# Extended Office Hours and Health Care Expenditures: A National Study

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## ABSTRACT

**PURPOSE** A key component of primary care improvement efforts is timely access to care; however, little is known regarding the effects of extended (evening and weekend) office hours on health care use and outcomes. We examined the association between reported access to extended office hours and both health care expenditures and mortality.

**METHODS** We analyzed data from individuals aged 18 to 90 years responding to the 2000-2008 Medical Expenditure Panel Surveys reporting access or no access to extended hours via a usual source of care in 2 successive years (year 1 and year 2; N = 30,714). Dependent variables were year 2 total health care expenditures and, for those enrolled in 2000-2005, all-cause mortality through 2006. Covariates were year 1 sociodemographics and health care use, and year 2 health insurance, health status, and chronic conditions. We conducted further analyses, progressively adjusting for year 2 use, to explore mechanisms.

**RESULTS** Total expenditures were 10.4% lower (95% confidence interval, 7.2%-13.4%) among patients reporting access to extended hours in both years vs neither year. Adjustment for year 2 prescription drug expenditures, and to a lesser extent, office visit–related expenditures (but not total prescriptions or office visits, or emergency and inpatient expenditures) attenuated this relationship. Extended-hours access was not statistically associated with mortality.

**CONCLUSIONS** Respondents reporting a usual source of care offering evening and weekend office hours had lower total health care expenditures than those without extended-hours access, an association related to lower prescription drug and office visit–related (eg, testing) expenditures, without adverse effects on mortality. Although requiring further study, extended office hours may be associated with more judicious use of health care resources.

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## INTRODUCTION

The Joint Principles of the Patient-Centered Medical Home emphasize the importance of offering patients access to a usual source of health care during extended (eg, evening and weekend) hours.[1] Among several desired outcomes of offering extended access, one goal in the context of the health care financing crisis is to reduce unnecessary health care expenditures.[2] Offering patients extended access to their usual source of care might afford earlier diagnosis and treatment of serious health conditions, potentially preventing catastrophic events, and reducing expenditures. Extended office hours might also limit unnecessary patient exposure to higher-acuity (eg, emergency) care and, therefore, to discretionary and potentially harmful testing, treatments, and hospitalizations[3-5] initiated by clinicians unfamiliar with their care, which might further reduce expenditures.

Few studies, however, have examined associations between extended hours and health care use and expenditures. Most studies in this realm concerned emergency department use, with findings suggesting that

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extended hours may decrease emergency visits, but without consideration of effects on total health care expenditures.[6-10] An additional study found little impact of improved access to care on inpatient admissions and medical costs among chronically ill patients, but again did not examine effects on total expenditures.[11] The generalizability of these studies is uncertain, as they involved small local samples of patients, some with selected health conditions.

In addition, no studies have explored associations between extended office hours and mortality. This is an important research gap, as potential cost savings alone should not drive practice redesign, and competing influences of extended access on mortality may exist. Although extended access to a familiar clinician may foster more appropriate care, thereby reducing mortality, extended access could divert some patients with serious acute illnesses from emergency and hospital settings, delaying necessary emergency care and increasing mortality.

To address these issues, we analyzed longitudinal data from the Medical Expenditure Panel Survey (MEPS) for the years 2000-2008,[12] and, for respondents enrolled in 2000-2005, linked data to the National Death Index (NDI) though 2006.[13] We examined associations between reported consistent access or lack of access to extended office hours via a usual source of care in 2 successive years (year 1 and year 2) and year 2 total health care expenditures and subsequent mortality. We hypothesized that self-reported access to extended office hours would be associated with lower health care expenditures, without an adverse effect on mortality. We also explored mechanisms of the association between extended access and expenditures in analyses progressively adjusting for subcategories of year 2 health care use and expenditures: (1) emergency department expenditures and inpatient expenditures, (2) number of office visits and number of prescription medications, (3) prescription medication expenditures, and (4) office visit–related expenditures.

## METHODS

The MEPS is an annual national survey of health care use and costs in the US civilian, noninstitutionalized population, using an overlapping panel design.[12] Individual data are collected over a 2-year period through 6 interviews. The MEPS Household Component includes information on respondent health care features, sociodemographics, health insurance, and health care expenditures. A self-administered questionnaire in both years includes items on chronic health conditions and health status. The full-year response rate varied from 65.8% to 59.3% for the 9 panels of data (2000-2008) we used.[12] Our analytic sample included all persons aged 18 years and older on entry reporting a usual source of care in both years, and either access to extended office hours in both years or no such access in both years.

