

Research article

## Measuring access to effective care among elderly medicare enrollees in managed and fee-for-service care: a retrospective cohort study

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### Abstract

**Background:** Our aim was to compare access to effective care among elderly Medicare patients in a Staff Model and Group Model HMO and in Fee-for-Service (FFS) care.

**Methods:** We used a retrospective cohort study design, using claims and automated medical record data to compare achievement on quality indicators for elderly Medicare recipients. Secondary data were collected from 1) HMO data sets and 2) Medicare claims files for the time period 1994–95. All subjects were Medicare enrollees in a defined area of New England: those enrolled in two divisions of a managed care plan with different physician payment arrangements: a staff model, and a group model; and the Medicare FFS population. We abstracted information on indicators covering several domains: preventive, diagnosis-specific, and chronic disease care.

**Results:** On the indicators we created and tested, access in the single managed care plan under study was comparable to or better than FFS care in the same geographic region. Percent of Medicare recipients with breast cancer screening was 36 percentage points higher in the staff model versus FFS (95% confidence interval 34–38 percentage points). Follow up after hospitalization for myocardial infarction was 20 percentage points higher in the group model than in FFS (95% confidence interval 14–26 percentage points).

**Conclusion:** According to indicators developed for use in both claims and automated medical record data, access to care for elderly Medicare beneficiaries in one large managed care organization was as good as or better than that in FFS care in the same geographic area.

### Background

Over 32 million elderly Americans are enrolled in the Medicare health insurance program. Since 1982, the

Health Care Financing Administration has offered a managed care option, with capitated payment, to Medi-

care enrollees. Currently nearly 15% of Medicare enrollees are members of managed care plans nationwide. [1]

The economic incentives of capitated payment have raised concerns that managed care organizations that use capitation might limit provision of effective services as a way of trimming costs. [2–5] Public concerns about restriction of service in managed care organizations have led to proposed legislation for a "patient's bill of rights." [6] once again being considered in the US Senate. [7] It is becoming clear, however, that "managed care" is not a single entity, and that a wide range of economic incentives and disincentives may be created in various forms of managed care, [8] each likely to have different kinds of influence on clinician behavior. [9–11] The proximity of risk to the clinician or clinician group has an especially strong effect on behavior. [12] Systems maintained by managed care organizations to assist clinicians in providing quality care also differ widely, and may strongly influence performance.

Although reduced access to care is a theoretical risk of capitated payment, relatively few studies have addressed whether this concern is borne out in practice. Perhaps because of the variation in managed care arrangements, the results of studies have been mixed. [13] If managed care presents barriers to access to effective care, the elderly would be especially vulnerable because they have a higher burden of illness than the rest of the population. We therefore created indicators in several domains for which it was known that care improved outcomes. We then used these indicators to compare health care received by elderly Medicare beneficiaries in three kinds of payment arrangements: a capitated, staff-model health maintenance organization (HMO) and a partially capitated group-model HMO, both parts of the same managed care organization, and in fee-for-service (FFS) care in the same geographic area.

## Methods

### Study site

The managed care plan participating in this study, Harvard Pilgrim Health Care (HPHC), is the largest HMO in New England, and is a not-for-profit entity. It was begun in 1981 as Harvard Community Health Plan, a Staff Model HMO that at the time of this study comprised about 300,000 members at fourteen health centers in the greater Boston area. Harvard Pilgrim Health Care had grown by merger to include, among its divisions, one made up of non-exclusive medical groups; at the time of this study the Group Model HMO cared for about 186,000 members in eastern Massachusetts.

For both divisions, the Medicare enrollees eligible for this study included all those age 65 and older who were

members for part or all of the period January 1, 1994 through December 31, 1995. Almost 10,000 members from the Staff Model and 5,000 in the Group Model met these criteria. Members who switched from one division to the other during the study period (497 members, 2 percent of the combined samples) were not included in the study. Samples were defined separately for each indicator (see Tables and 1Additional file Indicator Definitions).

### Staff model HMO

The Staff Model division of HPHC provided primary care-based, multi-specialty care. The organization has cared for aged Medicare patients in risk and other commercial plans since the mid-1980's. All primary care providers were salaried and there were no specific economic incentives (i.e. no bonuses of any kind) for individual providers during the study period.

