

# Relationship of Depression Screening and Physician Office Visit Duration in a National Sample

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**Objective:** Although depression screening in primary care is recommended by the U.S. Preventive Services Task Force, it may increase the duration of primary care physician visits that are often at or exceeding capacity. This study was conducted to evaluate the relationship between depression screening and physician visit duration in community-based, primary care physician office visits while controlling for important covariates. **Methods:** Cross-sectional data from the 2005–2007 National Ambulatory Medical Care Survey were used to examine the relationship between physician-indicated depression screening and office visit duration among adults ( $\geq 18$  years of age) with multivariable, ordered logistic regression. Predicted probabilities of visit duration (by 15-minute increments of one to 15, 16–30, 31–45, and 46–60 minutes) were estimated for visits where depression screening was and was not documented. **Results:** In a sample of 14,736 physician office visits, representing an estimated population of more than 641 million visits, depression screening was significantly associated with increased visit duration (adjusted odds ratio=3.66, 95% confidence interval=2.25–5.95). A prominent shift in the proportion of visits that were from one to 15 minutes long to visits that were at least 16–30 minutes long was observed when depression screening was documented. **Conclusions:** Depression screening may increase the duration of physician visits. Given demands on physicians' time, the impact of increased depression screening, including the costs and benefits of using alternative methods and technologies to reduce physician time burden associated with depression screening, should be evaluated. (*Psychiatric Services* 61:1126–1131, 2010)

Major depressive disorder is a common, debilitating chronic illness with a lifetime prevalence of 16.2% and a 12-month prevalence of 6.6% in the U.S adult population (1). General depressive symptoms have been reported to have a lifetime prevalence affecting

nearly one-fourth (23.1%) of U.S. adults (2). In 2000, the World Health Organization ranked depression as the fourth leading contributor to global burden of disease (3). In a study of 13 chronic conditions, only depression was associated with workplace attendance (presence and ab-

sence) and with critical incidents (such as job-related accidents, injuries, and other negative events) (4). As a common comorbidity, depression adds to the burden of many chronic disease states (5–10). Studies examining the costs of depression among U.S. workers have shown that employees with depression cost businesses \$31 billion annually in lost productive time compared with peers without depression (11) and \$51.5 billion in total workplace costs (12).

Given the high prevalence of depression and its adverse impact on medical expenditures and patient quality of life, one would expect that adequate detection and treatment would be key concerns among primary care providers (13). However, despite the consequences, depression often is unrecognized by physicians in a large proportion of patients (14–21). After reviewing available evidence and beginning in their 2002 recommendations (22), the U.S. Preventive Services Task Force (USPSTF) endorsed depression screening for adults (recommendation grade B) in primary care settings that have adequate systems to ensure accuracy of diagnosis, management, and treatment of the illness (23).

Although the USPSTF guidelines are well intended, the provision of preventive services may substantially add to the duration of physician visits. For example, a study examining primary care preventive services recommended by the 1996 USPSTF guidelines reported that absolute physician adherence to all recommendations

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and guidelines would increase a physician's workday by 7.4 hours (24). Other research examining USPSTF guidelines has found that, in general, preventive services add an average of 2.1 minutes per visit (25), with some services adding over five minutes to visit duration (26). A cost-utility analysis of depression screening before the implementation of the 2002 USPSTF recommendations estimated that depression screening added approximately six minutes to physician office visits when a nurse administered and a physician scored a depression screening instrument (27). However, the time necessary to conduct depression screening varies depending on the instrument and technique used, with no standard method endorsed by USPSTF.

The objective of this study was to evaluate the relationship between depression screening and duration of patients' visits with their primary care physician in a nationally representative sample of office visits. Quantifying differences in duration of physician visits with respect to use of depression screening while controlling the analyses for other factors that may influence physician time burden should provide evidence for policy makers as they consider actions to ensure that patients are routinely screened for depression and that facilitate optimal adherence to USPSTF guidelines.

## Methods

### *Study design and overview*

Patient and visit characteristics from a nationally representative sample of community-based family, general, and internal medicine primary care physicians' office visits were used to evaluate the relationship between depression screening and office visit duration.