The MEPS Household Component sample is a subsample of households included in the previous year's National Health Interview Survey (NHIS), conducted annually by the National Center for Health Statistics. The NHIS is linked to death certificate data in the NDI, a central computerized index of US death record information on file in state vital statistics offices, in turn permitting linkage to the MEPS.[13]

### Measures

#### Extended Hours

All respondents answered a question each year asking whether they had a usual source of health care (yes vs no). Those answering yes were asked whether the usual source of care offered evening and weekend hours.

#### Health Care Use and Expenditures

The MEPS Household Component collects detailed information about health care use (hospitalizations, emergency department visits, outpatient hospital visits, office-based visits, dental visits, home health care, prescription medications, and ancillary care). In each year, this information is used to generate standardized expenditures for each item of use, summed to yield total expenditures.

#### Health Status

Mental and physical health status were measured with the 12-Item Short Form Health Survey (SF-12) Mental Component Summary (MCS-12) and Physical Component Summary (PCS-12) scores, respectively.[14] Scores range from 0 to 100, with higher scores indicating better health. We also included a single-item global self-rated health measure, as it has been significantly associated with use and mortality independent of mental and physical health status.[15] The item asks, "In general, would you say your health is: excellent, very good, good, fair, or poor?"

#### Mortality

Mortality was assessed via the NDI through December 2006 with the public-use version of the NHIS-linked mortality files. Calibration studies indicate that, overall, 98.5% of respondents are correctly classified by their death date or as alive. Survival was measured in quarters from year 1 until time of death, or considered censored if the individual was alive on December 31, 2006.[13]

### Sociodemographic and Other Variables

We examined the following sociodemographic variables: sex; age in years; race/ethnicity (Hispanic, white, black, or other [with Hispanic ethnicity taking categorical precedence over race]); household income level (<100%, 100% to <125%, 125% to <200%, 200% to <400%, or ≥400% of the federal poverty level); education level (0-8 years formal schooling [less than high school]; 9-11 years [some high school]; 12 years [high school graduate]; 13-15 years [some college]; ≥16 years [college graduate]); urban residence (living in a Metropolitan Statistical Area or not); US Census region of residence (West, Midwest, Northeast, South); and health insurance status (none/uninsured [no insurance for the whole year], privately insured [any private insurance during the year], or publicly insured [only public insurance during the year, primarily Medicaid, Medicare, or both]).

MEPS Household Component respondents also self-report 8 chronic conditions: diabetes, hypertension, coronary heart disease, myocardial infarction, cerebrovascular disease, asthma, emphysema, and arthritis. Agreement between survey respondent–reported and clinician-reported health conditions is high.[16]

## Data Analysis

Data were analyzed using Stata 12.0 (StataCorp), adjusting for the complex survey design of MEPS. We used longitudinal strata and primary sampling unit identifiers and survey weights, to derive estimates representative of the US civilian, noninstitutionalized adult population.

Linear regression analysis examined the association between the logarithm (to normalize expenditures) of year 2 health care expenditures (among those reporting any expenditures) and reported access to extended hours in both year 1 and year 2 among panel members reporting a usual source of care and starting in 2000-2008. We excluded from this primary analysis those who did not use any health care, because we considered the availability of extended hours would primarily affect those with at least some use. Parameter estimates (PEs) from ordinary least-squares models of log-costs yield percentage differences in actual costs using the following formula: % cost difference = $[\exp(PE) - 1] \times 100$. For respondents starting in the 2000-2005 panels, we examined the association between extended hours and mortality using Cox proportional hazards survival models. We examined the proportional hazards assumption both graphically and statistically, and found no statistically significant evidence of violation. All analyses adjusted for year 1 sociodemographic characteristics (sex, age, race/ethnicity, household income level, education, urban residence, and census region) and year 1 health care use (total health care expenditures, any hospitalization [vs none], any emergency department visit [vs none], number of office visits, and number of prescription medications). All analyses also adjusted for year 2 health insurance status, health-related characteristics (mental health status [MCS-12], physical health status [PCS-12], global self-rated health, and health conditions [count of 8 chronic conditions]). Analyses also adjusted for MEPS panel year, included as a categorical variable.

