

Reducing Emergency Visits in Older Adults with Chronic Illness

A Randomized, Controlled Trial of Group Visits

CONTEXT. Emergency department utilization by chronically ill older adults may be an important sentinel event signifying a breakdown in care coordination. A primary care group visit (i.e., several patients meeting together with the provider at the same time) may reduce fragmentation of care and subsequent emergency department utilization.

OBJECTIVE. To determine whether primary care group visits reduce emergency department utilization in chronically ill older adults.

DESIGN. Randomized trial conducted over a 2-year period.

SETTING. Group-model HMO in Denver, Colorado.

PATIENTS. 295 older adults (≥ 60 years of age) with frequent utilization of outpatient services and one or more chronic illnesses.

INTERVENTION. Monthly group visits (generally 8 to 12 patients) with a primary care physician, nurse, and pharmacist held in 19 physician practices. Visits emphasized self-management of chronic illness, peer support, and regular contact with the primary care team.

MEASURES. Emergency department visits, hospitalizations, and primary care visits.

RESULTS. On average, patients in the intervention group attended 10.6 group visits during the 2-year study period. These patients averaged fewer emergency department visits (0.65 vs. 1.08 visits; $P=0.005$) and were less likely to have any emergency department visits (34.9% vs. 52.4%; $P=0.003$) than controls. These differences remained statistically significant after controlling for demographic factors, comorbid conditions, functional status, and prior utilization. Adjusted mean difference in visits was -0.42 visits (95% CI, -0.13 to -0.72), and adjusted RR for any emergency department visit was 0.64 (CI, 0.44 to 0.86).

CONCLUSION. Monthly group visits reduce emergency department utilization for chronically ill older adults.

Older adults with chronic illness frequently require care from different practitioners in multiple settings. Many of these patients have limited ability to navigate an increasingly complicated care delivery system. The emergency department frequently becomes the focal point in the health care system when care is poorly coordinated.

This paper is available at ecp.acponline.org.

ORIGINAL ARTICLE

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Eff Clin Pract. 2001;4:49-57.

*Edited by Steven Woloshin, MD,
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dinated.¹⁻³ Emergency department utilization has been associated with subsequent functional decline, health care utilization, nursing home admission, and mortality.⁴⁻⁷ Thus, while emergency visits are an important adverse health event in their own right, they may also be important “sentinel events,” signifying a breakdown in care.⁸

Enhanced delivery system organization for chronic illness management may prevent such breakdowns.⁹ Delivering primary care in a group format is one such example of enhanced organization. Longitudinal care organized into groups of similar patients with chronic conditions is not a new concept. Earlier in the past century, a group visit format was used in the United States to care for persons with tuberculosis.¹⁰ Mini-clinics have been developed in Great Britain for chronic diseases, such as diabetes.^{11,12} A model of group sessions to promote arthritis self-management skills has been shown to improve care outcomes¹³ and has been expanded to encompass other conditions as well. Our objective in this study was to determine whether a primary care group visit intervention for older adults with chronic illness would decrease emergency department utilization.

Methods

Setting

Kaiser Permanente Colorado is a large, group-model HMO serving 317,000 persons, predominantly in the metropolitan Denver area. Approximately 46,000 members are over the age of 60. Nineteen physician–nurse teams based in eight primary care medical practices agreed to participate in the study. The study was approved by institutional review committees at both the University of Colorado Health Sciences Center and Kaiser Permanente.

Participants

Study participants were older adults with chronic illness and a history of frequent utilization of outpatient services. The selection process is shown in **Figure 1**. Using administrative data, we identified 7271 patients aged 60 years and older with 11 or more outpatient clinic visits in the past 18 months. Between April 1995 and July 1996, we randomly selected 3400 of these patients (this number was determined by budget constraints) and mailed them a survey to which 73% recipients responded after two written requests. Ninety-three percent of respondents had one or more chronic conditions. The survey included questions on chronic illnesses, functional status, and living arrangements.

