Impact Of A Patient Education Intervention On Appropriate Utilization Of Clinic Services

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Abstract: ***Background:*** **Patient education interventions have been identified as a means of decreasing the utilization of ambulatory services; however, research on the impact of self-care initiatives should also assess changes in the appropriateness of patient visits.**

Methods: **New patients to the Family Practice Clinic at a university medical center were randomized into control and experimental groups. Experimental patients received the *Family Practice Clinic Patient Medical Advisor Booklet* and an educational presentation. Controls received the booklet without the educational intervention.**

Results: **Over the subsequent year, there were no significant differences in the total number of visits or telephone calls to the Family Practice Clinic by either group. The total number of visits to other medical center clinics and the emergency department was also similar. The experimental group, however, showed a statistically higher percentage of appropriate Family Practice Clinic visits, and their telephone calls to the clinic for advice tended to be more appropriate. Finally, experimental group patients had a significantly higher percentage of appropriate visits to the emergency department than did control group patients.**

Conclusions: **Although this educational intervention did not change the total number of patient visits or telephone calls, it did have an impact on the appropriateness of patient utilization of health care services.**
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In a climate of growing consumer interest in self-care, lay persons are assuming more responsibility for disease prevention and the treatment of health problems. Health maintenance organizations and other clinics are encouraging the self-care movement with the distribution of patient education materials aimed at more appropriate use of health care services. Other expectations for patient education include improved physician-patient communication, increased patient understanding of the illness and its treatment, and better compliance with the therapeutic or preventive regimen.

The effectiveness of patient education techniques has been evaluated in a large number of studies. The results have not always been in agreement,[1-3] but there is an impressive body of evidence to support the belief that patient education can improve patient knowledge, compliance, and health outcome.[4-16] Several studies have also examined the effect of self-care educational interventions on ambulatory service utilization. Some studies have not reported a reduction in physician utilization despite patient use of self-care materials for specific health problems[17] or increased patient self-care knowledge scores following an educational program.[18] Others have found evidence for the positive effect such patient education programs can have on the use of medical services.[19-22]

Although patient education materials have been demonstrated to have a positive effect on patient knowledge and compliance, these effects may be further improved when there is embellishment by a health professional.[23,24] A previous study was conducted to test the efficacy of a patient education program using a new *Family Practice Clinic Patient Medical Advisor Booklet* developed by the author for patient education.[25] Experimental group patients were given the booklet with a prepared 25-minute presentation describing it. Control group patients were not given the educational presentation. Experimental patients had a statistically significant higher mean score on a health knowledge questionnaire (96.8 percent) compared with the control group (71.6 percent). Both groups were asked to evaluate the

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booklet by mail approximately 1 month after the health knowledge questionnaire was administered. In their responses to the mailed evaluation forms, both groups thought the booklet was well written and useful in understanding and treating the illnesses described. Thus, it was shown that participants in a program introducing a self-care booklet do learn new information, which they retain. The answers to a mailed evaluation form for both groups revealed a positive effect of the booklet. It was apparent that future research on the impact of the *Family Practice Clinic Patient Advisor Booklet* would need to focus on the subsequent number and appropriateness of telephone calls and visits to the clinic.

The present study is a randomized, controlled, prospective trial designed to test the effects of an educational intervention on patient health care utilization patterns. It was hypothesized that patients receiving the *Family Practice Clinic Patient Advisor Booklet*, with an accompanying specially designed educational introduction, would use clinic services more appropriately than would those not receiving a similar educational intervention. Information gained from the study would help measure not only the effectiveness of this booklet and patient education program, but also the feasibility of making it available to the entire family practice clinic population.

Methods

New patients coming to the Family Practice Clinic at the University of California Davis Medical Center (UCDMC) were asked to participate in the study. Enrollment took place at the time of their first appointment in the clinic. The only criterion for inclusion was that they intended to use the Family Practice Clinic for their primary health care needs in the future. Ten percent of those eligible declined to participate; 214 patients consented and were randomized into control and experimental groups. A single interviewer met with each patient in the study. Experimental group patients were given a 25-minute educational presentation describing the *Family Practice Clinic Patient Medical Advisor Booklet* and its uses. This presentation actually lasted between 10 and 30 minutes, depending on the individual needs of each patient. A written script was memorized by the interviewer to insure consistency in the presentations.