**Data source.** Cross-sectional data from the 2005–2007 National Ambulatory Medical Care Survey (NAMCS) were used (28). The NAMCS is a national survey conducted by the National Center for Health Statistics of patient visits to non-federally employed, office-based physicians primarily engaged in direct patient care. The survey uses a three-stage probability design of primary sampling

units, physicians' practices within those units, and patient visits within physicians' practices. Each visit is weighted by sampling probability, adjustment for nonresponse, physician specialty, and geographic location to obtain nationally representative estimates. These estimates were considered reliable if they had a standard error of 30% or less and if they were achieved with a sample of no fewer than 30 patient visits (28). This study was exempt from review by the University of Oklahoma Institutional Review Board because it used publicly available, deidentified data.

**Inclusion and exclusion criteria.** The 2005–2007 NAMCS data contained 87,835 unique visits. The USPSTF depression screening guidelines target adult patients of primary care physicians. Therefore, data were limited to visits including adult patients ( $\geq 18$  years) of general and family practices and internal medicine physicians indicated to be the patient's primary care physician. We excluded from analysis visits with primary-reason-for-visit codes related to injuries, adverse effects, or test results; visits coded as administrative (examinations for unemployment, licensing, Social Security disability, and so on); and visits that were uncodable (that is, there was insufficient information). Because this study focused on physician time burden, visits indicating presence of non-physician clinicians (such as nurse practitioners or physician assistants) were excluded from the analytical sample. Visit time outliers were eliminated by restricting visit time to a range from one to 60 minutes. Because only visits with complete data were analyzed in multivariable analyses, all visits containing variables of interest coded as missing were excluded, leaving a final analytical sample of 14,736 family, general, and internal medicine primary care adult office visits in the United States between 2005 and 2007.

**Study variables.** The dependent measure of interest was duration of physician time spent with a patient for a particular visit. Time spent with physicians is defined in the NAMCS data documentation as the amount of time (in minutes) that a physician spent with the patient, not including

time spent waiting for an appointment or with another type of practitioner (28). Although defined as a continuous variable, the distribution of time spent with a physician in the NAMCS data was largely recorded in increments of five minutes of visit duration (five minutes, ten minutes, 15 minutes, and so on). To preserve the nature of the data while balancing the need for adequate sample sizes to achieve reliable estimates in data analysis, we defined the duration of time spent with a physician at an office visit as an ordinal measure of four 15-minute time increments (that is, one to 15 minutes, 16–30 minutes, 31–45 minutes, and 46–60 minutes). Prior analyses that have examined physician time using NAMCS data (26,29) dichotomized the time variable at the median visit duration. However, an ordered measure provides a more precise estimate of the associations between depression screening and physician time while respecting the analytical assumption of the nonnormal distribution of the data.

Several patient characteristics were used as control variables in the multivariable analysis. Age was dichotomized as patients aged 65 or older or those younger than 65. Race-ethnicity was defined as white non-Hispanic or "other" (including black non-Hispanic, Hispanic, Asian, Native Hawaiian or other Pacific Islander, American Indian or Alaska Native, or people of multiple races or ethnicities). The NAMCS documents 14 common chronic conditions, regardless of the diagnosis associated with that specific visit. Given its suspected relationship with depression screening, a diagnosis of depression (yes or no) was included as a separate control variable in the analyses. Of the 13 remaining possible, chronic conditions, the sum of the total number of chronic conditions was dichotomized as patients with more than the median number of chronic conditions or those with the median number or fewer.

Several visit characteristics were also suspected to be related to visit duration. An indicator variable was created to document the number of prior visits a patient had made to the sampled physician in the previous 12 months. This variable was di-

chotomized as patients with up to two prior visits versus those with three or more prior visits. Primary payment type was defined as private insurance, Medicare, Medicaid, or other, which included worker's compensation, self-pay, no charge, other, or unknown. The NAMCS data also document the order for or provision of numerous diagnostic or screening tests. The independent variable of primary interest in this study was order for or provision of depression screening documented in the patient medical record. Depression screening was defined

separately from the other diagnostic and screening tests by a dichotomous variable (yes or no). Because the data collected in the NAMCS regarding diagnostic and screening tests are limited to the description of "order for or provision of" a given test, the meaning of the term "depression screening" as used in this study was defined as physician intent to screen the patient for depression.

