

The Delivery of Clinical Preventive Services Acute Care Intervention

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BACKGROUND. Evidence-based clinical preventive services are underutilized. We explored the major factors associated with delivery of these services in a large physician-owned community-based group practice that provided care for both fee-for-service (FFS) and health maintenance organization (HMO) patient populations.

METHODS. We performed a cross-sectional audit of the computerized billing data of all adult outpatients seen at least once by any primary care provider in 1995 (N = 75,621). Delivery of preventive services was stratified by age, sex, visit frequency, insurance status (FFS or HMO), and visit type (acute care only or scheduled preventive visit).

RESULTS. Insurance status and visit type were the strongest predictors of clinical preventive service delivery. Patients with FFS coverage received 6% to 13% (absolute difference) fewer of these services than HMO patients. Acute-care-only patients received 9% to 45% fewer services than patients who scheduled preventive visits. The combination of these factors was associated with profound differences.

CONCLUSIONS. Having insurance to pay for preventive services is an important factor in the delivery of such care. Encouraging all patients to schedule preventive visits has been suggested as a strategy for increasing delivery, but that is not practical in this setting. Assessing the need for preventive services and offering them during acute care visits has equal potential for increasing delivery.

KEY WORDS. Preventive health services; fee-for-service plans; health maintenance organizations. (*J Fam Pract* 1999; 48:785-789)

Preventive care to the well patient has become an accepted activity in primary care.¹ Clinical preventive services require a high standard of proof of effectiveness.² Although evidence-based guidelines¹ and goals³ have been published, optimal delivery has been achieved only infrequently.⁴ The formidable list of its potential barriers¹ includes physician factors (lack of consensus, motivation, compensation, time), patient factors (age, race, sex, patient acceptance, insurance status, visit frequency, not scheduling preventive visits), and system factors (absence of paramedical assistance, disorganized medical records, fragmentation of care, lack of a systematic delivery program). Strategies to improve the delivery of preventive services must recognize the complexity and uniqueness of each office practice⁵⁻⁷ and advocate the use of quality improvement methodologies.⁸

Previous studies have shown that insurance coverage significantly affects preventive service delivery,⁹ but the fear that health maintenance organization (HMO) patients would receive fewer preventive services than fee-for-service (FFS) patients¹⁰ is unfounded.¹¹ The favorable effect of HMO enrollment on preventive service delivery is probably because of insurance coverage rather than self-selection.¹¹ Many studies of FFS and HMO care delivery have compared one physician group seeing FFS patients exclusively with another group seeing HMO patients.¹²⁻¹⁸ In that study design, differences may be related to confounding physician and system factors rather

than the type of insurance coverage.¹⁹

Physicians have been trained to deliver preventive care during the annual complete physical examination. The effectiveness of the traditional complete physical as a vehicle for preventive service delivery has been questioned recently,²⁰ however, and delivery of preventive services during acute care visits has been advocated as a more effective alternative.^{21,22} Indeed, systematic delivery strategies that include the offer of these services during acute care visits have achieved the highest levels of preventive service delivery in primary care settings.^{4,23} But these studies were performed in a small number of private practice settings, and it is unclear whether the same results apply in the larger organized systems of care.²⁴

As part of a program to increase delivery of adult clinical preventive services, we determined the major factors associated with the performance of specified preventive services in a large physician-owned health delivery system that included both HMO and FFS patients. We particularly sought to measure the quantity of preventive services associated with insurance status (HMO vs FFS) and visit type (preventive visits vs acute care only).

METHODS

PRACTICE SETTING

We studied a multispecialty group practice with 15 offices located in Dane County, Wisconsin. The service area is representative of the county and contains one midsize city (190,000 population), several smaller cities and towns, and a surrounding rural area. During the audit period there was a county population of 351,362, of whom 149,225 (42%) were enrolled in HMOs, 7027 (2%) were covered by Medicaid, and 42,193 (12%) were uninsured. The group practice owned and operated its own prepaid health plan (DeanCare HMO), which was clinically managed by the physician-owners who were compensated for

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their services on the basis of a discounted FFS formula that did not provide financial incentives to manage HMO and FFS patients differently. The HMO paid for all preventive services deemed appropriate by the physician, while many FFS insurance carriers did not.