In its 70 pages, the booklet describes the Family Practice Clinic and the functions of each member of the health care team. Specific information is given regarding appropriate use of the clinic facilities, including appointment making and canceling, medication refills, and what to do in an emergency or when the clinic is not open. Forty-four common symptoms in adults and children are discussed, with recommendations on self-treatment and "when to see a doctor." Also included are sections on well-baby visits and immunizations and information about pregnancy. The booklet concludes with a list of over-the-counter medications and their uses. An effort was made to use nontechnical language. The Flesch method[26] was chosen to analyze the readability of the booklet material, which equalled a standard grade 8 to 9 reading level.

During the session, experimental group patients were also encouraged to ask questions about the book and its use. After this educational session, each experimental patient was given a copy of the booklet to keep. Those in the control group also received the booklet but did not receive the special educational intervention.

Both groups were monitored for 1 year after randomization. No other continuing educational program was provided to either group. Physicians provided care as usual and were not told which patients were involved in the study. At the end of the study period, patient medical records were reviewed for frequency and appropriateness of visits and telephone calls to the Family Practice Clinic, frequency and appropriateness of visits to other UCDMC subspecialty clinics and the emergency department, and number of hospitalizations. The appropriateness of hospitalizations was not evaluated, because hospital admission is entirely at the discretion of the attending physician. Reviewers did not know whether the patient record belonged to a member of the experimental or control group. Reliability for the 2 reviewers, determined for a random selection of 10 percent of patient medical records, equaled 92.2 percent.

It should be noted that Family Practice Clinic patients were counseled to call the Family Practice Clinic during regular working hours before coming into the clinic or going directly

Table 1. Criteria for Appropriate versus Inappropriate Utilization of Health Care Facilities.

Facility Use	Appropriate	Inappropriate
Family Practice Clinic visits	New medical problem Follow-up appointment Drop-in visits authorized by triage nurse or physician	Minor problem discussed in booklet
Family Practice Clinic telephone calls	Medical problem not discussed in booklet Worsening medical condition Medication refill (inadequate amount given before next scheduled appointment)	Medication refill (if recently seen in clinic or failed to make follow-up appointment) Advice for self-treatable medical condition discussed in booklet
Other subspecialty clinic visits	Family practice referral Other physician referral Emergency department or hospitalization follow-up referral	Patient self-referral for services provided by Family Practice Clinic
Emergency department visits	Patient unconscious or seriously ill Contacted family practice on-call physician Advised by emergency department personnel to return	Nonemergency medical problem Medication refill Did not contact family practice or on-call physician

to the emergency department. Calls to the clinic were noted in the patient's medical record. Patients were told to telephone the on-call family physician regarding serious health questions when the clinic was closed. If the patient warranted attention, the patient was seen in the emergency department by the family practice provider. Referrals to subspecialty clinics at UCDMC were normally initiated only by the primary care physician. Once a referral was made, consultant physicians were able to authorize future visits to themselves or to others.

Criteria for appropriate versus inappropriate utilization were related to information in the booklet and were also developed with input from medical staff and providers in the clinic (Table 1). Inappropriate use of the Family Practice Clinic included visits for minor problems detailed in the booklet. Appropriate visits included those scheduled for new medical problems, follow-up appointments, or those drop-in visits authorized by the triage nurse or a physician. Inappropriate telephone calls to the Family Practice Clinic were those made for medicine refills (if the patient had recently been seen in the clinic and had not refilled medications at that time, or if the patient failed to make an appointment for follow-up and medication refill when advised to do so) and for calls for advice on medical conditions covered in the booklet that could be self-treated. Appropriate telephone calls included medical problems not covered in the booklet, calls for worsening medical conditions, not improving by the physician's or the booklet's time line, or calls for medication refills as a result of a scheduling error (patient had not been given enough medication to last until the next appointment). Inappropriate visits to other UCDMC subspecialty clinics were self-referrals by patients for services provided by the Family Practice Clinic. Visits to subspecialty clinics arising from a family practice referral, another physician's referral (regardless of clinic), or a referral subsequent to emergency department treatment or hospitalization were considered appropriate. Inappropriate emergency department visits were those made for nonemergencies and medication refills or for visits made without first consulting with the family practice physician on call. Appropriate emergency department visits encompassed those in which the patient was unconscious or seriously ill, the patient conferred first with the family physician, or the patient was told to return to the emergency facility by staff there. The percentage of appropriate visits was calculated by dividing the number of appropriate visits by the total number of visits to the facility (both appropriate and inappropriate).