All other diagnostic and screening tests were collapsed into a single dichotomous variable indicating at least one test versus no tests. Measure-

ments of vital signs, height, and weight were not included as diagnostic tests in the analysis because they are standard practice at family, general, and internal medicine primary care visits. The order for or provision of health education at a visit was dichotomized as yes or no. A final indicator variable for visit type was used to identify an acute care, chronic care (including routine and flare-up chronic care), or preventive care visit.

### Analysis

Univariate descriptive statistics were calculated to profile the study sample. Ordered logistic regression was used to evaluate the relationship between depression screening and primary care physician visit duration while controlling for important covariates in a multivariable model. Predicted probabilities were calculated from the multivariable ordered logistic regression to assess the distribution of visit duration time intervals stratified by visits with and without depression screening. To provide population estimates, all data management and analyses were performed in Stata, version 10.1 (30), with complex survey commands using Taylor-linearized variance estimation, sampling weights, and masked sampling design variables provided in the NAMCS data set (31). An a priori alpha level of .05 was the criterion for statistical significance.

### Results

A total of 14,736 complete, community-based adult visits to family, general, and internal medicine primary care physicians were analyzed from the 2005–2007 NAMCS data set, which represented 641,345,993 visits nationally (Table 1). Henceforth, all results are presented and discussed at the population level. Overall, most visits were from one to 15 minutes long (56.1%). The distribution of visit duration was positively skewed, with a median visit time of 15 minutes. Depression screening was documented at 3.4% of visits.

Several variables were associated with longer visit duration in the ordered logistic regression model (Table 1). Most important, depression screening at a visit was associated

**Table 1**

Factors associated with physician office visit duration<sup>a</sup>

Characteristic	Sample proportion	Adjusted odds ratio	95% CI
Time spent with physician (minutes)			
1–15	.561	—	
16–30	.369	—	
31–45	.057	—	
46–60	.013	—	
Sex			
Male (reference)	.414	1.00	
Female	.586	1.04	.94–1.16
Race			
White (reference)	.749	1.00	
Other	.251	.90	.75–1.09
Age			
<65 (reference)	.681	1.00	
≥65	.319	.95	.80–1.13
Visits with physician in previous 12 months			
0–2 (reference)	.377	1.00	
≥3	.623	.88	.77–1.00
Visit type			
Acute care (reference)	.404	1.00	
Chronic care	.437	1.24	1.08–1.41
Preventive care	.159	2.00	1.57–2.53
Diagnosis of depression			
No (reference)	.868	1.00	
Yes	.132	.99	.83–1.18
Number of chronic conditions (other than depression)			
0–1 (reference)	.575	1.00	
≥2	.425	1.35	1.19–1.53
Payment type			
Private insurance (reference)	.536	1.00	
Medicare	.278	1.00	.80–1.25
Medicaid	.101	1.00	.77–1.30
Other	.085	.90	.72–1.12
Depression screening			
No (reference)	.966	1.00	
Yes	.034	3.66	2.25–5.95
Additional diagnostic tests and screenings			
No (reference)	.403	1.00	
Yes	.597	1.60	1.42–1.80
Health education			
No (reference)	.575	1.00	
Yes	.425	1.49	1.23–1.81

<sup>a</sup> Source: National Ambulatory Medical Care Survey, 2005–2007. N=14,736 visits, weighted to a population estimate of 641,345,993 visits

with significantly higher odds of having a longer visit duration compared with visits not involving depression screening (adjusted odds ratio=3.66).