Information on all ambulatory services, including visits, diagnoses, procedures and tests, was maintained electronically for all members as part of an Automated Medical Record System (AMRS). [14] These data have been used in previous studies. [15–17] The Staff Model HMO contracted with area hospitals for inpatient services. For hospitalization and other outside utilization, the HMO maintains claims data using ICD-9 codes; this data structure contains up to six diagnoses and up to 3 surgical procedures per claim.

### Group model HMO

The Group Model division of HPHC included 16 medical groups in 1993 that contracted with the HMO on a non-exclusive basis, i.e. they were exclusive with regard to other managed care plans, but not with respect to indemnity insurance. Most were primary care groups but a small number were multispecialty groups. Payment of groups was based on various forms of capitation; the most common arrangement was for groups to be capitated for both primary and specialty outpatient care, and for hospitalization risk to be shared in a wider pool. Capitation rates and details such as loss-limit provisions varied from group to group. Almost all groups comprised between 5 and 10 physicians.

Data from the Group Model were obtained from claims that were submitted to the HMO to document care for calculations pertinent to loss-limit provisions, even though payments were not based on the claims themselves. Data files contained information on services provided in the offices of the primary care clinicians, on outpatient services not provided by the primary care provider, (i.e. referrals), and on hospitalizations. Diagnoses and procedures were coded using ICD-9 and CPT-4 codes.

Demographic and insurance coverage information on members in the study were obtained from HMO enrollment files.

#### *Fee-for-service*

Medicare beneficiaries were included in this study if they were: age 65 and older as of January 1, 1994; had both Part A and B coverage for at least 12 consecutive months during 1994 and 1995; were not enrolled in an HMO during these 12 consecutive months; and resided within the HMO catchment area (see below).

We matched Medicare members enrolled in the HMO with those in fee-for-service by area of residence. First, we constructed a list of the zip codes in which eligible HMO members resided during the study period. We constructed a list of Medicare fee-for-service beneficiaries residing in the comparison area consisting of all contiguous zip codes in which at least one HMO Medicare beneficiary resided. The resulting sample included 339,627 people.

Data for the fee-for-service sample were obtained from an enrollment file for demographic information, the MedPAR (Medicare Provider Analysis and Review) file for hospitalization claim data, Part B physician/supplier claims file, and Hospital Outpatient Department claims file.

#### **Performance indicators**

We developed performance measures that met several or all of the following criteria: the disease or condition was relatively common and potentially severe; a clinical service that could affect the health outcome of the patient was identifiable; the performance of the indicated service depended in part on the role of a physician or health system and not only on the patient; service performance was potentially subject to financial incentives; it was possible from other research to assume that the indicated service would on average improve outcome; and data to construct the indicator were currently or potentially available.

Our indicators assessed access to health care in three domains (Table 1): 1) *preventive care*, including services that provide future, not current, benefit; 2) *diagnosis-specific care*, examining treatment for acute conditions or episodes of disease; and 3) *chronic disease care*, including secondary prevention. The selection of preventive care indicators was guided by the generic applicability of these maneuvers in this age group, making it unnecessary to define a special population for whom the procedure would be indicated. The indicators of timely follow-up after hospitalization (diagnosis-specific care) were selected based on the seriousness of the

medical conditions; [18] the time interval between hospital discharge and outpatient visit were determined by a panel of physicians.

A panel of national experts in access to quality health care, convened by the Health Care Financing Administration in March of 1996, suggested additions to our original indicator set. We then selected those that best met the structured evaluation criteria, including at least two indicators in each of the domains. Table 1 shows the indicators organized by domains. More complete definitions of inclusion criteria and coding, including specific AMRS, ICD-9 and CPT codes used, have been published elsewhere [19] and are summarized in 1Additional file Indicator Definitions.

#### **Statistical analyses**

We compared the three samples by age category using the chi-square test. For annual indicators, we averaged utilization rates for 1994 and 1995; the denominators were individuals eligible for each calendar year. We calculated rates in three age strata: age 65–74, 75–84, and 85 years and older. We also calculated age-adjusted rates standardized to the fee-for-service sample. Analyses were performed using SAS.[20] We conducted two-way comparisons of age-adjusted rates across the three samples (Staff Model, Group Model, and fee-for-service) using the chi-square test.