Patients who returned the survey were eligible for the study if they had one or more self-reported chronic

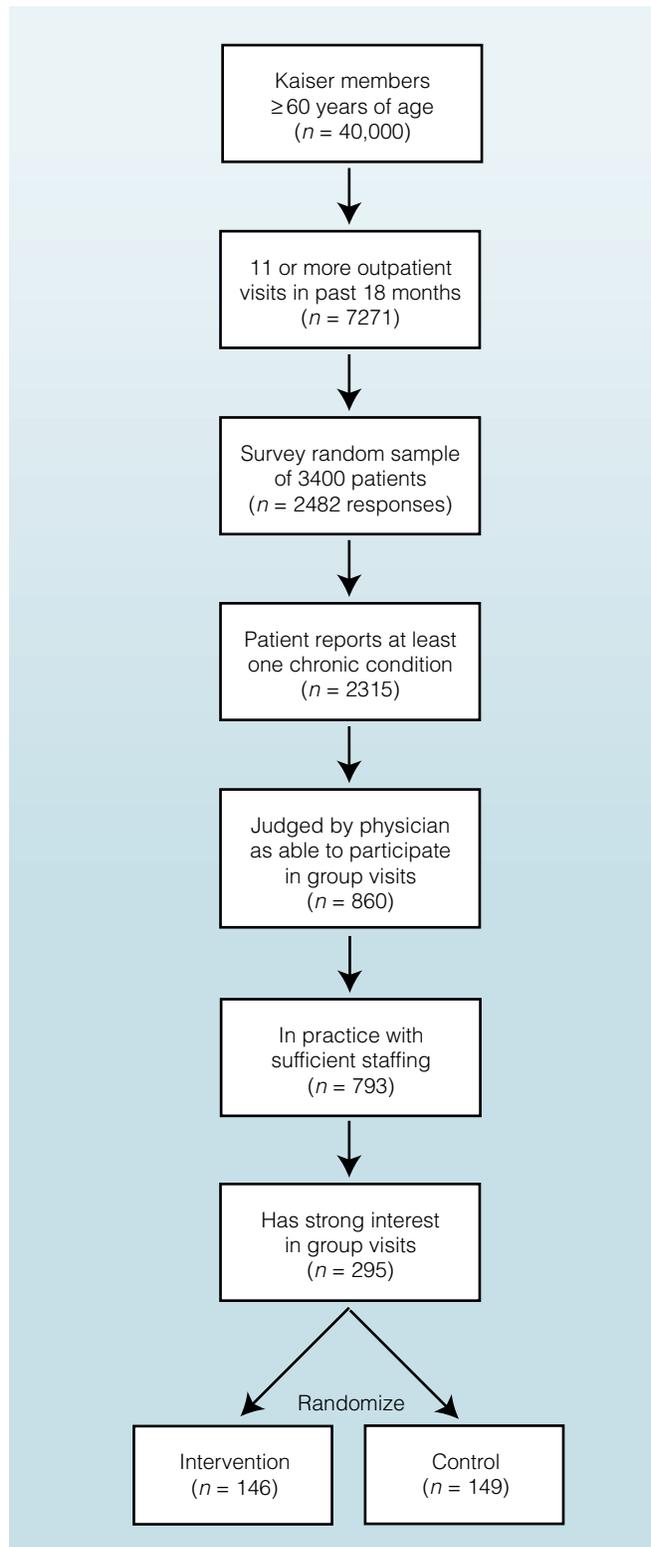


FIGURE 1. Participant selection process.

conditions (e.g., asthma, chronic obstructive pulmonary disease, congestive heart failure, diabetes, and heart disease) and were patients of a participating physician. Although not a requirement for study selection, nearly

all of the patients selected using these criteria had at least one hospitalization in the past 18 months. Physician-determined significant functional impairment or dementia that precluded participation in a group-visit format were the primary exclusion criteria. Ineligible patients had lower self-reported health status ($P = 0.01$) and took fewer medications per day ($P < 0.01$) than did eligible patients.