Subsequent to the primary analysis, the dependent variable, visit duration, was specified and tested in a number of ways in several multivariable post hoc analyses using an identical set of independent variables from the primary analysis and the same complex survey commands. Results of a multivariable linear regression analysis using physician visit duration (in minutes) as a continuous dependent variable demonstrated no variation in results compared with results presented in Table 1. Multivariable models using log-linear, square root, and squared transformations of the continuous dependent variable also demonstrated no variation in results when compared with the ordered logistic model. It is important to note that none of these techniques normalized the distribution of the visit duration variable. Finally, to compare this study's results with prior NAMCS studies examining physician visit duration, the dependent variable was dichotomized at its median of 15 minutes in a logistic regression model. With the exception of number of prior visits in the previous 12 months ( $p=.184$ ), the interpretation of results did not vary from the primary analysis using the ordered dependent variable.

The distribution of the probability of a physician visit in a given time interval estimated from the ordered logistic regression demonstrates differing patterns of visit duration when stratified by visits with and without depression screening while holding other independent variables at their sample means (Figure 1). Whereas 27.7% of depression screening visits occurred in the one- to 15-minute interval, 58.4% of nonscreening visits occurred in this time interval. However, this relationship subsequently reversed, with higher proportions of visits including depression screening at longer visits.

## Discussion

This research sought to evaluate the relationship between depression

screening and physician visit duration. Depression screening was found to be independently associated with an increased time burden on primary care physicians after controlling analyses for other factors that may contribute to physician visit duration. Although this result is not surprising, time burden is often overlooked by policy makers when proposing new disease identification and management guidelines.

The U.S. Department of Health and Human Services has acknowledged that primary care providers have little incentive to perform mental health screenings (32), and research has shown that physicians may deliberately misdiagnose major depressive disorder in patients' medical records for reasons of reimbursement (33). Without efficient mechanisms to facilitate depression screening in primary care, physicians may not be able to adequately provide this service. Therefore, well-intended, evidence-based guidelines may not be fully implemented and optimized. The shame and stigma associated with mental disorders may also discourage many individuals from seeking care (34); therefore, a proactive effort by health care providers is of the utmost importance.

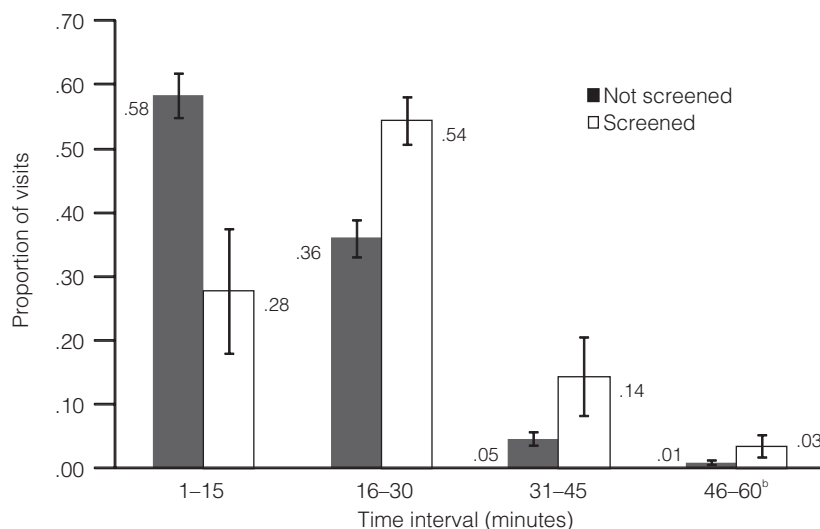
Given the additional physician time

burden and costs associated with depression screening, alternative methods for implementation warrant continued study. Research examining potential strategies to facilitate and integrate cost-effective depression screening within the current structure of the primary care system is needed. Alternative and accessible community health care providers such as pharmacists may be well positioned to screen and refer patients who are at risk of a depressive disorder. Other promising mechanisms include computerized screening kiosks in physicians' offices, which were recently described in a study of an electronic version of the nine-item Patient Health Questionnaire (35). Such devices likely will save personnel time and deliver real-time screening results to patients' physicians.