#### **Results**

Demographic characteristics of the study subjects are shown in Table 2. The FFS population in the region under study was older than the nationwide Medicare population, and a slightly larger proportion was female (62% versus 60%,  $p < 0.001$ ). Those enrolled in the HMO were younger than both the geographically matched, fee-for-service sample and Medicare enrollees in the US as a whole ( $p < 0.001$ ), and they were less likely to be female ( $p < 0.001$ ).

Age-adjusted rates of breast cancer screening with mammography were substantially higher in the two HMO settings than under fee-for-service insurance. (Table 3). Mammography screening rates in the Staff Model were nearly double those in the FFS sample. The proportion of Medicare enrollees who saw a clinician within a one-year period (Annual visit rate, Table 3) was greater than 85% in all three groups; however, this rate was significantly higher in the Staff Model HMO (94%) than the fee-for-service sample (88%) ( $p < 0.001$ ).

Proportion with follow up by either a primary care physician or cardiologist within 60 days of hospital discharge after myocardial infarction (Table 4) was similar in the two managed care divisions and, in both cases,

**Table 1: Medicare Performance Indicators**

Domain/Indicator	Population	Measurement
<b>Preventive and Primary Care</b>		
Breast cancer screening rate	Women 65 yrs +	% with mammogram in two years
Annual visit rate	All beneficiaries	% with at least one visit to primary care physician or specialist in a twelve month period
<b>Diagnosis-Specific Care</b>		
<i>Post-hospitalization follow-up for:</i>		
Myocardial infarction	of those hospitalized for myocardial infarction	% with at least one cardiology or primary care visit within 60 days of discharge
Depression	of those hospitalized for depression	% with at least one mental health or primary care visit within 14 days of discharge
<b>Chronic Disease Care</b>		
Diabetes: Retinal screening	of those with diabetes diagnosis	% with retinal examination in a following 12 month period
Diabetes: Visit rate	of those with diabetes diagnosis	% with at least 2 visits to primary care or endocrinology in a following 12 month period

**Table 2: Age and Gender (%) of Elderly Medicare Beneficiaries**

	Fee-for-Service Sample		Managed Care Sample	
	United States N = 32,800,745	N= 344,733	Staff Model N= 8,920	Group Model N= 4,258
<b>Female *</b>	60	62	56	55
<b>Age (years)†</b>				
<b>65-69‡</b>	30	23	42	44
<b>70-74 §</b>	26	29	28	24
<b>75-79 **</b>	20	23	18	16
<b>80-84 ††</b>	13	15	8	9
<b>85+ ‡‡</b>	11	10	4	7

\*p < 0.001 for all two-way comparisons, except Staff/Group, p= 0.28 † Chi – square for all ages = 11,128; p = 0.001 ‡ p < 0.001 for all two-way comparisons, except Staff/Group, p = 0.03 §p < 0.001 for all two-way comparisons, except FFS/Staff, p = 0.04 \*\*p < 0.001 for all two-way comparisons, except Staff/Group, p = 0.005 †† p < 0.001 for all two-way comparisons, except Staff/Group, = 0.05 ‡‡ p < 0.001 for all two-way comparisons

higher than under fee-for-service insurance (91% and 93% in the Staff and Group Model respectively, compared to 73% in FFS; p < 0.001). Follow up within 14 days after hospitalization for depression was highest in the Group Model HMO, although small sample size limited our ability to find statistically significant differences (p > 0.3).

Care of chronic diseases is summarized in Table 5. Screening rates for diabetic retinopathy were higher in both divisions of the managed care organization than in the fee-for-service sample. The proportion of diabetics

with 2 or more visits was 50% higher in managed care than in fee-for-service (95% and 91% in the Staff and Group Model, respectively, versus 61% in FFS, p < 0.001).

