficits in care continue to pose serious hazards to the health of the American public in the form of missed care opportunities as well as waste and potential harm from overuse. Ongoing national efforts to measure and improve the quality of outpatient care should continue, with a renewed focus on identifying and disseminating successful improvement strategies.

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Invited Commentary

The Quest to Improve Quality
Measurement Is Necessary but Not Sufficient

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Thirteen years ago, we reported that American adults were receiving about half of recommended care for the 30 leading causes of illness and death.[1] We used 439 indicators covering inpatient and outpatient care that were validated through a modified Delphi process. Indicators were scored using data abstracted from all physicians seeing participants supplemented by survey data. We also found that quality deficits were similar across very different communities[2] and that everyone was at risk for experiencing substandard quality.[3] These findings caught the public and health professionals by surprise, although they were consistent with prior small studies. Since then, there has been a proliferation of public and private programs to measure, publicly report, and reward or penalize health plans, hospitals, physicians, and other care settings on quality.

So, is quality any better today than it was in 2003? Unfortunately, the substantial costs associated with replicating the methodology have deterred funders from supporting a study to fully answer this question. However, the article in this issue by Levine et al[4] using a different methodology suggests that, on average, quality has not improved dramatically. Their study has several limitations. First, they used measures that were valid across all years of their study, which means they did not necessarily address best clinical practice in 2013. Second, the relatively small number of measures used were selected because they could be scored using administrative data and not because of their importance to overall quality outcomes. So, we probably do not know how good quality is overall in 2013.

Using this limited set of measures, the authors[4] report anemic improvements in quality. For example, over the 11 years of their study, improvements in composite scores for use of cardiovascular medications and counseling for smoking cessation, weight loss, and exercise ranged from 2 to 7 percentage points. Most of the composites they constructed remained below the overall performance of 55% we reported in 2003 with the exception of cancer screening and selected

interventions for diabetes, preventive, or diagnostic care. In those areas, performance was similar to the levels at the beginning of the study. This will likely disappoint many readers. For those actively engaged in efforts to improve quality, the results may not be as surprising.

Measurement Isn't Enough
Measurement combined with public reporting can draw attention to particular areas of concern and stimulate improvement efforts, but measurement in the absence of other changes will not produce different results. For example, you can weigh yourself every day but if you do not change your diet or exercise routine, the results (measurements) probably won't change. Further measurement approaches today are deficient. Many measures are simplistic approximations of what clinicians and patients believe represents high quality of care. Much of today's quality measurement enterprise operates separately from the workflows associated with delivering health care services. But the workflows have to change to get different results. Physicians generally know what constitutes best practices and show up every day to do the best for their patients, but reliably and consistently offering those services at the point of care delivery requires a systems approach. This means integrating clinically meaningful measurement into care delivery at appropriates points of interaction with patients combined with specific actions to ensure delivery of optimal care.[5]

Payment Reform May Be Helpful but Not Sufficient
Levine and colleagues[4] point to both insurance coverage and payment reform as potential opportunities to encourage future improvements in quality but the evidence on this is not clear. For example, Asch et al[3] showed no significant differences in performance related to either the presence or type of health insurance coverage. An older body of work on appropriateness of care has demonstrated rates of inappropriate care that were similar in the United States and in countries such as Canada, the United Kingdom, and Israel with universal coverage. Our study of 12 US communities with very different health economic profiles (eg, managed care penetration, insurance rates, unemployment rates, physician-to-patient