

# Final Report: National Trends in Outpatient Quality Indicators

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## Abstract

Purpose: This project proposed development of a set of quality indicators for outpatient care in the US to evaluate overall quality, trends in quality, and disparities by ethnicity.

Scope: Using data from the 1992-2004 National Ambulatory Medical Care and National Hospital Ambulatory Medical Care Surveys, we constructed 23 outpatient quality indicators; evaluated temporal changes in these indicators; and determined patient, physician, and organizational factors associated with indicator performance, with a focus on ethnic disparities.

Methods: The 23 quality indicators were developed for their clinical importance and scientific soundness as well as feasibility using our data sources. They fell into five categories: medical management of common diseases (10 indicators), antibiotic use (3), preventive counseling (5), screening tests (4), and inappropriate prescribing in elderly patients (1). Multivariable logistic regression models were the primary analytical tool to test our Primary hypothesis: *Although minority patients receive suboptimal quality care compared to White, non-Hispanic patients, the magnitude of ethnic disparities will diminish over time.*

Results and Conclusions: Large gaps persist between clinical practice and evidence-based recommendations in outpatient care, particularly for preventive counseling. Limited ethnic disparities were found, suggesting that healthcare access, rather than unequal treatment in physicians' offices, drives health disparities.

## Purpose

In 2003, the first National Healthcare Quality Report (NHQR) identified a number of areas where the quality of healthcare was suboptimal (AHRQ 2003B). The companion National Healthcare Disparities Report (NHDR) concluded that suboptimal health care does not affect the US population uniformly, but rather points to racial, ethnic, and socioeconomic disparities (AHRQ 2003A). Both of these reports acknowledged the need for further research using additional data sources and new quality measures. Particularly lacking were rigorous evaluations of trends and disparities in the quality of outpatient care. In addition, the information and guidance contained in two recent Institute of Medicine (IOM) reports, *Envisioning a National Health Care Quality Report* (Hurtado 2001) and *Crossing the Quality Chasm* (IOM 2001), has reinforced, as well as prompted expansion of, our earlier strategies for indicator selection.

The measure set examined in NHQR and NHDR under-represents the spectrum of outpatient care, even for recommended medication use in chronic conditions for which the most rigorous evidence exists. The measure set also makes limited use of readily available national surveys of patient care physicians in private offices (National Ambulatory Medical Care Survey [NAMCS]) and hospital outpatient departments (National Hospital Ambulatory Medical Care Survey [NHAMCS]). To fill these gaps, we proposed and successfully obtained funding for a project to examine trends and disparities in the quality of outpatient care using 1992-2004 NAMCS and NHAMCS public-use datasets. Under the auspices of the funds for this project, we constructed 23 quality indicators focusing on pharmacotherapy for and prevention of chronic diseases. We published 11 manuscripts examining all or some of these measures. In this end-of-project progress report, we summarize the key elements of the original design and the main findings in our published articles.

## Specific Aims

This series of analyses evaluated the national quality of outpatient healthcare using data from the 1992-2004 NAMCS and NHAMCS. The aims were to 1) construct a set of outpatient quality indicators, 2) assess quality of care at the national level using the selected indicators, 3) evaluate time trends in these indicators, and 4) determine patient, physician, and organizational predictors of quality of care, with a particular focus on racial/ethnic minorities. A set of 23 quality indicators was constructed to provide a quantitative assessment of quality and covers: 1) medical management of chronic diseases (e.g., warfarin in atrial fibrillation), 2) antibiotic use (e.g., antibiotics in viral respiratory infections), 3) preventive services (e.g., dietary counseling in coronary heart disease), 4) diagnostic testing (e.g., screening urinalysis tests), and 5) medication errors (e.g., inappropriate prescribing for the elderly).

## Preliminary Studies

This project builds on a line of research that the PI, Dr. Randall Stafford, has embarked on since the early 1990s. The following studies were completed prior to the funding of this project and form the basis for the subsequent quality indicator studies.

### 1) Medical Management

Physicians have not fully adopted the recommended pharmacotherapy in the treatment of cardiac disease. Published studies have examined the use of warfarin anticoagulation (Stafford 1996, 1998A) and anti-arrhythmic medications (Stafford 1998A) in atrial fibrillation, angiotensin-converting enzyme (ACE) inhibitors in congestive heart failure (Stafford 1996, 1997A, 2001C), and aspirin (Stafford 2000B) and beta blockers (Wang 1998) in coronary artery disease.

Studies regarding the treatment of other chronic conditions have found a similar situation regarding the use of menopausal hormone replacement therapy (Stafford 1998B), antidepressant use (Stafford 2000C), lipid-lowering medications (Stafford 1997B, Wang 2001), nicotine replacement for

smoking cessation (Thorndike 1998), risky co-prescribing of multiple antihypertensives (Misra 2000), and analgesic therapy in osteoarthritis (Ausiello 2001).