AUDIT OF COMPUTERIZED BILLING RECORDS

The group practice computerized billing system contained a record for every encounter. The records include provider and patient codes, the site of service, diagnosis codes, and any billable tests obtained within the group's clinical laboratory and radiology facilities. Only group practice sites that used these facilities exclusively were audited. Patient demographic information was obtained by cross-referencing the patient code with a master enrollment file. Computerized billing data for 1985 to 1995 were audited. For each patient, yearly data were abstracted that included a flag for the presence/absence (1/0) of a billable preventive procedure. From this data file, a set of positive criteria was constructed to determine the prevalence of preventive service delivery on the basis of age, sex, and frequency criteria (Table 1). Positive criteria were modeled after those developed by the National Committee on Quality Assurance.²⁵

The audited population included all adult outpatients (aged 18 years and older) who visited a defined panel of primary care providers at 10 sites at least once in 1995. In addition to age and sex, the following data were abstracted: billable preventive procedures (Papanicolaou test, screening mammogram, cholesterol test, tetanus immunization, fecal occult blood test, and sigmoidoscopy), total visits to primary care providers, insurance type (HMO, FFS, Medicare, Medicaid, or workers' compensation), and visit type (acute care-only or scheduled preventive care visit). Cholesterol testing as part of a chemistry panel was counted separately from single cholesterol determinations or lipid profiles, which were classified as screening.

COMPUTER AUDIT VALIDATION USING MEDICAL RECORD REVIEWS

At one study site, the computer audit results were validated by manual review of 200 randomly selected medical

records. The validation audit found good agreement ($\pm 2.5\%$) for documentation of preventive procedures; the proportion of positive criteria for the computerized audit was always within 2.5% of that for the manual chart review of the same patient population. Computerized visit frequency counts were highly correlated with medical record review counts ($R = 0.93$; $P < .0001$). Medical record review also showed that, except for sigmoidoscopy, approximately 98% of audited preventive procedures had been performed for screening, not for symptoms. (Sixty-seven percent of sigmoidoscopies had been done for screening.)

A separate review of a stratified sample of 245 medical records⁴ found evidence that screening was performed outside the system of care (and not recorded in the transaction files) in 0.5% or fewer of preventive procedures; the only exception was Papanicolaou tests, which had been obtained outside the system in 13.8% of women aged 20 to 29 years and 4.5% of those aged 30 to 39 years.

STATISTICAL TESTING

We explored univariate associations between age, sex, visit frequency, insurance type, and visit type using analysis of variance for continuous dependent variables and the Fisher exact test for binary categorical variables. We used logistic regression to test whether preventive services were independently associated with those same variables. For the statistical testing, visit frequency was defined as all visits to primary care providers in 1995, and presence of a visit scheduled specifically for preventive care was coded as positive if one occurred during 1994 or 1995 ($P < .05$ was reported as significant).

RESULTS

Thirty-five family practice physicians, 33 general internists, 15 obstetrician/gynecologists, and 12 physician assistants supervised by the primary care physicians made up the primary care provider panel. This panel encountered 75,621 outpatients at least once in 1995. Characteristics of this patient group are presented in Table 2.

Age was positively associated with men (mean = 47 years vs 45 years for women), visit frequency ($R = .073$), HMO insurance (mean = 45 years vs 41 years for FFS) and acute care-visits (mean = 48 years vs 43 years for preventive care visit) ($P < .001$ for all comparisons). Women were positively associated with visit frequency (mean = 3.4 visits per year vs 2.6 visits for men) and preventive care visits (52% of all women scheduled such visits vs 22% of men).

HMO membership was equal for both sexes. Visit frequency was positively associated with HMO membership (mean = 3.2 visits vs 2.6 for FFS) and preventive care visits (mean = 3.1 visits vs 3.0 for acute care only) ($P < .001$ for both). HMO members scheduled more preventive visits than FFS patients in 1995 (36% and 31%, respectively; $P < .001$).

TABLE 1

Positive Criteria for the Preventive Service Delivery Audits

Preventive Procedure*	Audited Time Period, Years	Eligible Patients	Age Range, Years
Papanicolaou test	3	Women	21-64
Mammogram	2	Women	52-64
Cholesterol test	5	All	40-64
Tetanus immunization	10	All	25-64
Fecal occult blood test	2	All	≥ 52
Sigmoidoscopy	5	All	≥ 55

*A preventive procedure was considered positive criteria if an eligible patient had the procedure recorded in the computerized billing file at least once within the audited time frame.