Finally, the survey also assessed whether the patient was interested in participating in a group model of care (described in greater detail below). This study focuses on the 295 patients who had an affirmative interest in participation.

Assignment

Two hundred ninety-five eligible patients in 19 participating physician practices were randomly assigned to group-visit intervention ($n = 146$) or usual care ($n = 149$). Randomization was performed within each physician's panel to control for differences in practice style. Only those participants assigned to the intervention group were formally asked to provide informed consent.¹⁴ Participants assigned to the control group (consisting of usual care) were unaware of the study. Blinding of participants was not possible given the nature of the intervention studied. Participating physicians were not informed about which of their patients were included in the control group.

The Group-Visit Intervention

The group-visit intervention is discussed in greater detail elsewhere.^{15, 16} This study builds on the pilot study,¹⁵ which was conducted in highly selected physicians' practices (the innovators of the primary care group-visit concept), based in a single ambulatory care facility. The present study selected physician practices that were more generalizable to the overall care delivery system in an attempt to translate efficacy into effectiveness.

In brief, group visits are a new model of care that recognize the discordance between the expanding needs of older adult patients with chronic illness and the acute-care orientation of the typical 15-minute office visit. The main goal of the group visit was to facilitate self-management of chronic illness through enhanced education, encouragement of self-care, peer and professional support, and attention to the psychosocial aspects of living with chronic illnesses. Each intervention physician practice team had one cohort of group-visit patients. The primary care physician, nurse, and clinical pharmacist constituted the core delivery team and were relieved of their other clinical responsibilities to attend each group visit. Additional ancillary providers, including a dietitian, social worker, and physical therapist, attended

periodically. The group visits were held during regular clinic hours in the clinic conference room, and the patients took turns bringing refreshments. The clinic receptionist handled all of the scheduling, and the visit was subject to the usual outpatient visit co-pay. Group visits were held monthly with an average attendance of 8 to 12 participants per group. Caregivers and spouses were invited to attend.

These visits had a standard format (Table 1). The visit began with a brief warm-up and socialization period that was followed by a presentation on a specific health topic. Initially, the topics were the same for all groups and included such areas as normal aging, medication management, exercise, nutrition, and advanced directives. Subsequent topics were chosen based on group consensus.

The next 25 minutes was devoted to health-promotion activities and included blood-pressure assessment, administration of such immunizations as influenza and pneumococcal vaccines, and medication refills. The group then reconvened for a brief question-and-answer period on the topic that was presented. During this time, the next session and its health topic presentation was planned.

TABLE 1
Description of Group Visits

MEMBERSHIP	
Core members 8–12 patients (+/- spouse) Primary care physician Nurse Pharmacist	
Periodic members Dietician Social worker Physical therapist	
TYPICAL AGENDA	TIME (MIN)
Warm-up and socialization	10
Presentation of health topic (e.g., normal aging, medication management, exercise, nutrition, advance directives)	30
Blood pressure checks, medication refills, immunizations	25
Questions/answers on health topic	10
Plan next meeting	5
Brief one-on-one MD/nurse visits	40
	120 (total)

The remaining time was reserved for individual sessions between the patients and the physician. The team nurse also visited individually with other patients during this time. Although these encounters occasionally took place in a private examination room, most occurred in the conference room, including limited physical examinations. Surprisingly, concerns over privacy were minimal. Most of these encounters served as interim assessments of ongoing chronic disease management, although acute problems were evaluated as well. When not being seen individually, the remaining patients used the time to fill prescriptions or to socialize.

Measures

The baseline health status survey contained information on demographic characteristics, self-rated health status, medication use, presence of chronic conditions, and functional status (including activities of daily living [ADLs]¹⁷ and instrumental activities of daily living [IADLs]).¹⁸ Membership data files provided informa-

tion about participant disenrollment from the health plan and deaths during the study period.