We explored potential mechanisms of the association between extended hours and total expenditures. The association between extended hours and year 2 emergency department or inpatient use was examined using logistic regression analyses, adjusting for the covariates listed above. A series of analyses progressively adjusted the base model predicting total expenditures for the following aspects of year 2 use: (1) emergency department expenditures and inpatient expenditures, (2) number of office visits and number of prescription medications, (3) prescription medication expenditures, and (4) office visit–related expenditures (standardized visit charges and ancillary expenditures including diagnostic testing).

We conducted several supplemental analyses to assess the robustness of the primary results. We repeated the expenditure regression model including site of usual source of care (office vs hospital based) as an additional covariate. In addition to using logarithm of expenditures as the dependent variable (which excludes those with no expenditures), we also implemented 2 generalized linear model analyses using a logarithm link and a Poisson distribution.[17] A final analysis also included smoking status (smoker or not) and body mass index category (<20, 20 to <25, 25 to <30, and ≥30 kg/m$^2$), to adjust for health risk behaviors. These health risks were not included in the main analyses because 4% of the analytic sample had missing data for these variables.

## RESULTS

A total of 54,624 eligible adults aged 18 to 90 years entering the MEPS cohorts between 2000 and 2007 reported a usual source of care in both years; 43,484 (79.6%) had complete baseline data. Of these, 33,269 (77.5%, population weighted) reported the same access to extended hours in both years ($\kappa$ for between-year agreement, 0.77; agreement expected by chance, 0.53) and composed the analytic sample.

Table 1 summarizes the characteristics of the analytic sample by whether or not the respondent reported access to extended office hours in both years. Compared with respondents reporting no such

**Table 1. Respondent Characteristics by Reported Extended-Hours Access**

| Characteristic | Access to Extended Hours[a] No (n = 21,817) | Access to Extended Hours[a] Yes (n = 11,452) | Total (N = 33,269) |
|---|---|---|---|
| **Year 1 characteristics** | | | |
| Female, % (SE) | 57.6 (0.3) | 55.9 (0.4) | 57.0 (0.3) |
| Age, mean (SE), y | 51.8 (0.2) | 45.7 (0.2) | 49.7 (0.2) |
| Race/ethnicity, % (SE) | | | |
| White | 77.1 (0.7) | 76.1 (0.9) | 76.8 (0.6) |
| Hispanic | 8.5 (0.5) | 8.6 (0.5) | 8.5 (0.4) |
| Black | 9.7 (0.5) | 9.6 (0.5) | 9.7 (0.4) |
| Other | 4.7 (0.3) | 5.7 (0.4) | 5.0 (0.3) |
| Family income, % (SE) of FPL | | | |
| <100% | 9.7 (0.3) | 7.2 (0.3) | 8.8 (0.3) |
| 100% to <125% | 4.1 (0.2) | 2.8 (0.2) | 3.6 (0.1) |
| 125% to <200% | 12.9 (0.4) | 10.3 (0.4) | 11.9 (0.3) |
| 200% to <400% | 30.5 (0.4) | 31.8 (0.7) | 31.0 (0.4) |
| ≥400% | 42.9 (0.6) | 47.9 (0.9) | 44.7 (0.6) |
| Education, % (SE) | | | |
| Less than high school | 6.7 (0.3) | 4.4 (0.2) | 5.9 (0.2) |
| Some high school | 11.1 (0.3) | 10.5 (0.4) | 10.9 (0.2) |
| High school graduate | 32.2 (0.5) | 33.8 (0.6) | 32.8 (0.4) |
| Some college | 23.1 (0.4) | 24.1 (0.5) | 23.4 (0.3) |
| College graduate | 26.9 (0.6) | 27.3 (0.7) | 27.0 (0.5) |
| Urban residence, % (SE) | 76.0 (1.2) | 86.3 (0.9) | 79.7 (0.9) |
| US Census region, % (SE) | | | |
| Northeast | 14.8 (0.9) | 29.0 (1.6) | 19.9 (0.9) |
| Midwest | 20.6 (1.0) | 27.6 (1.4) | 23.1 (0.9) |
| South | 43.8 (1.3) | 22.8 (1.3) | 36.3 (1.1) |
| West | 20.8 (1.3) | 20.6 (1.3) | 20.8 (1.1) |
| **Year 2 characteristics** | | | |
| Health insurance, % (SE) | | | |
| Private | 75.9 (0.5) | 81.5 (0.6) | 77.9 (0.4) |
| Public | 17.7 (0.4) | 11.7 (0.5) | 15.6 (0.4) |
| None | 6.4 (0.2) | 6.8 (0.3) | 6.6 (0.2) |
| Health conditions, mean (SE), No.[b] | 1.2 (0.0) | 0.8 (0.0) | 1.1 (0.0) |
| PCS-12 score, mean (SE)[c] | 47.0 (0.1) | 49.8 (0.1) | 48.0 (0.1) |
| MCS-12 score, mean (SE)[c] | 50.7 (0.1) | 51.4 (0.1) | 50.9 (0.1) |
| Self-rated health, % (SE) | | | |
| Excellent | 19.2 (0.4) | 22.5 (0.6) | 20.4 (0.4) |
| Very good | 33.6 (0.5) | 37.4 (0.7) | 34.9 (0.4) |
| Good | 30.3 (0.4) | 28.6 (0.6) | 29.7 (0.3) |
| Fair | 12.2 (0.3) | 8.8 (0.3) | 11.0 (0.3) |
| Poor | 4.7 (0.2) | 2.7 (0.2) | 4.0 (0.1) |
| Smoker, % (SE) | 17.3 (0.3) | 18.7 (0.5) | 17.8 (0.3) |
| Body mass index in kg/m$^2$, % (SE) | | | |
| <20 | 4.9 (0.2) | 4.6 (0.2) | 4.8 (0.1) |
| 20 to <25 | 29.8 (0.4) | 30.7 (0.6) | 30.1 (0.3) |
| 25 to <30 | 35.8 (0.4) | 36.3 (0.5) | 35.9 (0.3) |
| ≥30 | 29.5 (0.5) | 28.4 (0.6) | 29.1 (0.4) |