TABLE 2

Patient Characteristics of Study Sample (N = 75,621)

Characteristic	Measurement
Age, years	
Mean (SD)	45.7 (17.2)
Median	43
Range	18-99
Sex, % men	38
Visits	
Mean no. (SD)	3.1 (2.9)
Frequency, %	
Less than 3	58
3 or more	42
Insurance category, %	
HMO	45
FFS	30
Other*	15
Mixed†	10
Acute care visits only, %	71

Note: Data reported refer to patient characteristics in 1995 only.

*Medicare, Medicaid, and worker's compensation.

†Multiple insurance categories reported for 1995.

SD denotes standard deviation; HMO, health maintenance organization; FFS, fee for service.

Table 3 presents the results for the Papanicolaou test, mammography, cholesterol, tetanus immunization, fecal occult blood testing, and sigmoidoscopy. In general, older patients received more preventive services than younger patients; differences by sex were inconsistent. Patients with 3 or more visits had consistently more positive criteria (7% to 12% more) than patients encountered only once or twice in 1995. HMO patients had 6% to 13% more screening than FFS patients. Associations with visit type

were greatest: Patients who scheduled at least one preventive visit had 9% to 45% more positive criteria than patients seen only for acute care. Because of the large sample size, all these differences were statistically significant. Even a trivial positive association of age and mammography use achieved statistical significance ($P = .01$) in the multivariate model. Logistic regression analyses showed that, for every preventive service audited, the associations of visit frequency and type were statistically independent ($P < .001$ in all cases).

Table 4 illustrates the profound interaction between insurance type and visit type. HMO patients who scheduled a preventive visit had the highest rates of screening, while FFS patients seen only for acute care had rates that were 14% to 50% lower. FFS patients who scheduled a preventive visit had rates approaching the high rates of screening of the HMO/preventive visit group. Interestingly, HMO patients seen only for acute care had low rates of screening, closer to those of FFS/acute care—only than to the HMO patients who scheduled a preventive visit.

DISCUSSION

The audit methodology we used in this study measured the delivery of adult clinical preventive services in a multispecialty, multisite group practice health system that treats both FFS and HMO patients. The audited group included all patients having at least one face-to-face encounter with a primary care provider in 1995. This methodology excluded patients who were not seen during the audited year. Peripheral sites where billable services were not recorded were also excluded. Positive audit criteria were determined according to nationally recognized norms.²⁵

LIMITATIONS

Two random medical record reviews validated the computerized billing file audit showing that most recorded preventive procedures were performed for screening,

TABLE 3

Percentage of Positive Criteria for Preventive Service Delivery for 1995 Audit (N = 75,621)

	Total Percentage	Age		Sex		Visit Frequency*		Insurance Type*		Acute Care Only†	
		Younger Half	Older Half	Men	Women	<3	>3	FFS	HMO	Yes	No
Papanicolaou test	77	75	79			72	84	72	85	51	96
Mammogram	68	68	68			64	74	64	77	49	84
Cholesterol test, panel	67	56	75	68	66	59	77	63	71	62	71
Cholesterol test, screening	34	29	39	33	35	31	39	31	39	27	43
Tetanus immunization	37	31	41	38	36	34	40	33	41	31	43
Fecal occult blood test	30	27	32	28	31	26	34	26	33	25	40
Sigmoidoscopy	20	21	19	22	18	16	23	17	23	17	26

Note: Total and subgroup results. All subgroup differences were statistically significant at $P \leq .001$ by logistic regression (except age for mammography, $P = .01$).

*In 1995.

†In 1995 and 1994.

TABLE 4

Percentage of Positive Criteria for Preventive Service Delivery, by Visit Type and Insurance Type

Preventive Procedure	Preventive visit(s)*		Acute care only*	
	HMO (n = 17,032)	FFS (n = 9199)	HMO (n = 16,629)	FFS (n = 13,425)
Papanicolaou test	97	95	62	47
Mammogram	87	83	60	46
Cholesterol test, panel	74	68	68	59
Cholesterol test, screening	46	40	31	25
Tetanus immunization	45	40	36	28
Fecal occult blood test	41	35	27	20
Sigmoidoscopy	29	21	21	15

Note: Results are given for the 56,285 patients with continuous FFS or HMO coverage only throughout 1995.

*In 1994 or 1995.