Emergency department utilization was determined from administrative data on utilization both within and outside the HMO network of care during the 24-month study period. Physician-assigned diagnoses were obtained for over 90% of emergency visits. Main outcome measures were the percentage of participants who made one or more emergency visits; the average number of emergency visits; and for intervention patients, the number of group visits attended. Other measures included hospitalizations and primary care visits during the follow-up period.

Analysis

An intention-to-treat analysis was used over the 24 months of follow-up. All participants were included in the analysis even if they changed primary care physicians (intervention 11.0% vs. control 20.1%; $P=0.04$), terminated their health plan enrollment (intervention 3.4% vs.

TABLE 2
Baseline Characteristics*

CHARACTERISTIC	INTERVENTION (n = 146)	CONTROL (n = 149)
Age, yr (mean)	74.1	74.0
Female	61.0%	57.0%
Married	60.0%	57.4%
1 or more deficits in ADLs	41%	38%
1 or more deficits in IADLs	20%	18%
Self-rated health status		
Excellent	4.2%	6.7%
Very good	30.6%	30.2%
Good	41.7%	37.6%
Fair	21.5%	20.1%
Poor	2.1%	5.4%
Chronic conditions		
Asthma	14.6%	13.5%
Chronic obstructive pulmonary disease	11.1%	19.6%
Congestive heart failure	8.3%	11.5%
Diabetes	12.5%	18.2%
Heart disease	24.3%	27.5%
Hypertension	42.8%	45.6%
Number of medications per day (mean)	4.8	4.9
At least 1 emergency visit in baseline year	20.7%	22.8%

*The observed difference in the prevalence of chronic obstructive pulmonary disease was significantly different ($P=0.05$). For all other differences, $P>0.2$. ADLs = activities of daily living; IADLs = instrumental (household) activities of daily living

control 8.7%; $P=0.09$), or died (intervention 5.5% vs. control 6.0%; $P>0.2$). The primary outcomes (the average number of emergency visits and the proportion of participants who had one or more emergency visits) were analyzed both including and excluding individuals who died during the 24-month study period. Because these results did not differ, only the former are presented.

Unadjusted differences between intervention and control participants were assessed using t -tests for parametric continuous measures, Mann–Whitney U test for nonparametric continuous measures, and Fisher exact test for dichotomous measures. Adjusted differences in average emergency department utilization were examined using least squares regression. Adjusted differences in the proportion of patients who had one or more emergency visits were examined using logistic regression. Because the outcome was quite common, odds ratios obtained from logistic regression were converted to relative risk (RR) ratios.¹⁹ Regression analyses were performed using SAS version 6.12 (SAS Institute, Cary, NC).

Results

Baseline demographic and health status characteristics are compared in **Table 2**. The intervention and control groups were similar with respect to age, gender, marital status, self-rated health status, and functional disability as measured by ADLs and IADLs. This suggests that the randomization procedure achieved reasonable allocation of key attributes, although the prevalence of chronic obstructive pulmonary disease may have differed. There was no difference in emergency department utilization during the year before the start of the

study. Fourteen percent of intervention patients attended no group visits, and 14% attended all 24; on average, intervention participants attended 10.6 group visits (**Figure 2**).

Effect of Group Visits on Emergency Department Utilization

Table 3 summarizes the rate of emergency utilization for the two groups over the 24-month period, comparing both the average number of emergency department visits and the proportion of participants who made one or more visits. Participants in the intervention group were significantly less likely to make any emergency visit than were those in the control group (35% vs. 52%; $P=0.003$). After controlling for age, gender, asthma, chronic obstructive pulmonary disease, congestive heart failure, diabetes, heart disease, functional status, and previous emergency utilization, the adjusted RR for an intervention patient making any emergency department visit compared with a control patient was 0.64 (CI, 0.44 to 0.86). Similarly, intervention participants averaged fewer emergency visits during the 2-year follow-up period than control participants (0.65 vs. 1.08; $P=0.005$).