FPL = federal poverty level; MCS-12 = the 12-Item Short Form Health Survey (SF-12) Mental Component Summary; PCS-12 = SF-12 Physical Component Summary.

Note: Percentages are population weighted.

[a] No group = 64.2% (SE 0.8); Yes group = 35.8% (SE 0.8).

[b] From a count of 8 conditions: diabetes, hypertension, coronary heart disease, myocardial infarction, cerebrovascular disease, asthma, emphysema, and arthritis.

[c] Scores range from 0 to 100, with higher scores indicating better health.

access, respondents reporting access were younger, had higher incomes and more education, were more likely to reside in urban areas and the Northeast, were more likely to have private insurance, and had better health status and fewer health conditions.

Table 2 shows unadjusted health care use and expenditures by reported access to extended hours. Those reporting access to extended hours had less use and lower related expenditures for all subcategories of use (office visits, prescription medications, emergency department visits, and hospitalizations).

Table 3 shows the adjusted associations between respondent characteristics and the logarithm of year 2 expenditures (model $R^2 = 42\%$); 6.7% (population weighted) had no expenditures. As compared with reported lack of access to extended hours, access to extended hours was associated with significantly lower year 2 expenditures (adjusted parameter estimate, −0.11, 95% confidence interval [CI] −0.14 to −0.07; $P < .01$). As shown in Table 4, this association translated to 10.4% lower year 2 expenditures (95% CI, 7.2%-13.4%; $P < .01$) in the group reporting access to extended hours. Supplementary adjusted analyses exploring possible pathways for the relationship between extended office hours and expenditures revealed that reported access to extended hours was associated with a significantly lower level of year 2 emergency department use (1.9% fewer visits; 95% CI, 0.8%-3.7%; $P = .04$), but not with year 2 hospitalizations.