## 2) Antibiotic Use

Rates for unnecessary antibiotic use by primary care physicians remained high, particularly for the treatment of upper respiratory infections (Metlay 1998), prostatitis (Collins 1998), urinary tract infections (Linder 2005), and adult sore throat (Linder 2001).

## 3) Preventive Services

Prevention tasks have been found to be neglected in published studies focusing on cholesterol management (Stafford 1997B), specialty differences in cardiac prevention activities (Stafford 1998C), cardiac prevention in patients with diabetes (Meigs 2000), management of obesity (Stafford 2000A), smoking cessation counseling (Thorndike 1998), and psychotherapy and other counseling in depression (Stafford 2000C). Two other studies have presented overviews of primary care practices provided to adults (Stafford 1999) and to children (Ferris 1998).

## 4) Diagnostic Test Ordering

Published studies have focused on prostate specific antigen testing (Collins 1999), cholesterol testing (Stafford 1997B), assessment of smoking status (Thorndike 1998), screening electrocardiogram use, exercise stress testing (Cohen 1999), and blood pressure measurement (Stafford 1996). These studies have a contrasting range of conclusions because some tests appear to be underutilized (cholesterol testing) whereas others are overused (PSA testing).

## Significance of Study

The failure of physicians to employ recommended practices uniformly represents a remediable source of suboptimal quality in the healthcare system. Such a situation forfeits the tremendous investment that has been made in developing new technologies, testing them, and disseminating them as guidelines. This project contributed to efforts aimed at quality improvement by significantly enhancing available information on the national patterns of quality in outpatient care. Much of what was known about quality on a national level at the inception of this project in 2002 was concentrated in assessments of inpatient medical care. There was and still is a great need for assessment of care in other settings. Outpatient care is particularly important because it defines the entry point into the healthcare system for a substantial majority of the population. Beyond simply describing suboptimal practices, there is a great need to begin to explain the mechanisms by which suboptimal practices and disparities between population groups exist.

This study used NAMCS and NHAMCS, which offer several unique advantages. Physician-reported data have the specific advantage of measuring physician behavior more accurately than patient-reported data. In addition, NAMCS and NHAMCS cover a longer consecutive time span and provide more complete information about disease-specific physician activities than many other national databases. With other sources of data, such as National Health and Nutrition Examination Survey (NHANES) or National Health Interview Survey (NHIS), the level of detail available for physician activities is very limited; with the Medical Expenditures Panel Survey (MEPS), the sample sizes are relatively small for many chronic diseases.

## Methods

### Construction of Quality Indicators

Twenty-three outpatient quality indicators were examined in 1992 and 2002, measuring overall performance and racial/ethnic disparities in outpatient care in the US. We applied both general and specific criteria in the construction of our quality indicators. The three general criteria used included 1) indicators must have a reasonable likelihood of correlating with either improved patient outcomes or, in the absence of outcome differences, reduced healthcare costs, 2) there is explicit evidence that the indicator forms a potential quality standard in the form of either clinical guidelines or reviews of the current literature, and 3) exceptions to the implied standard must be relatively infrequent (e.g.,

medication allergies), identifiable for exclusion from the analysis, or likely to be randomly distributed across time and other variables of interest (e.g., race/ethnicity). The three specific criteria used included 1) variables must be available from the NAMCS or NHAMCS datasets for 2002 and at least 4 other years, with a preference for recent years; 2) because of the per-visit basis of NAMCS and NHAMCS data, indicators should be meaningful when measured at individual patient visits and assessment of quality should not depend heavily upon speculation about activities that occur at other visits by the same patients; and 3) indicators should not rely on data elements or subpopulations that are considered unreliable according to the standards from the National Center for Health Statistics (e.g., sample size <30 or relative SE >30%).

The evidence base for our set of measures consists of current, formal recommendations in the form of practice guidelines or, in the absence of authoritative guidelines, consensus expert statements. We evaluated the performance of the 23 quality indicators using 1992- 2004 NAMCS and NHAMCS datasets. The performance of quality indicators was computed as the percentage of applicable visits receiving appropriate care (the number of eligible visits receiving recommended care divided by the number of all eligible visits). Visits found to have clinical contraindications to recommended treatment were excluded from the numerator and the denominator.

We examine the quality of outpatient care using 23 quality indicators we have measured, which fall into five distinct categories. These include 1) medicinal management of common chronic diseases (10 measures), 2) appropriate antibiotic use (3 measures), 3) preventive counseling (5 measures), 4) screening tests (4 measures), and 5) inappropriate prescribing in elderly patients (1 measure).

### Statistical Analysis

We employed a series of multivariable logistic regression models, one for each quality indicator, to test the primary hypothesis. The following section describes the structure of our analyses. We will discuss findings for each quality indicator and overall conclusions in a later section of the report.