HMO denotes health maintenance organization; FFS, fee for service.

and few patients had received any preventive services elsewhere. (The exceptions were the approximately 33% of sigmoidoscopies that were done for symptoms and a small percentage of Papanicolaou tests that were performed outside the system.) The magnitude of these discrepancies was insufficient to alter the conclusions of our study. It is possible that physicians did not code for some preventive visits scheduled by FFS patients whose insurance did not cover prevention. If so, our audit could have underestimated the association of scheduling preventive visits with the delivery of such services for FFS patients. There was no incentive for physicians to under-code preventive visits for HMO patients. The system of care did not record assignment of patients to individual physicians. Therefore, it was not possible to audit individual providers. The system's database did not record demographic information, such as education, income, ethnic origin, or race. Thus, we could not analyze health system performance in regard to socioeconomic status, which is an important additional predictor of preventive service use.²⁶ Nonbillable services, such as smoking cessation counseling and blood pressure testing, were not measurable using our methodology.

FFS VERSUS HMO INSURANCE

With one exception,²⁷ studies of HMO and FFS care have compared one group treating HMO patients with another group providing care for FFS patients. That type of study design raises the concern that system factors (different provider group attitudes, training, system access, protocols, and so forth) were responsible for the differences reported between HMO and FFS care. It is unlikely that this happened in our study, because both HMO and FFS patients were seen within the same system of care by the same physicians whose compensation formula did not discriminate between insurance types. In this system of care, HMO members had insurance to pay for any preventive service offered by the physician, while coverage for prevention was not uniformly available to FFS policy holders.

Our results that show HMO patients received more preventive services than FFS patients agree with the results of the National Health Interview Survey (NHIS),¹¹ which included a representative sample of the US population. It is unlikely that HMO self-selection accounted for the higher preventive services delivery rates for HMO patients in these studies. After controlling for factors correlated with selection into HMOs, health status, and use of medical services, results of the NHIS were not altered. In our study, only half of the HMO patients scheduled a preventive visit; the other half had lower screening rates (Table 4).

The most important determinant of access to health care is having health insurance.²⁸ We believe the most simple explanation for the superiority of preventive service

delivery to HMO patients in our system of care is that FFS patients without preventive coverage are reluctant to pay out-of-pocket expenses for these services. This belief is supported by the results of a recent study in managed care settings showing that physician compensation method was not significantly related to use, while plan benefit level was positively related to increased service delivery.⁹ Thus, providing insurance coverage to pay for preventive care is one potential strategy for increasing delivery.

PREVENTIVE VISITS VERSUS ACUTE CARE

Visit frequency has previously been shown to have a positive association with the delivery of preventive services.^{4,29} Our study confirms the association with visit frequency, but found a statistically independent and greater association with visit type. Similar to results in other primary care studies,³⁰ we found that a scheduled preventive visit was strongly predictive of the delivery of preventive services. One strategy, then, for rectifying this discrepancy is to insist that all patients schedule a yearly preventive visit. Currently only one third of patients in primary care settings³¹ schedule such a visit. A simple calculation demonstrates, however, that if primary physicians in our audit spent 30 additional minutes each year performing a complete physical examination for the approximately 54,000 patients currently seen for acute care only, there would be little or no time remaining to care for sick patients. Since the audited group represents only a part of the whole, the systemwide impact would be even greater. Additionally, when one author (D.L.H.) systematically invited all adults aged older than 50 years to schedule a complete physical examination, most did not do so (unpublished observations).

We agree with Frame²⁰ that it is neither feasible nor necessary to insist that all patients schedule preventive visits to receive preventive care. The delivery of preventive services during acute care visits has been advocated as a necessary strategy to deliver adequate services to entire

patient populations.^{21,22} People want physicians to provide more preventive services,³² and many patients who have not scheduled preventive visits will accept them if the physician offers.^{4,33} Preventive services delivery during illness visits is common in community practice,³³ though it is more prevalent in high-risk than average-risk patients.³⁴ Other primary care-based studies show that the best results are accomplished when these services are systematically offered to all patients during illness visits, regardless of risk status.^{4,23,35,36} Offering preventive care during acute care visits can be integrated into office practice^{4,33,34} and can be effective.^{4,36}

CONCLUSIONS

Coordinating efforts to offer evidence-based preventive services to all patients seen for acute care visits is a potential strategy to increase the delivery of this care. Implementation of this strategy could result in increased screening for patients enrolled in HMOs and for FFS patients with coverage. In 1996, Dean Health System began implementing a systemwide adult health maintenance guideline that emphasizes assessment and delivery during acute care visits and includes provider reports of guideline adherence. After 3 years of implementation, providers reported that more than 60,000 patients (mean = 1775 per month) were treated in accordance with the guideline. Follow-up audits are planned to monitor the outcome of this strategy to assess and offer preventive services during acute care visits.

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