Effect of Group Visits on Repeated Emergency Department Utilization

The frequency of emergency department use over the 24-month study period is shown in **Figure 3**. Not only were intervention participants less likely to make an emergency visit, they were also less likely to have made multiple emergency visits ($P<0.001$).

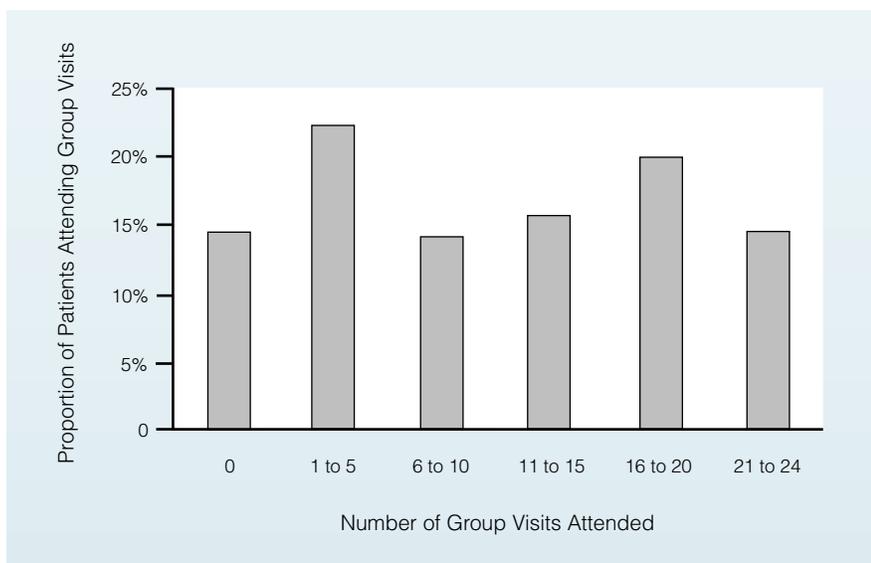


FIGURE 2. Distribution of group visits in the intervention group.

TABLE 3

Emergency Department Use at 24 Months

VARIABLE	INTERVENTION (n = 146)	CONTROL (n = 149)	P VALUE	ADJUSTED VALUE* (95% CI)
Average number of emergency visits	0.65	1.08	0.005	Difference = -0.42 (-0.13 to -0.72)
Proportion with ≥ 1 emergency visit	34.9%	52.4%	0.003	RR = 0.64 (0.44 to 0.86)

*Adjusted for age, gender, asthma, chronic obstructive pulmonary disease, congestive heart failure, diabetes,† heart disease,† self-rated health status, and past use of the emergency department† (†significant at P < 0.10).

Effect of Group Visits on Hospital and Outpatient Services Utilization

We also examined the effect of group visits on overall utilization. Table 4 provides data on hospitalizations and outpatient utilization. On average, intervention participants had fewer hospitalizations (0.44 vs. 0.81; P = 0.04) than controls. Primary care visits did not differ between the two groups. However, once the group visits were added to the primary care visits, intervention patients had significantly higher overall outpatient utilization (23.5 vs. 13 visits over 2 years; P < 0.01).

Discussion

Our results demonstrate how one strategy for responding to the expanding number of chronically ill older adults influenced an important health event—emer-

gency department utilization. The group-visit intervention seems to have been effective in reducing emergency department visits in this population. Compared with control participants, intervention participants were one third as likely to have an emergency visit for any reason and were less likely to make multiple emergency visits.