*Primary hypothesis: Though minority patients will remain less likely to receive high-quality care compared to White, non-Hispanic patients, the magnitude of racial/ethnic disparities will have diminished significantly over the past decade.*

The key analytic strategy is to evaluate whether there is statistical interaction between race/ethnicity and time, such that the impact of race/ethnicity changes over time in the direction of narrowing differences. The logistic regression model for each quality indicator takes the form of:

$$\ln(\pi/(1-\pi)) = b_0 + b_1T + b_2NW_i + b_3x_{3i} + \dots + b_mx_{mi} + b_7T \times NW_i + b_8T \times x_{3i} + \dots + b_nT \times x_{ni} + e_i$$

where  $\pi_i$  is the probability of quality indicator performance,  $b_0$  is a constant term,  $b_1$  is the coefficient associated with time in years (T),  $b_2$  is the coefficient associated with non-White race/ethnicity (NW) relative to White,  $b_3 \dots b_m$  are coefficients associated with the other independent variables  $x_{3i} \dots x_{mi}$ ,  $b_7 \dots b_n$  are coefficients associated with interaction terms between the independent variables and time (e.g.,  $T \times NW_i$ ), and  $e_i$  is an error term. The independent variables  $x_{1i} \dots x_{ni}$  include both hypothesized predictors and potential confounders. The variable non-White race/ethnicity ( $NW_i$ ) represents the simplest case analysis. We have expanded this comparison in later analyses to include other race/ethnicities. Additional interaction terms between independent variables themselves were also evaluated. As formulated, these regression models evaluate linear time trends with respect to the logit of indicator performance.

Assuming a dependent variable where increasing probability is a positive outcome, the primary hypothesis was confirmed if the coefficient ( $b_7$ ) for interaction term between time and non-White race ( $T \times NW$ ) was significantly more than zero, while the coefficient for non-White race was significantly less than zero. This indicates a situation where non-White race/ethnicity is initially associated with poorer quality, but that this pattern is attenuated over time (i.e., becomes less negative).

*Hypothesis 2: Are racial disparities exacerbated in the elderly?*

*Hypothesis 3: Are racial differences greater for women than for men?*

*Hypothesis 4: Does care provided by specialists generate smaller racial/ethnic differences than care by primary care physicians?*

Several additional hypotheses tested the role of age, female gender and physician specialty as potential moderators of racial/ethnic disparities in healthcare quality (Kraemer 2001). We were interested in identifying segments of the population where specific intervention may be particularly warranted. The following logistic regression model, similar to that used to test our primary hypothesis, was used to test the influence of these variables:

$$\ln(\pi/(1-\pi)) = b_0 + b_1\text{Old}_i + b_2\text{NW}_i + \dots + b_3\text{Old}\times\text{NW}_i + \dots + e_i$$

where Old<sub>i</sub> is an indicator of advanced age, NW<sub>i</sub> is non-white race/ethnicity, and Old×NW<sub>i</sub> is the interaction term between age and race/ethnicity.

*Hypothesis 5: Does the lack of private health insurance explain some of the lower levels of care received by racial/ethnic minorities?*

*Hypothesis 6: Does greater residence in the South by minority patients help explain the impact of non-White race?*

*Hypothesis 7: Does greater use of outpatient departments by minorities help explain racial/ethnic differences in quality?*

Several potential mediators of racial disparities were also investigated, with the goal of identifying possible mechanisms by which racial/ethnic disparities are generated. We were particularly interested in the extent to which socioeconomic status (measured via source of payment information) is a mediator in determining the impact of race/ethnicity on outpatient quality. To evaluate this hypothesis, we used a regression model similar to that employed for Hypotheses 2 through 4. This model included independent variables that represent potentially mediating factors:

$$\ln(\pi/(1-\pi)) = b_0 + b_1\text{NW}_i + b_2\text{SESi}_i + \dots + b_m\text{xmi}_i + e_i$$

where SES<sub>i</sub> is the participant's socioeconomic status (again, presented as a single parameter for clarity) and NW<sub>i</sub> is non-White race. Other potential mediators were included in a similar manner.

## **Results**

We have provided a summary of the publications that have resulted from this project, beginning with our overview paper that summarizes the core work conducted to address the project's hypotheses.

### **Summary Manuscript**

1) Overview of quality indicators - (Ma 2005) Arch Int Med

We presented an overview of the performance of all 23 quality measures in our 2004 publication in the Archives of Internal Medicine. In that article, we presented changes in performance from 1992 to 2002 and disparities by race/ethnicity. In 2002, mean performance was 50% or more for 12 indicators, seven of which were in the areas of appropriate antibiotic use and avoiding unnecessary routine screening. The performance of the remaining 11 indicators ranged from 15% to 42%. Overall, changes between 1992 and 2002 were modest, with significant improvements in six indicators: treatment of depression (47% vs. 83%), statin use for hyperlipidemia (10% vs. 37%), inhaled corticosteroid use for asthma in adults (25% vs. 42%) and children (11% vs. 36%), avoiding routine urinalysis during general medical examinations (63% vs. 73%), and avoiding inappropriate medications in the elderly (92% vs. 95%).

We subsequently performed detailed analyses of selected quality measures in 10 articles. These measures mainly fell into the categories of medical management of common chronic diseases and antibiotics prescribing.