Data were analyzed using chi-square, Kruskal Wallis, Mann-Whitney, or Wilcoxon rank-sum tests to evaluate utilization differences between the experimental and control groups.

Results

A total of 106 control and 108 experimental patients took part in the study. As seen in Table 2, the experimental and control groups were compa-

Table 2. Sociodemographic Characteristics in Which the Control and Experimental Groups Did Not Significantly Differ by Chi-Square.

Demographic Characteristics	Control Group (n = 106) No. (%)	Experimental Group (n = 108) No. (%)	Significance of Difference
Sex			
Men	40 (37.7)	33 (30.6)	NS
Women	66 (62.3)	75 (69.4)	
Age, years			
($\bar{X} \pm$ SD)	36.7 ± 14.5	36.2 ± 13.6	NS
Race			
White	78 (73.6)	80 (74.1)	NS
Nonwhite	28 (26.4)	28 (25.9)	
Mechanism of payment			
Public assistance	74 (69.8)	66 (61.1)	NS
Self-paying	17 (16.0)	10 (9.3)	
Worker's compensation and hospital employee	9 (8.5)	14 (12.9)	
Private insurance	4 (3.8)	12 (11.1)	
Government insurance	2 (1.9)	6 (5.6)	
Mean length of care (months)	13.1 ± 9.0	11.6 ± 8.0	NS

rable for sex, age, race, mechanism of payment, and mean length of care.

During the study period, control group patients made an average of 4.2 visits to the Family Practice Clinic and experimental group patients made 3.7 visits, which was not significantly different. During this time, however, 8 control group patients made eight inappropriate clinic visits compared with one inappropriate clinic visit made by an experimental group patient. Table 3 shows that experimental group patients made a significantly lower mean number of inappropriate visits to the clinic. Consequently, experimental group patients had a significantly greater percentage of appropriate visits compared with the control group.

There was no difference in the mean number of telephone calls made to the Family Practice Clinic by experimental or control group patients. Experimental group patients receiving the educational intervention, however, tended to make a higher percentage of appropriate telephone calls to the clinic.

As might be expected in a health care system in which patient self-referral to subspecialty clinics is not encouraged, patient education did not have a significant effect on the mean number of visits or percentage of appropriate visits made to other UCDMC subspecialty clinics.

Patients in the experimental and control groups made a similar mean number of visits to the UCDMC emergency department. Of these, experimental group patients had a higher percentage of appropriate visits than their control patient counterparts. While this difference did not reach statistical significance, it did warrant additional investigation. A subset of patients who actually made at least one emergency department visit during the study period was further analyzed. Of 33 control group patients seen in the emergency department, 32 patients made a total of 51 inappropriate visits. In contrast, of 31 experimental group patients making emergency department visits during the study period, 20 patients made 35 inappropriate visits. Statistically fewer mean visits made by the 31 experimental group patients (who went to the emergency department at least once) were inappropriate compared with those made by the 33 control patients who were seen in the emergency department during the study period (Table 4). Experimental group patients also had a significantly greater percentage of appropriate emergency department visits than control patients.

Patients in both the experimental and control groups had an equivalent number of hospitalizations. Twelve experimental group patients were hospitalized an average of 1.5 ± 0.9 times and 15 control group patients were hospitalized 1.2 ± 0.4 times (P = NS). Hospitalizations, of course, are at the discretion of the admitting physician rather than the patient and would not be

Table 3. Comparison of Utilization of Clinical Facilities by Control (n = 106) and Experimental Groups (n = 108).