Table 4 also shows the change in the magnitude of the

**Table 2. Respondent Health Care Use and Expenditures by Reported Extended-Hours Access**

| Measure | Access to Extended Hours[a] No (n = 21,817) | Access to Extended Hours[a] Yes (n = 11,452) | Total (N = 33,269) |
|---|---|---|---|
| **Office visits** | | | |
| Year 1 | | | |
| Number, mean (SE) | 5.3 (0.1) | 4.3 (0.1) | 4.9 (0.1) |
| Expenditures, mean (SE), $ | 1,261.0 (23.9) | 973.9 (31.5) | 1,158.8 (20.1) |
| Year 2 | | | |
| Number, mean (SE) | 5.4 (0.1) | 4.2 (0.1) | 5.0 (0.1) |
| Expenditures, mean (SE), $ | 1,229.4 (34.1) | 947.4 (39.4) | 1,129.0 (28.2) |
| **Prescription medications** | | | |
| Year 1 | | | |
| Number, mean (SE) | 19.6 (0.3) | 13.2 (0.3) | 17.4 (0.2) |
| Expenditures, mean (SE) $ | 1,283.4 (22.7) | 833.6 (21.3) | 1,123.4 (17.5) |
| Year 2 | | | |
| Number, mean (SE) | 19.3 (0.3) | 13.1 (0.3) | 17.1 (0.2) |
| Expenditures, mean (SE), $ | 1,307.5 (22.0) | 894.2 (31.2) | 1,160.5 (19.4) |
| **Emergency department visits** | | | |
| Year 1 | | | |
| Having any, % (SE) | 15.5 (0.3) | 13.6 (0.4) | 14.8 (0.3) |
| Expenditures, mean (SE), $ | 142.7 (5.0) | 122.5 (7.4) | 135.5 (4.3) |
| Year 2 | | | |
| Having any, % (SE) | 16.0 (0.3) | 13.1 (0.4) | 14.9 (0.3) |
| Expenditures, mean (SE), $ | 144.0 (6.0) | 123.3 (10.6) | 136.6 (5.2) |
| **Hospitalizations** | | | |
| Year 1 | | | |
| Having any, % (SE) | 11.0 (0.3) | 8.2 (0.3) | 10.0 (0.2) |
| Expenditures, mean (SE), $ | 1,391.0 (55.0) | 1,038.9 (133.6) | 1,265.7 (59.4) |
| Year 2 | | | |
| Having any, % (SE) | 11.9 (0.3) | 8.7 (0.3) | 10.7 (0.2) |
| Expenditures, mean (SE), $ | 1,746.9 (66.8) | 1,203.4 (116.2) | 1,553.6 (57.9) |
| **Total expenditures** | | | |
| Year 1, mean (SE), $ | 5,173.7 (87.7) | 3,852.4 (157.0) | 4,703.6 (82.5) |
| Year 2, mean (SE), $ | 5,522.3 (99.5) | 4,067.1 (171.0) | 5,004.6 (90.6) |

Note: Percentages are population weighted.

[a] No group = 64.2% (SE 0.8); Yes group = 35.8% (SE 0.8).

association between reported extended hours access and total health care expenditures when additionally adjusted for year 2 health care use. The association was not substantively attenuated by added adjustment for year 2 emergency department and inpatient expenditures or for total number of office visits and number of prescription medications. The association was attenuated, however, with added adjustment for prescription expenditures and attenuated further with adjustment for office visit–related expenditures.

A total of 833 respondents (3.7%) had died by the end of 2006, 191 (2.3%) among those reporting access to extended hours in both years, and 642 (4.0%) among those reporting no extended access in both years. Mortality was not associated statistically with reporting extended hours among respondents enrolled in 2000-2005 panels (adjusted hazard ratio = 1.11; 95% CI, 0.92-1.35; $P = .28$; N = 22,766; 833 [3.7%] died). Associations between reporting extended hours and expenditures were consistent in all supplementary analyses, including analyses using generalized linear models with Poisson distributions, and adjusting for site of usual source of care and health risks (body mass index and smoking).

## DISCUSSION

Patients reporting in both study years that their usual source of care offered evening and weekend hours had lower year 2 total health care expenditures than those consistently reporting no evening and weekend access, without apparent adverse effects on mortality. The findings stemmed from analyses adjusted for numerous potential confounders, including sociodemographics and health insurance status plus an array of variables capturing comorbidity (year 2 mental and physical health status, self-rated health, and chronic conditions, and year 1 health care expenditures and use). Indeed, the model explained 42% of the variance in total expenditures, more than most expenditure prediction models, typically including less comorbidity adjustment.[18]