### Medical Management of Chronic Diseases

#### 2) Statin prescribing – (Ma 2005) PloS Med

Statin is recommended by evidence-based guidelines as a generally well tolerated and effective pharmacotherapy for decreasing low-density lipoprotein cholesterol (LDL-C) levels. Evidence-based practice guidelines focus on LDL-C as the primary target for risk reduction. Hyperlipidemia represents an important modifiable risk factor in the development and progress of CHD.

Statin use grew from 47% of all lipid-lowering medications in 1992 to 87% in 2002, with atorvastatin being the leading medication in 2002. Statin use increased significantly from 9% of patient visits with hyperlipidemia in 1992 to 49% in 2000, but then declined to 36% in 2002. Absolute increases in the rate of statin use were greatest for high-risk patients with a 15% increase from 4% of all visits in 1992 to 19% in 2002. Use among moderate-risk patient visits increased from 2% in 1992 to 14% in 1999, but it showed no continued growth subsequently. In 2002, 1 year post the release of the ATP III recommendations, treatment gaps in statin use were conservatively estimated to be at least 50% among moderate and high-risk patient visits with reported hyperlipidemia. Lower statin use was independently associated with younger patient age, female gender, African American race (vs. non-Hispanic White), and non-cardiologist care.

#### 3) Aspirin prescribing – (Stafford 2005) PloS Med

Aspirin use has been shown to be beneficial in primary and secondary prevention of cardiovascular disease (CVD). The American Diabetic Association recommends regular aspirin for men and women with diabetes who are >40 years of age or who have additional cardiovascular risk factors. We investigated the likelihood of receiving aspirin by patients with varying degrees of CVD risk.

Only 37% of those with CVD and 13% of those with CVD risk factors were regular aspirin users. Reported aspirin use grew only modestly from 21% in 1992-93 to 24% in 2000-01 during visits by high-risk patients and from 4% to 6% among visits by patients with diabetes. Among moderate-risk patient visits defined by multiple risk factors, aspirin increased significantly from 3% in 1992-93 to 7% in 2000-01. Improvements in reported aspirin use for cardiovascular prevention were modest in the past decade and substantial treatment gaps persisted, particularly among moderate-risk patients including individuals with diabetes.

#### 4) Aspirin vs. statins prescribing for CVD – (Ma 2006) Prev & Contr

CVD is the leading cause of morbidity and mortality in the US. Among proven medications, antiplatelet therapy (mainly aspirin) and cholesterol-lowering therapy (mainly statins) are recommended for reduction of cardiovascular risk.

We found that, between the two therapies, aspirin tended to be more underused than statins despite aspirin's more favorable cost-effectiveness. The proportion of patient visits on aspirin while a statin was used declined from 56% in 1995-96 to 33% in 1999-00 before rebounding to 57% in 1993-94. In contrast, statin use among aspirin-treated patient visits grew successively from 37% in 1993-94 to 75% in 1999-00 and stabilized at 68% in 2003-04. Among barriers to guideline adherence are upper gastrointestinal events, drug marketing campaigns that influence physician prescribing, miscategorizing patient in wrong risk category as well as a number of common barriers, such as lack of awareness or agreement with guidelines, patient compliance, and lack of time.

#### 5) COX-2 prescribing – (Dai 2005) Arch Int Med

The withdrawal of rofecoxib has highlighted concerns regarding the safety of cyclooxygenase-2 (COX-2) inhibitors. Benefits of COX-2 inhibitors depend on their use in patients at higher than normal risk from nonsteroidal anti-inflammatory drugs (NSAIDs). We examined trends in COX-2 inhibitor use based on risk for adverse events from NSAIDs.

Of the visits in which either a COX-2 inhibitor or NSAID was prescribed, the frequency of COX-2 inhibitor use increased from 35% in 1999 to 55% in 2000 to 61% in 2001 and 2002. Among patients with the lowest risk for adverse events from NSAIDs, the proportion receiving a COX-2 inhibitor increased from 12% in 1999 to 35% in 2002. Overall, increases in COX-2 inhibitor use among patients in whom NSAIDs could have been used accounted for more than 63% of the growth in COX-2 inhibitor use during the period examined.

#### 6) Treatment of hypertension – (Ma 2006) Hypertension

In the treatment of hypertension, the fifth and sixth reports of the Joint National Council (JNC), released in 1993 and 1997, respectively, recommended diuretics and  $\beta$ -blockers as the first-line drug therapy for uncomplicated hypertension, while more recently, the seventh JNC report released in 2003 recommended thiazide diuretics to be prescribed alone or as part of combination therapy for most hypertensive patients. We investigated the impact of published evidence-based guidelines on the treatment of hypertension and found clear but short-lived effects on physician prescribing.