Because depression is a highly prevalent comorbidity that adversely affects the management of other disease states and generates excess financial costs (36), the USPSTF determined depression screening to be an appropriate method for improving depression treatment. Despite these guidelines, there is no consensus on the feasibility and implementation of depression screening for the general population. In 2001–2002, a study using simulated models to analyze the

**Figure 1**

Probability of time spent with physician, by depression screening status<sup>a</sup>



<sup>a</sup> Source: National Ambulatory Medical Care Survey, 2005–2007. N=641,345,993 (population estimate). Confidence intervals are shown at the tops of bars.

<sup>b</sup> Standards of reliability or precision were not met within this time interval.



cost utility of depression screening found that regular screening could incur costs in excess of \$50,000 per quality-adjusted life year (27,37). Although the study concluded that more effective therapies and efficient treatment protocols may improve the cost utility of depression screening, we are unaware of any controlled studies examining both the actual costs and consequences of implemented depression screening programs subsequent to the publication of the 2002 USPSTF depression screening guidelines. Thus, to more fully understand depression screening practices in primary care, there is a critical need for research examining the real-world implementation of depression screening programs. Important domains that should be studied include efficient use of personnel, providers, and technology; patient disposition into treatment; and subsequent patient outcomes.

There were several limitations to this study. As is common with survey methodology, data gathering was subject to recording and transcribing errors. The cross-sectional data collected through the NAMCS precludes consideration of direct causation between depression screening and physician visit duration. Although adjustments were made to account for the complex survey procedure of the NAMCS, results are only estimates. Publicly available NAMCS data files contain masked sampling unit and strata markers to protect patient privacy. Compared with the use of unmasked markers, the masking procedure decreases the precision of error estimates when weighting is applied to correct for the complex nature of the NAMCS survey data. However, internal testing by National Center for Health Statistics staff has indicated that standard errors produced with masked markers may tend to slightly overestimate error terms (31), therefore yielding a more conservative statistical analysis.

Measures from diagnostic and screening tests, including depression screening, as well as health education, do not directly address whether those services were provided at the office visits or simply ordered by the physician. Nonetheless, a documented in-

tent to screen for depression was associated with increased duration of visit. The NAMCS has been found to accurately document diagnostic tests but to underestimate behavioral counseling (38,39); however, such studies occurred before the implementation of the depression screening variable in data collection and thus cannot be extrapolated to the accuracy of screening documentation. In addition, this study included only visits where physicians were seen and excluded nonphysician clinicians. In offices with multiple types of practitioners, physicians may see sicker patients with more complex case histories, which therefore may affect depression screening rates.

Because of a smaller number of visits that lasted from 46 to 60 minutes, some cells in bivariate cross-tabulations contained fewer than 30 observations. Although this may lead to instability in statistical analysis, this time interval was not of direct importance to the results of this study; the shift from visits of one to 15 minutes to those of 16–30 minutes was not limited by sample size. Although it has been reported that the NAMCS may overestimate visit duration (38,39), this study sought only to examine the relationship of depression screening and visit duration. A consistent overestimation in visit duration should not affect the significant pattern of relationships found in this study. In addition, a post hoc multivariable model (results not shown) excluding visits where visit duration was imputed by the National Center for Health Statistics staff did not change the interpretation of results.

Although several potential covariates were included in the multivariable analysis, additional factors unaccounted for, such as physician characteristics and practice patterns not captured in the publicly available NAMCS data, may have influenced the relationship between physician visit time and depression screening. For example, physicians who spend more time with patients may conduct more thorough patient examinations and may be the type of physician who screens for depression. Therefore, analysis of physician practice patterns represents an important area of fu-

ture research to identify factors associated with successful depression screening programs in primary care physicians' practices.

## Conclusions

Depression screening is a recommended practice in primary care settings to triage patients into depression treatment. This study demonstrated that depression screening was associated with extended physician office visit duration. Future research examining both the costs and consequences of depression screening using formal cost-effectiveness or cost-benefit analysis for novel comparator strategies (using technology or personnel other than physicians to conduct screenings) are warranted to determine appropriate strategies that facilitate more complete implementation of efficient depression screening programs.

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