Furthermore, in analyses progressively adjusting for aspects of year 2 health care use, only adjustment for year 2 prescription drug expenditures and office visit–related expenditures (but not number of prescriptions or office visits) substantively attenuated the relationship between extended hours and total expenditures. Although our study design does not permit formal testing of causal pathways, 2 interpretations of this finding seem plausible. First, clinicians in practices offering extended access may tend to provide more cost-conscious care in general, including a proclivity for prescribing less expensive (eg, generic) medications and less discretionary test ordering during office visits. A patient-centered approach has been previously dem-

onstrated to be associated with decreased use of and charges for medical services.[19] Other work suggests significant independent effects of clinicians on generic drug and discretionary care use.[20-22] Extended access may thus represent a marker of primary care practices with a cost-conscious approach. This finding may be useful to health administrators and policy makers interested in relatively simple ways of identifying such practices—a seemingly important aim given the health care financing crisis.[2] Additionally, or alternatively, practices offering extended access may attract patients less likely, from a dispositional standpoint, to request brand name medications and discretionary testing. Studies designed to examine these and other mechanisms would be helpful.

**Table 3. Adjusted Associations Between Sample Characteristics and Logarithm of Year 2 Total Health Care Expenditures (N = 30,714)**

| Characteristic[a] | Adjusted Parameter Estimate (95% CI) | *P* Value |
|---|---|---|
| Access to extended hours in both year 1 and year 2 (reference = no access in both years) | −0.11 (−0.14 to −0.07) | <.01 |
| Age, y | 0.02 (0.01 to 0.02) | <.01 |
| Female | 0.19 (0.16 to 0.22) | <.01 |
| Race/ethnicity (reference = white) | | |
| Hispanic | −0.22 (−0.28 to −0.16) | <.01 |
| Black | −0.22 (−0.28 to −0.16) | <.01 |
| Other | −0.20 (−0.29 to −0.12) | <.01 |
| Income, % of FPL (reference = <100%) | | |
| 100% to <125% | −0.06 (−0.15 to 0.03) | .20 |
| 125% to <200% | 0.00 (−0.07 to 0.06) | .98 |
| 200% to <400% | 0.04 (−0.03 to 0.10) | .24 |
| ≥400% | 0.16 (0.09 to 0.22) | <.01 |
| Education (reference = no high school) | | |
| Some high school | 0.08 (−0.00 to 0.16) | .05 |
| High school graduate | 0.15 (0.09 to 0.22) | <.01 |
| Some college | 0.23 (0.16 to 0.30) | <.01 |
| College graduate | 0.33 (0.26 to 0.40) | <.01 |
| Urban residence | 0.06 (0.02 to 0.11) | <.01 |
| US Census region (reference = Northeast) | | |
| Midwest | 0.08 (0.02 to 0.13) | .01 |
| South | −0.03 (−0.08 to 0.03) | .34 |
| West | −0.01 (−0.06 to 0.05) | .80 |
| Health insurance (reference = private), year 2 | | |
| Public | −0.12 (−0.17 to −0.06) | <.01 |
| None | −0.51 (−0.58 to −0.43) | <.01 |
| Count of chronic health conditions, year 2 | 0.09 (0.07 to 0.10) | <.01 |
| Health status, year 2 | | |
| PCS-12 score | −0.02 (−0.02 to −0.02) | <.01 |
| MCS-12 score | −0.01 (−0.01 to 0.00) | <.01 |
| Self-rated health, year 2 (reference = excellent) | | |
| Very good | 0.20 (0.15 to 0.25) | <.01 |
| Good | 0.31 (0.25 to 0.37) | <.01 |
| Fair | 0.36 (0.28 to 0.44) | <.01 |
| Poor | 0.57 (0.45 to 0.68) | <.01 |
| Health care use | | |
| Total health care expenditures, per $1,000 increase | 0.01 (0.01 to 0.01) | <.01 |
| Any hospitalization (reference = none) | −0.05 (−0.11 to 0.00) | .06 |
| Any emergency department visit (reference = none) | 0.15 (0.11 to 0.19) | <.01 |
| Office visits, number | 0.03 (0.03 to 0.03) | <.01 |
| Prescription medications, number | 0.01 (0.01 to 0.01) | <.01 |

FPL = federal poverty level; MCS-12 = the 12-Item Short Form Health Survey (SF-12) Mental Component Summary; PCS-12 = SF-12 Physical Component Summary.

Note: Analyses also adjusted for Medical Expenditures Panel Survey panel year.