Diuretic prescriptions remained level through 2001 (39%; 95% CI: 34-44%) but increased to 53% (48-58%) in 2003, due largely to a 72% increase in thiazide prescriptions in the first quarter of 2003 [50% (40-59%)]. However, these increases did not sustain in 2004.  $\beta$ -blocker prescriptions increased modestly from 1993 (24%; 19-29%) to 2004 (33%; 28-39%). Prescription of CCBs and ACEIs declined significantly following the sixth Joint National Committee report (JNC 6), but both subsequently rebounded to pre-JNC 6 levels. Prescription of ARBs increased continuously from 1% in 1995 to 23% by 2004. Prescription of polytherapy – particularly that involving >3 drug classes – became increasingly prevalent, accounting for 60% of antihypertensive drug visits by 2004. Prescription of thiazides and  $\beta$ -blockers were both more likely in 1998-2004 (vs. 1993-1997). In addition, African Americans, women, and hospital outpatients were more likely to receive thiazides. Also, cardiologists were more likely to prescribe  $\beta$ -blockers.

#### 7) Asthma prescribing – (Ma 2003) J Allergy Clin Immun

In the treatment of asthma, the emphasis of asthma pharmacotherapy shifted during the 1990s from that of relieving acute bronchospasm with short-acting reliever medications (e.g., beta-2 agonists) to long-term, proactive control of underlying inflammation with anti-inflammatory medications (e.g., inhaled steroids). We investigated the likelihood of receiving appropriate pharmacotherapy for asthma.

Overall, inhaled steroids were reportedly prescribed during 24% (99% CI: 21%-26%) of all asthma visits, and short-acting  $\beta_2$  agonists were reported during 55% (52%-58%) of all asthma visits. After controlling for other characteristics, the likelihood of visits by Hispanics being prescribed inhaled steroids was 43% less than that in visits by Whites, whereas visits cared for by asthma specialists were three times more likely to be prescribed inhaled steroids than those seen by generalists. Physician-reported prescribing of short-acting  $\beta_2$  agonists did not differ by patient race/ethnicity or physician specialty. Compared with their adult counterparts, visits by children and adolescents were 43% less likely to be prescribed inhaled steroids but 80% more likely to be prescribed short-acting  $\beta_2$  agonists. Relative to visits to hospital outpatient departments, visits to in-office physicians were less likely to be prescribed both inhaled steroids (66% lower) and short-acting  $\beta_2$  agonists (61% lower). In addition, asthma visits by patients with private insurance versus those without private insurance had 1.51 times the odds of being prescribed short-acting  $\beta_2$  agonists.

#### 8) Depression treatment in children and adolescents – (Ma 2005) J Adol Health

Treatment of depressed children and adolescents with selective serotonin reuptake inhibitors (SSRIs) has been associated with increased risk of suicidality and the Federal Drug Administration has recently required manufacturers print a “black box” warning. Since their market entry, SSRIs have become the leading antidepressant prescribed to children and adolescents despite the lack of evidence of safety and efficacy, except for fluoxetine. We investigated the impact of recent regulatory actions on antidepressant and particularly SSRI prescribing.

The number of children and adolescents seen for depression who were prescribed antidepressants increased markedly through 2002, and especially for SSRIs. Although fluoxetine remained the most commonly prescribed SSRI, other SSRIs were increasingly prescribed as well. SSRIs were reported in 1.35 million visits in 2001-2002, reflecting a 2.6-fold increase from 1995-1996. Fluoxetine was prescribed in 207,914 visits in 1995-1996 and increased 100% to 415,580 visits in 2001-2002. The use of sertraline increased by 62% to 345,576 visits, while paroxetine increased by 269% to 279,275 visits. The proportion of visits in which antidepressants were prescribed rose from 47% in 1995-1996 to 52% in 2001-2002, whereas visits where psychotherapy or mental health counseling was provided declined from 83% to 68%.

#### 9) Antibiotics prescribing - (Linder 2005) Am J of Med

Recent reports have documented the emergence of fluoroquinolone resistance among a variety of pathogens that cause pneumonia, meningitis, otitis media, sinusitis, and bacteremia. To preserve efficacy, antibiotics, such as fluoroquinolones, should be used judiciously and for appropriate indications. We investigated the rate and range of fluoroquinolone prescribing.

Between 1995 and 2002, fluoroquinolones became the most commonly prescribed class of antibiotics to adults in the US. Fluoroquinolone prescribing rose threefold, from 7 million visits in 1995 to 22 million in 2002, and increased as a proportion of overall antibiotics prescribing (from 10% to 24%) and as a proportion of the US population (from 39 to 106 prescriptions per 1000 adults). These increases were due to the use of newer fluoroquinolones with activity against *Streptococcus pneumoniae*. Forty-two percent of fluoroquinolone prescriptions were for non-approved diagnoses. Among patients receiving antibiotics, non-approved fluoroquinolone prescribing increased over time (odds ratio=1.18 per year, 95% CI: 1.13-1.24).

### Preventive Services

#### 10) Diet and physical activity counseling - (Ma 2004) Prev Med

Many of the risk factors for developing cardiovascular disease (CVD) include smoking, hypertension, diabetes mellitus, obesity, and hyperlipidemia, which are preventable and modifiable. Diet and physical activity counseling, including lifestyle modifications such as engaging in healthy dietary patterns and adequate physical activity, are integral to the prevention and treatment of CVD. We investigated the likelihood of receiving diet and physical activity counseling.