Facility Use	Control Group ($\bar{X}$ ± SD)	Experimental Group ($\bar{X}$ ± SD)	Significance of Difference *P* Value
Family Practice Clinic			
Visits	4.2 ± 4.9	3.7 ± 3.5	0.829
Appropriate visits	4.1 ± 4.8	3.7 ± 3.5	0.750
Inappropriate visits	0.08 ± 0.3	0.01 ± 0.1	0.016*
Appropriate visits (%)	97.6 ± 11.2	99.5 ± 4.8	0.016*
Family Practice Clinic			
Telephone calls	0.7 ± 1.4	0.67 ± 1.7	0.511
Appropriate telephone calls	0.3 ± 0.8	0.35 ± 0.9	0.865
Inappropriate telephone calls	0.4 ± 0.8	0.33 ± 1.3	0.145
Appropriate telephone calls (%)	82.6 ± 35.6	89.9 ± 28.7	0.087
Other subspecialty clinic			
Visits	1.8 ± 3.9	1.1 ± 2.3	0.758
Appropriate visits	1.8 ± 3.9	1.0 ± 2.3	0.802
Inappropriate visits	0.1 ± 0.4	0.01 ± 0.1	0.093
Appropriate visits (%)	98.0 ± 11.6	99.1 ± 9.6	0.097
Emergency department			
Visits	0.6 ± 1.4	0.6 ± 1.1	0.740
Appropriate visits	0.2 ± 0.5	0.2 ± 0.6	0.351
Inappropriate visits	0.5 ± 1.1	0.3 ± 0.9	0.095
Appropriate visits (%)	75.3 ± 40.7	84.0 ± 35.2	0.072

*Statistically signficant by Wilcoxon rank-sum test.

expected to differ. They are used here as a rough measure of morbidity for study subjects.

Discussion

Previous research on the effect of patient self-care educational interventions on ambulatory service utilization has provided conflicting results. Moore and co-workers[17] conducted a prospective trial to evaluate the self-care book, *Take Care of Yourself*.[22] Families enrolled in a prepaid insurance plan were randomized into three groups and then followed for physician visits at a multispecialty group practice. Group 1 was the control group and groups 2 and 3 were the experimental groups. Group 2 was given the book and an optional seminar on its use. Group 3 was treated identically to group 2 except that each family was also offered a $50 incentive to reduce their family's visits by one-third. Attendance at the optional seminars was poor for both experimental groups. Those self-selected seminar attendees did not decrease their visits any more than the average families in groups 2 and 3. There was widespread use of the book by both experimental groups and a larger decrease in clinic use rates for those groups than for the control group. Statistical significance of the impact of the book could not be demonstrated. Large variations within the three groups in the number of physician visits resulted in a "power problem," making it difficult to establish the statistical significance of the intervention. Moore, et al. suggested that future efforts to evaluate the impact of self-care initiatives should focus on assessing changes in the appropriateness

Table 4. Comparison of Control (n = 33) and Experimental Group (n = 31) Patients with at Least One Emergency Department Visit.

Emergency Department Facility Use	Control Group $\bar{X}$ ± SD	Experimental Group $\bar{X}$ ± SD	Significance of Difference *P* Value
Visits	2.1 ± 1.9	1.9 ± 1.3	0.798
Appropriate visits	0.6 ± 0.8	0.8 ± 0.9	0.168
Inappropriate visits	1.5 ± 1.5	1.1 ± 1.4	0.038†
Appropriate visits (%)	20.6 ± 31	44.2 ± 46.2	0.034*

*Statistically significant by Wilcoxon rank-sum test.
†Statistically significant by Mann-Whitney rank-sum test.

of visits, which they did not evaluate in their study.

Kemper[18] examined the impact of a medical self-care educational program on the frequency and cost of health care services received by patients in a prepaid group practice. The self-care program for experimental patients consisted of a series of 10, 2-hour workshop sessions led by a nurse practitioner. Each participant was also given a 250-page self-care guide. Unfortunately, only 55 percent of the experimental group actually participated in at least one workshop, making the results of this educational intervention somewhat difficult to interpret. Despite an increase of 125 percent for patient self-care knowledge scores, no significant program effect, either on the frequency or on the total costs of clinic visits, resulted. Although both clinic and referral costs were lower for the experimental group than for the control group, the high variance encountered once again precluded any conclusions confirming a favorable impact on total costs.

On the other hand, Roberts and associates[19] developed an instructional pamphlet on the common cold with a symptom-based algorithm to determine the necessity of a physician visit. These pamphlets were given to test group families by a health educator in an educational session. Visits to the university hospital-based family practice clinic by family members were then monitored and evaluated according to the algorithm. Test families made 44 percent fewer unnecessary clinic visits than the control families.