The group-visit intervention incorporated many of the core components that are considered vital for the provision of high-quality primary care for persons with chronic illnesses.^{9, 20} In particular, these interventions include planned, scheduled contact with the primary care team; a focus on improving self-management skills; peer support from persons with similar illnesses; emphasis on prevention of both short- and long-term complications of chronic illness; and use of information systems to support treatment priorities. The primary care focus of our intervention may account for why our intervention

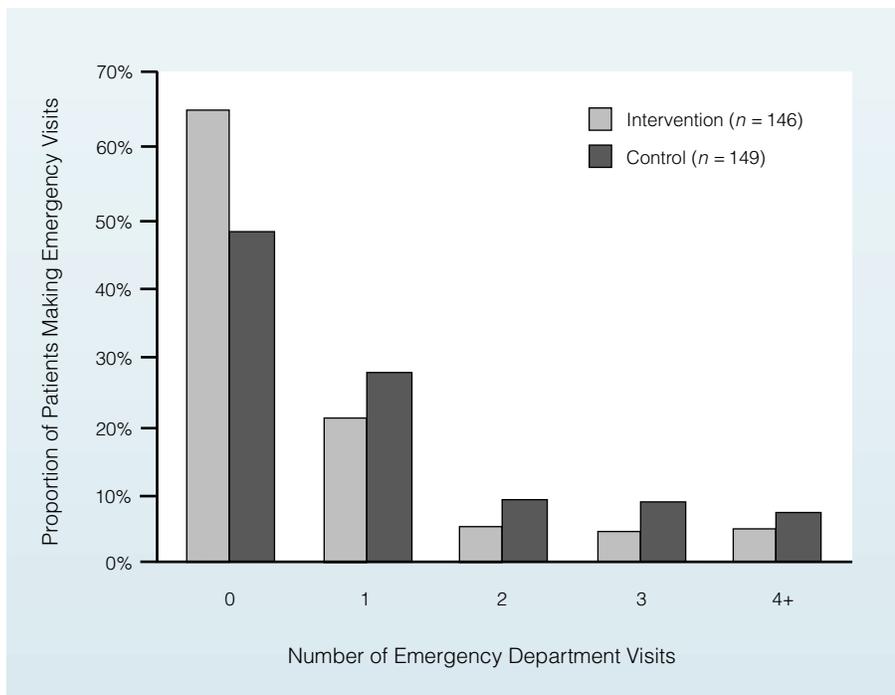


FIGURE 3. Distribution of emergency department visits.

TABLE 4

Average Hospital and Outpatient Utilization over 24 Months

VARIABLE	INTERVENTION (n = 146)	CONTROL (n = 149)	P VALUE
Hospitalizations	0.44	0.81	0.04
Primary care visits	12.9	13.5	0.20
Group visits attended	10.6	NA	—
Primary care + group visits	23.5	13.5	<0.001

was effective while many previous studies of chronic illness management interventions for the elderly have failed: The predominantly disease-specific nature of past interventions may have actually increased the fragmentation of care.²¹ We believe that the group-visit intervention provided continuity that was distinct from simply having the same primary care physician over time. We compared emergency department utilization among intervention and control participants who had the same primary care physician over the 24 months of this trial and found no difference in the main findings presented.

It has been suggested that high-quality primary care may decrease emergency department visits for certain “ambulatory care-sensitive” conditions,²² including asthma, chest pain, congestive heart failure, chronic obstructive pulmonary disease, diabetes, hypertension, cellulitis, pneumonia, dehydration, and urinary tract infection. We repeated our analyses considering only ambulatory-sensitive conditions and found an even stronger effect (adjusted RR for any emergency department visit was 0.55 comparing intervention with control patients [CI, 0.31 to 0.91]).

Determining which aspect of this multifaceted intervention was responsible for the reduction in emergency utilization is challenging. We hypothesize that the critical elements of this intervention include: 1) improved continuity with a health care team focused on chronic disease management; 2) early problem identification and intervention; and 3) active care coordination both within the primary care team and between other care providers and care settings. We believe that the group visit intervention provided continuity that was distinct from simply having the same primary care physician over time.