Rates of reported diet and physical activity counseling during visits by at-risk adults increased modestly from 1992 to 2000. Rates increased significantly from 1996 [diet: 27% (25% 28%); physical activity: 20% (18% 21%)] to 1997 [diet: 43% (40% 46%); physical activity: 26% (24% 29%)]. The occurrence of these increases coincided with the release of Guide to Clinical Preventive Services in 1996. Throughout the 1990s, however, diet counseling was provided in <45% of visits and physical activity counseling in <30% of visits by adults with hyperlipidemia, hypertension, obesity, or diabetes mellitus. Ethnic minorities were 1.2 to 1.7 times more likely to receive diet counseling than non-Hispanic Whites. Both diet and physical activity counseling was two to three times more likely to be provided when patients were seen by physicians, physician assistants, or nurse practitioners compared to those seen by the nursing staff.

A diagnosis of obesity and hyperlipidemia was associated with the greatest odds of receiving either diet or physical activity counseling, with odds ratios ranging from 2.7 [99% CI: (2.1 3.4)] to 5.8 (4.8 7.0)]. Surprisingly, a positive diagnosis of CHD had no effect on the likelihood of diet or

physical activity counseling. When examined according to aggregate CVD risk, the likelihood of diet and physical activity counseling increased incrementally with each additional risk factor of hyperlipidemia, hypertension, obesity, or diabetes.

#### 11) Preventive Counseling for Adolescents – (Ma 2005) J Adol Health

Adolescents are particularly at risk of adopting health-compromising behaviors such as poor diet, physical inactivity, and tobacco or other substance use, unsafe sex, unintentional injury, and violence. These unhealthy behaviors are all preventable and necessitate preventive services to be emphasized in adolescent healthcare. We investigated the likelihood of receiving preventative counseling for adolescents.

Adolescents had the lowest rates of outpatient visits among all age groups, with particularly low rates among boys and ethnic minorities. Most frequently, adolescent visits were for upper respiratory tract conditions, acne, routine medical or physical examinations, and, for girls, prenatal care. In 1997-2000, counseling services were documented for 39% (99% CI: 32-46%) of all adolescent GME visits. Diet [26% of GME visits (20-32%)] and exercise [22% (17-28%)] were the most frequent counseling topics. The counseling rates of the other five topics ranged from as low as 3% to 20%, with skin cancer prevention, HIV/STD transmission, and family planning/contraception ranking the lowest. These rates represented minimal improvements from 1993-1996, both in absolute terms and in relation to the gaps between practices and recommendations.

### Summary

Our primary goal was to assess the quality of outpatient care at the national level in US ambulatory settings. As part of this goal, we succeeded in 1) constructing 23 quality indicators, 2) assessing the current quality of US outpatient care using these indicators, 3) evaluating temporal changes in these indicators, and 4) determining patient, physician, and organizational factors associated with these indicators. The 23 quality indicators fall into five categories: medical management of common diseases (10 indicators), appropriate antibiotic use (3), preventive counseling (5), screening tests (4), and inappropriate prescribing in elderly patients (1).

Results from 11 articles that we published on these quality indicators consistently show that large gaps exist between actual clinical practice and evidence-based recommendations in many areas of outpatient care, with preventive counseling being the most problematic. We found limited evidence that would support our primary hypothesis that *while minority patients will remain less likely to receive high-quality care compared to White, non-Hispanic patients, the magnitude of racial/ethnic disparities will have diminished significantly over the past decade*. First, we did not find substantial disparities in performance by race and ethnicity for many of the 23 quality indicators. Second, performance gaps between clinical practice and recommendations are narrowing for only some of the quality indicators and at modest rates, with no differences in the rate of improvement by race or ethnicity. When racial and ethnic disparities were present in the performance of an indicator, they did not seem to vary by patient age (*hypothesis 2*), patient gender (*hypothesis 3*), or physician specialty (*hypothesis 4*), nor were they explained by insurance coverage (*hypothesis 5*), geographic location (*hypothesis 6*), or type of healthcare setting (*hypothesis 7*).

### Next steps

This project is an intermediate step in the process of improving the quality of healthcare. We described in detail the state of the quality of US outpatient care, which advances previous work, including work by the principal investigator that had focused more narrowly on a description of inadequate adoption of guidelines. The current research creates a foundation for intervention initiatives aimed at changing physician and patient behaviors as well as changing the healthcare system in order to improve healthcare quality. Future research is warranted to address whether the quality of outpatient care can be improved through the following interventions.