**Discussion**

We developed a set of indicators of access to effective care for elderly people insured by Medicare designed to fit varying clinical settings, insurance structures, and data systems. In general, performance in both the Staff and Group Model divisions of the managed care plan studied was equivalent to or better than that in the fee-

**Table 3: Preventive and Primary Health Care**

	Fee-for-Service Sample	Managed Care Sample	
	N = 211,026	Staff Model N = 1,638	Group Model N = 910
<b>BREAST CANCER SCREENING RATE</b>			
All eligibles (age-adjusted)*	40.8	77.0	64.8
Age 65-74	53.7	86.6	78.1
Age 75-84	35.9	76.6	61.2
Age 85 and older	12.2	46.7	31.1
*p = 0.001 for all two-way comparisons			
	Fee-for-Service N = 325,984	Staff Model N = 500	Group Model N = 500
<b>ANNUAL VISIT RATE</b>			
All eligibles (age-adjusted)*	88.4	93.9	90.9
Age 65-74	86.0	95.0	89.7
Age 75-84	90.6	91.6	92.7
Age 85 and older	91.4	97.6	90.0

\*p = 0.001 for Fee-for-Service/Staff Model Comparison

**Table 4: Percent with Follow-up After Hospitalization**

	Fee-for-Service Sample	Managed Care Sample	
	N = 5,942	Staff Model N = 162	Group Model N = 68
<b>MYOCARDIAL INFARCTION*</b>			
All eligibles (age adjusted)†	73.3	90.7	93.2
Age 65-74	77.6	94.3	94.9
Age 75-84	73.4	92.3	89.4
Age 85 and older	60.2	75.0	100
	Fee for Service N = 1,858	Staff Model N = 29	Group Model N = 17
<b>DEPRESSION ‡</b>			
All eligibles (age-adjusted)§	65.8	64.5	80.3
Age 65-74	68.0	79.1	87.5
Age 75-84	64.8	53.4	75.0
Age 85 and older	63.0	--**	--**

\*Follow up within 60 days of hospital discharge † p < 0.001 for Fee-for-Service/Staff Model and Fee-for-Service/Group Model comparisons ‡ Follow up within 14 days of hospital discharge §p for each comparison > 0.3 \*\*No hospitalizations occurred for this age group

**Table 5: Chronic Disease Care**

	Fee-for-Service Sample	Managed Care Sample	
	N = 34,260	Staff Model N = 1,092	Group Model N = 495
<b>RETINAL EXAM RATE FOR DIABETIC PATIENTS</b>			
All eligibles (age-adjusted)*	54.8	67.5	63.9
Age 65–74	53.1	64.8	61.6
Age 75–84	57.3	68.9	67.1
Age 85 and older	52.2	76.0	62.1
*p < 0.001 for Fee-for-Service/Staff Model and Fee-for-Service/Group Model Comparisons			
<b>VISIT RATE FOR DIABETICS</b>			
All eligibles (age-adjusted)*	61.2	94.6	90.7
Age 65–74	59.4	95.4	91.5
Age 75–84	61.9	92.5	90.7
Age 85 and older	67.0	100.0	88.0

\*p < 0.001 for all two-way comparisons, except Staff/Group p = 0.004

for-service sector. Other investigators have devised administrative claims-based indicators, [21,22] and chart review-based indicators for hospitals, [23] and ambulatory care sites, [24] in efforts to compare hospital performance or health plan performance. In contrast, we explored the feasibility of using data elements available in an automated outpatient medical record, which are increasingly prevalent, in addition to those available in claims databases. The indicators we selected overlap with those chosen to be included in the Health Plan Employer Data and Information Set (HEDIS) for the Medicare population, released in 1997, which also evaluates breast cancer screening and retinal screening for diabetics. [25]

Previous studies comparing performance indicators across insurance types have found inconsistent results. HMO performance on preventive services is consistently higher than in FFS settings. [26–28] On the other hand, some studies' findings have raised a concern that vulnerable populations such as the chronically ill [29] and the elderly [30] fare less well in HMOs than in FFS care. In the Medicare population, data to support concern about worse outcomes of care in HMOs has come from a national telephone survey about persistence of symptoms. [29]

In numerous other investigations, however, care for the Medicare population provided by HMOs has been shown to be comparable to that in FFS. No differences between HMO and FFS samples were found in studies of care for colon cancer, [31,3,2] breast cancer,[33,34] prostate can-

cer,[35] cardiovascular disease,[36] rheumatoid arthritis,[37] congestive heart failure, [38] hypertension, [39] acute myocardial infarction,[40] acute appendicitis, [41] and stroke. [42] One study found that functional status did not decline faster among Medicare recipients enrolled in HMOs versus those in FFS. [43] Our findings are consonant with these previous studies: for example, a higher rate of mammography screening as seen in our managed care population could explain the trend to earlier stage breast cancers seen in California among HMO enrollees compared to FFS.[31], [32] While most of previous work focussed on specific disease entities, we studied the general Medicare population and measured indicators applicable to all enrollees, as well as indicators focussed on specific disease-populations.