The study findings need to be interpreted in light of several limitations. First, this trial was conducted in a group practice HMO, and it is not known whether the results could be generalized outside this setting. However, organized health systems, such as HMOs, have definite advantages with regard to designing chronic illness care,²³

and it is worth pointing out that group visits for chronic conditions were advanced in one of the world’s largest organized health delivery systems, the National Health Service in Great Britain. Replication of the group visits described here have been attempted in a wide variety of practice environments, including managed care organizations, fee-for-service delivery systems, academic health centers, and senior centers (Personal communication. Marlene McKenzie, Research Coordinator for Senior Programs, Kaiser Colorado).

Second, our analysis focused on those patients who expressed a high level of interest in the group-visit approach to primary care. The results may differ for patients who prefer to receive care through traditional one-on-one visits with their physician. We compared the frequency of emergency department visits between intervention participants who made no group visits with control participants and found that they did not differ statistically. Thus, even among patients who express initial interest in group visits, not all will choose to participate and consequently, will not benefit from the intervention.

Third, intervention patients were, by design, organized into groups. The models we used did not account for the inherent clustering of intervention patients within groups. The statistical consequences of using unclustered models are falsely low *P* values. Given the large effect size detected (e.g., 34.9% of intervention patients had >1 emergency department visit vs. 52.4% of controls), it is unlikely that accounting for clustering would render our findings statistically insignificant. Furthermore, the randomization performed within each physician panel probably controlled for differences in practice style, thereby reducing the potential effect of clustering.

Fourth, the study participants, who were selected based on the presence of chronic illness and a pattern of high utilization, were not particularly frail. A recent review of systems of care for older adults raises concern for the utility of group visits for a frailer population, particularly those with associated cognitive impairment.²⁴

Finally, although reduced emergency visits have direct cost implications, a formal cost analysis was beyond the scope of our study. The addition of monthly group visits is clearly an investment of time and resources. The question is whether this investment has a favorable impact on overall use. Outpatient utilization of primary care (excluding group visits) did not differ between the intervention and control groups. Intervention patients made additional group visits; however, a direct comparison of group visits with typical primary care visits is complicated by the difference in intensity. Group visits provide certain efficiencies (i.e., an economy of scale) and are therefore less intensive. Further, determining whether adding group visits can offset utilization of emergency services or other health care resources not only raises questions about cost of care but also about appropriateness of the care-delivery venue. Proactive primary care may be more desirable than treating exacerbated symptoms of chronic illness of older persons in the emergency department. Nevertheless, we believe that the investment in the additional monthly group visits is small in comparison with the savings resulting from the reduction in emergency and hospital utilization in the population studied.

Summary

We found a significant association between participation in a group-visit model of care and a reduction in emergency visits. Although there may be several possible

Take-Home Points

- **Primary care group visits (several patients meeting together with a team of providers) may reduce care fragmentation and utilization of emergency services.**
- **We conducted a randomized trial of group visits in older adults with a history of frequent outpatient utilization. The group visits were held monthly and attended by 8 to 12 patients, the primary care physician, team nurse, and pharmacist.**
- **On average, intervention patients attended about 11 group visits during the 24-month study period.**
- **Intervention patients were significantly less likely to use the emergency department; however, after including the group visits, these patients had substantially more outpatient service utilization than control patients.**
- **Future studies are needed to assess the net benefit of group visits on emergency department utilization and patient outcomes.**

explanations for our findings, we believe that improved continuity and coordination of care with associated earlier problem identification may account for the reduction in emergency department visits. Studies designed to explicitly examine the role of improved care coordination in reducing emergency department utilization are needed to further elucidate this association.

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Grant Support

Dr. Coleman was a recipient of the Hartford/Jahnigen Center of Excellence Faculty Award and a Pfizer/American Geriatrics Society Fellow during the preparation of this manuscript.

Project support provided by the Robert Wood Johnson Foundation, grant number 024738.

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