**Interventions targeted to selected quality indicators.** Although large gaps persist between actual clinical practice and evidence-based recommendations in many areas of healthcare, performance in preventive counseling is the most lacking. This is a common conclusion reached in a number of recent research articles and national healthcare quality reports. The US healthcare system remains overly centered on acute care. The relative neglect of preventive care is exacerbated by a growing chronic disease burden and the increase of physician productivity demands. Alternative approaches are needed to supplement usual physician care. One such approach that has shown great promise is integrated prevention services delivered through case management by ancillary healthcare providers (e.g., nurses, dietitians, and pharmacists).

**Interventions targeted to selected patients and physicians.** Research on healthcare quality, including the present study, consistently finds variations in quality by patient (e.g., age, gender, and insurance coverage) and physician characteristics (e.g., specialty, profession, and personal attributes). Given the finite resources available for improving the quality of healthcare, it may be most cost-effective to target patients who are most likely to benefit from interventions and physicians who are most amenable to change.

**Interventions targeted to health care systems.** Healthcare systems as a whole play a determinant role in the conceptualization and delivery of healthcare. System changes are necessary, although not sufficient, for ultimate improvement in the quality of healthcare in the US. Evidence is accumulating in the US and abroad that shows the potential of pay for performance and health information technology. Yet, much is still to be learned about these and other innovations before their uniform adoption within the US healthcare system.

### **Literature cited**

Agency for Healthcare Research and Quality. National Healthcare Disparities Report. Available at: <http://www.qualitytools.ahrq.gov/disparitiesreport/archive/2003/document/Report%207.pdf>. Accessed September 20, 2006.

Agency for Healthcare Research and Quality. National Healthcare Quality Report. Available at: <http://www.qualitytools.ahrq.gov/qualityreport/archive/2003/browse/browse.aspx>. Accessed September 20, 2006.

Ausiello JC, Stafford RS. Trends in medication use for osteoarthritis treatment. *J Rheumatol*. 2002 May;29(5):999-1005.

Collins MM, Stafford RS, O'Leary MP, Barry MJ. How common is prostatitis? A national survey of physician visits. *J Urol* 1998; 159:1224-8.

Collins MM, Stafford RS, O'Leary MP, Barry MJ. Distinguishing chronic prostatitis and benign prostatic hyperplasia symptoms: results of a national survey of physician visits. *Urology* 1999; 53: 921-5.

Dai C, Stafford RS, Alexander C. National trends in cyclooxygenase-2 inhibitor use since market release. *Arch Int Med* 2005;165:171-177.

Ferris TG, Saglam D, Stafford RS, et al. Changes in the daily practice of primary care for children. *Arch Pediatr Adolesc Med* 1998; 152: 227-33.

Hurtado M, Swift E, Corrigan J, Editors, Committee on the National Quality Report on Health Care Delivery, Board on Health Care Services. *Envisioning the National Health Care Quality Report*. Institute of Medicine, Washington, D.C., National Academy Press, 2001.

Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21<sup>st</sup> Century*,

Committee on Quality of Health Care in America, Institute of Medicine, Washington, D.C., National Academy Press, 2001.

- Linder JA, Stafford RS. Antibiotic treatment of adults with sore throat by community primary care physicians: a national survey, 1989-99. *JAMA* 2001;286:1181-1186.
- Linder JA, Huang, ES, Steinman MA, Gonzales R, Stafford, RS. Fluoroquinolone prescribing in the U.S.: 1995 to 2002. *Am J or Med* 2005;118:259-268.
- Ma J, Stafford RS. U.S. physicians' adherence to standards in asthma pharmacotherapy varies by patient and physician characteristics. *J Allergy Clin Immun* 2003;112:633-635
- Ma J, Urizarr GG, Jr., Alehegn T, Stafford RS. Diet and physical activity counseling during ambulatory care visits in the U.S. *Prev Med* 2004;39:815-822.
- Ma J, Wang Y, Stafford RS. U.S. adolescents receive suboptimal preventive counseling during ambulatory care. *J Adolesc Health* 2005;36:441.e1-441.e7.
- Ma J, Sehgal NL, Ayanian JZ, Stafford RS. National trends in statin use by coronary heart disease risk category. *PloS Med* 2005;2(5):e123.
- Ma J, Stafford RS. The quality of outpatient care in the U.S.: Temporal changes and racial/ethnic disparities. *Arch Int Med* 2005;165:1354-1361.
- Ma J, Lee K-V, Stafford RS. Depression treatment during outpatient visits by U.S. children and adolescents. *J Adolesc Health* 2005;37(6):434-442.
- Ma J, Monti V, Stafford RS. Are evidence-based cardiovascular prevention therapies being used? A review of aspirin and statin therapies. *Prevention and Control* 2005;1:285-295.
- Ma J, Lee K-V, Stafford RS. Changes in antihypertensive prescribing during U.S. outpatient visits for uncomplicated hypertension between 1993 and 2004. *Hypertension* 2006;48:1-7.
- Meigs JB, Stafford RS. Cardiovascular disease prevention practices by U.S. physicians for patients with diabetes. *J Gen Intern Med* 2000; 15: 220-8.
- Metlay, JP, Stafford RS, Singer DE. National trends in the use of antibiotics by primary care physicians for adult patients with cough. *Arch Intern Med* 1998; 158: 1813-18.
- Misra B, Stafford RS. Examination of antihypertensive polypharmacy predictors from claims data (abstract) . *J Gen Intern Med* 2000;15 [suppl 1]: 136.
- Stafford RS, Singer DE. Warfarin use in atrial fibrillation by U.S. physicians. *Arch Intern Med* 1996; 156: 2537-41.
- Stafford RS, Saglam D, Blumenthal D. National patterns of angiotensin-converting enzyme use in congestive heart failure. *Arch Intern Med* 1997A; 157:2460-4.
- Stafford RS, Pasternak R, Blumenthal D. Variations in the cholesterol management practices of U.S. physicians. *J Am Coll Card* 1997B; 29: 140-7.
- Stafford RS, Singer DE. Recent national patterns of warfarin use in atrial fibrillation. *Circulation* 1998A; 97:1231-3.
- Stafford RS, Saglam D, Causino N, Blumenthal D. The declining impact of race and insurance status on hormone replacement therapy. *Menopause*. 1998B; 5: 140-4.
- Stafford RS, Blumenthal D. Specialty differences in cardiovascular disease prevention practices. *J Am Coll Card* 1998C; 32: 1238-1243.
- Stafford RS, Robson D, Misra B, Ruskin J, Singer DE. Rate control and sinus rhythm maintenance in atrial fibrillation: National trends in medication use, 1980-95. *Arch Intern Med* 1998D; 158:2144-2148.