There are few studies of the effect of managed care structure, (e.g. Group vs. Staff vs. IPA models) on indicators of quality care. [44,45] These models differ both in the extent to which financial risk is attached to individual providers, and also the degree to which providers are effectively formed into an organized system of care. For example some of the differences seen in our study between the Group and Staff Model were probably due to organizational processes and systems in place in the Staff Model, such as physician reminder systems for preventive services leading to higher rates of breast cancer screening.

This study has several strengths. We included a large number of Medicare enrollees covered by the health plan studied, and the universe of fee-for-service Medicare en-

rollees in the same geographic region. Matching by region reduces the variation that may have affected some previous comparisons of FFS and HMO populations, in which national samples were used. [46] This method also automatically accounts for any "spillover" effect of managed care practices onto fee-for service practice, wherein cost-saving techniques are applied widely by providers, even to those with fee-for-service insurance, in a market with high penetration of managed care insurance. [47] In contrast to studies that focus on inpatient data (in part because of their ready availability), [48] our focus on outpatient care is highly relevant to comparisons of managed care with fee-for-service care [49] in terms of ambulatory practices that may prevent hospitalizations. Our work on the time period 1994–95 follows the transformations in managed care in 1991–1993, and thus can be seen as an update to previous studies of the topic. [13]

Our study also has limitations. People enrolling in managed care organizations may be systematically different from those choosing fee-for-service arrangements. [50] For example, patients who are sicker or more disabled may not enroll, [28] or may differentially choose to leave managed care. [51] Those who do enroll could be more aggressive in seeking care. We know that a smaller proportion of HMO enrollees were over the age of 85 years, compared to the matched fee-for-service sample. Differential enrollment could influence our results if patients with higher degrees of co-morbid conditions preferentially enrolled in the fee-for service system and did not participate in cancer screening or secondary diabetic prevention because of their other illnesses. [52] In addition, the annual visit rate could potentially be overestimated in the HMO population if an influx of new patients and a "new enrollee" effect were to cause more patients to come in for visits than otherwise would. Another potentially important limitation is that different data systems created for different purposes, such as claims and clinical databases, may not provide comparable results, even for strictly defined indicators. [53,54]

The use of performance indicators to compare care provided in different settings usually requires expensive data gathering. Indicators based on automated data systems offer partial relief to this problem. Our findings related to staff model and group model HMO types should be replicated in other settings, and extended to other types of managed care. While the staff model HMO share of the market is shrinking, group and network model health maintenance organizations are experiencing increased enrollment. Our finding of concordance on many indicators between the Group and Staff Model divisions suggests that a less tightly organized provider system may perform as well as a staff model HMO. Neither of the

HMO divisions studied resembles an independent practice association (IPA) model, so our findings may not apply to that form of provider organization. In addition we studied only one managed care organization, one that is well established, and exists in a region of the country with high level access to specialty services. The generalizability of our findings to other managed care populations is unknown. Furthermore, the single HMO studied is a not-for profit organization, and our findings might not be applicable to for-profit entities. [55]

## Conclusions

In conclusion, we believe that the indicators we have tested are feasible to implement in other managed care systems, and could be translated into other electronic medical record systems. Indicators such as these might be useful for consumers in comparing health plans to one another, such as those participating in Medicare+Choice. We found no evidence of any decrement in access to health care for the elderly Medicare population enrolled in one managed care plan in this geographic region. The low- or no cost "supplemental" insurance provided by many HMOs may in fact lower financial barriers to care for low-income seniors. Our study describes only two models of managed care, and this is a crude classification by current standards. Yet to be studied are the effects of financial incentives on increasingly smaller units of leverage, e.g. small IPA model groups, and the effectiveness of managed care plans that use sophisticated information systems to track and improve care, as compared to those that use principally financial incentives. [56,57] The latter is crucial to understanding how best to create a partnership between providers and health plans that facilitates the provision of excellent care.

## Competing interests

None declared

## Additional material

### Additional file

Indicator Definitions

[<http://www.biomedcentral.com/content/supplementary/1472-6963-1-11-S1.doc>]

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