[a] Characteristics measured in year 1 unless noted.

Of note, although patients reporting access to extended hours were less likely to visit the emergency department in year 2, reduced emergency use did not account for the lower total health care expenditures in year 2 associated with extended access, as we and others[6-10] had contemplated. With hindsight, this is not a particularly surprising finding, given that emergency department–related expenditures represented only a small proportion of total year 2 health care expenditures (Table 2). The association between extended hours and total expenditures also did not appear attributable to another factor we considered salient—clinician familiarity with the patient (eg, continuity)—given the lack of meaningful attenuation when adjusting for year 2 office visits. Rather, as noted previously, adjustment for year 2 office visit expenditures attenuated the relationship, suggesting clinician practice style (eg, proclivity for discretionary testing) may influence total expenditures more than patient continuity. Again, however, further studies are needed to test these hypotheses.

Although health care costs are an important consideration in the current climate, patient outcomes remain the most important criteria for assessing quality of care, as some cost-saving care approaches may foster unacceptably worse health outcomes.[23] Specifically, the availability of extended office hours could increase mortality by diverting patients in need of

**Table 4. Adjusted Percentage Change in Year 2 Total Health Care Expenditures Associated With Extended-Hours Access With Progressive Adjustment for Year 2 Health Care Use**

| Analysis | Adjusted % Change in Year 2 Total Health Care Expenditures (95% CI) | *P* Value |
|---|---|---|
| Base model | −10.4 (−13.4 to −7.2) | <.01 |
| Model with progressive adjustment for year 2: | | |
| Emergency department and inpatient expenditures | −9.1 (−11.8 to −6.3) | <.01 |
| + Numbers of office visits and prescription medications | −8.4 (−11.0 to −5.8) | <.01 |
| + Prescription medication expenditures | −5.7 (−8.1 to −3.3) | <.01 |
| + Office visit expenditures | −4.3 (−6.5 to −2.0) | <.01 |

Note: All analyses adjusted for year 1 age, sex, race/ethnicity (white [reference], Hispanic, black, other), income (≤100% [reference], 100% to <125%, 125% to <200%, 200% to <400%, or ≥400% of federal poverty level), education (no high school [reference], some high school, high school graduate, some college, college graduate), Metropolitan Statistical Area, Census region (Northeast [reference], Midwest, South, West), health insurance (private [reference], public, none), total health care expenditures, hospitalizations (any vs none), emergency department visits (any vs none), number of office visits, and number of prescription medications; year 2 count of 8 chronic health conditions, the 12-Item Short Form Health Survey (SF-12) Mental Component Summary and Physical Component Summary scores, and self-rated health; and Medical Expenditures Panel Survey panel year.

higher-acuity care away from emergency departments and hospitals. In this context, although reported access to extended hours was not associated with decreased mortality, that it was not associated with increased mortality is reassuring.

Limitations of this study include the MEPS reliance on patient survey data. Self-reports of having a usual source of care may overstate the respondent's actual connections to a primary care clinician. There may also be some bias in recall, in that patients recalling the availability of extended hours may also be those likely to generate lower expenditures. Our approach of including only respondents reporting the same access to extended hours in both survey years probably reduced this problem; however, it is likely that some misclassification bias remained, and this bias may have resulted in underestimation of the association between extended hours and total expenditures. In addition, we used self-reported health care use and standardized expenditures in our analyses, rather than more direct measures of visits, tests, or claims. We were also unable to adjust for some variables that might plausibly influence health care expenditures beyond those included in our models, such as specific type of health care system (eg, vertically integrated health maintenance organization vs stand-alone primary care office) and health insurance plan, and health care quality (eg, National Committee for Quality Assurance indicators).

In conclusion, respondents consistently reporting access to a regular source of care offering evening and weekend hours in both study years had significantly lower year 2 total health care expenditures, but not mortality. The association was substantially attenuated by adjusting for year 2 prescription medication and office visit–related expenditures, but not number of medications and office visits or emergency department and inpatient use. Although studies designed to formally test this hypothesis are needed, extended hours may be associated with relatively judicious use of primary health care resources (eg, more generic medication prescribing, less discretionary testing), with no apparent adverse effects on survival.

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**Key words:** after-hours care; comprehensive health care; health care costs; health status; mortality; primary health care

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