- Stafford RS, Saglam DS, Causino N, Starfield B, Culpepper L, Marder W, Blumenthal D. Trends in adult visits to primary care physicians in the United States. *Arch Fam Med* 1999; 8:26-32.
- Stafford RS, Farhat JH, Misra B. National patterns of physician activities related to obesity management. *Arch Fam Med* 2000A, 9: 631-8.
- Stafford RS. Low use of aspirin among coronary artery disease patient visits in the United States. *Circulation* 2000B; 101: 1097-1101.
- Stafford RS, Misra B, Ausiello JC, Saglam D. National patterns of depression treatment in primary care. *Primary Care Companion to J Clinical Psych*: 2000C; 2: 211-216.
- Stafford, RS, Monti V, Ma J. Underutilization of aspirin persists in U.S. ambulatory care for the secondary and primary prevention of cardiovascular disease. *PloS Med* 2005;2(12):e353.
- Thorndike AN, Ferris TG, Stafford RS, Rigotti NA. Do U.S. physicians address smoking with adolescent patients? *JNCI* 1999;91: 1857-62.
- Wang TJ, Stafford RS. National patterns of beta blocker use in patients with coronary artery disease. *Arch Intern Med* 1998; 158:1901-1906.
- Wang TJ, Stafford RS, Ausiello JC, Chaisson CE. Randomized clinical trials and recent patterns in the use of statins. *Am Heart J*, 2001; 141: 957-63.

### **List of publications**

- Dai C, Stafford RS, Alexander C. National trends in cyclooxygenase-2 inhibitor use since market release. *Arch Int Med* 2005;165:171-177.
- Linder JA, Huang, ES, Steinman MA, Gonzales R, Stafford, RS. Fluoroquinolone prescribing in the U.S.: 1995 to 2002. *Am J or Med* 2005;118:259-268.
- Ma J, Stafford RS. U.S. physicians adherence to standards in asthma pharmacotherapy varies by patient and physician characteristics. *J Allergy Clin Immun* 2003;112:633-635
- Ma J, Urizarr GG, Jr., Alehegn T, Stafford RS. Diet and physical activity counseling during ambulatory care visits in the U.S. *Prev Med* 2004;39:815-822.
- Ma J, Wang Y, Stafford RS. U.S. adolescents receive suboptimal preventive counseling during ambulatory care. *J Adolesc Health* 2005;36:441.e1-441.e7.
- Ma J, Sehgal NL, Ayanian JZ, Stafford RS. National trends in statin use by coronary heart disease risk category. *PloS Med* 2005;2(5):e123.
- Ma J, Stafford RS. The quality of outpatient care in the U.S.: Temporal changes and racial/ethnic disparities. *Arch Int Med* 2005;165:1354-1361.
- Ma J, Lee K-V, Stafford RS. Depression treatment during outpatient visits by U.S. children and adolescents. *J Adolesc Health* 2005;37(6):434-442.
- Ma J, Monti V, Stafford RS. Are evidence-based cardiovascular prevention therapies being used? A review of aspirin and statin therapies. *Prevention and Control* 2005;1:285-295.
- Ma J, Lee K-V, Stafford RS. Changes in antihypertensive prescribing during U.S. outpatient visits for uncomplicated hypertension between 1993 and 2004. *Hypertension* 2006;48:1-7.
- Stafford, RS, Monti V, Ma J. Underutilization of aspirin persists in U.S. ambulatory care for the secondary and primary prevention of cardiovascular disease. *PloS Med* 2005;2(12):e353.