Vickery and colleagues[20] obtained similar results in their study at a health maintenance organization. Three experimental groups received the book *Take Care of Yourself*, as well as other self-care written materials. In addition to these written materials, group 1 was also offered individual health counseling and a telephone information service; group 2 was offered the written materials and the telephone information service. Group 3 received only the written materials. Unfortunately, less than one-half of the patients in group 1 participated in the counseling session, and use of the telephone information service by experimental groups 1 and 2 was negligible. Nonetheless, all experimental groups displayed statistically significant decreases in total ambulatory care utilization, averaging 17.2 percent. The magnitude of results generally paralleled the magnitude of the intervention. Vickery, et al.[21] went on to study the effect of a self-care communication-based health education program (written materials and a telephone information service) on a Medicare population at the same health maintenance organization. Although once again the telephone information system was essentially not used, they had a statistically significant decrease of 15 percent in total medical visits for the experimental group compared with a control group.

The present study sought to expand upon previous work by focusing on the impact of a specific educational intervention on patients' appropriate utilization of clinical facilities. The experimental group, receiving the *Family Practice Clinic Medical Advisor Booklet* with a presentation describing it, displayed significantly less inappropriate use of both the Family Practice Clinic and emergency department. A greater percentage of their telephone calls to the clinic also tended to be more appropriate. The number of hospitalizations, which served as a marker for general patient health status, did not differ between the two groups. This finding underscores that the emphasis on appropriate use of facilities did not negatively influence patients seeking necessary health care. Moreover, patients receiving the booklet have been uniformly positive in their evaluation of it.

This study, however, did not find a significant change in the total number of patient visits or telephone calls to these clinical facilities, perhaps because the control group patients also received the booklet (without the educational presentation). It could be argued that any use of the booklet by control group patients may have minimized differences in utilization patterns between the control and experimental groups. Also, as Vickery and Fries[27] have pointed out, wide-scale patient education programs employing self-care reference books are characterized by low cost per recipient and relatively low percentages of behavior change. Because of large variations in physician visits among any group of persons, it has een difficult to show a statistically significant impact on physician visits with any intervention.

Another explanation for this finding is that it may not be possible to affect the total number of visits to physicians because patient education and self-care strategies may be decreasing inappropri-

ate visits while simultaneously increasing appropriate visits. Indeed, Berg and LoGerfo[28] predicted that strict adherence to the self-care algorithms in *Take Care of Yourself* could actually increase the number of physician visits for selected common illnesses by 45 percent.

These observations are germane to the findings in the present study, which took place in a university medical center environment where approximately two-thirds of the patients are on public assistance. There are no immediate financial disincentives for these patients to seek medical care. Moreover, this specific population may in fact require a certain irreducible number of physician's visits for health reasons. Given these considerations, it may not be possible, or even desirable, to decrease the total number of visits and telephone calls. Nevertheless, it was shown here that the appropriateness of patient utilization of health care services can be improved through the use of a patient education intervention with individualized teaching and the self-care booklet.

Preventing inappropriate utilization of health care resources has been often cited as an important method for promoting both efficiency and equity in the national health care system. Proponents of this strategy point out that inappropriate utilization is an attractive area for resource savings because both the volume and cost of health care services are so great. Substantial savings could result if only a portion of inappropriate use of services was prevented.[29]

Future research on the impact of cost-containment interventions or strategies to promote more appropriate utilization of clinical services should focus also on the effect on patient outcomes. Until recently, a major problem in quality of care and inappropriate utilization measurement has been the lack of sound outcome measures for health care. Patient outcomes, however, remain the best validators of the effectiveness and quality of medical care.[29] The development of brief measures of functional status and well-being may be valuable summary measures with which to assess patient outcomes, and they show promise for use in primary care settings.[30,31]

References

1. Sackett DL, Haynes RB, Gibson ES, Hackett BC, Taylor DW, Roberts RS, et al. Randomized clinical trial of strategies for improving medication compliance in primary hypertension. Lancet 1975; 1: 1205-7.
2. Fletcher SW, Appel FA, Bourgeois MA. Management of hypertension: effect of improving patient compliance for follow-up care. JAMA 1975; 233:242-4.
3. Webb PA. Effectiveness of patient education and psychosocial counseling in promoting compliance and control among hypertensive patients. J Fam Pract 1980; 10:1047-55.
4. Egbert LD, Battit GE, Welch CE, Bartlett MK. Reduction of postoperative pain by encouragement and instruction of patients: a study of doctor-patient rapport. N Engl J Med 1964; 270:825-7.
5. Carpenter JO, Davis LJ. Medical recommendations—followed or ignored? Factors influencing compliance in arthritis. Arch Phys Med Rehabil 1976; 57:241-6.
6. Haynes RB, Sackett DL, Gibson ES, Taylor DW, Hackett BC, Roberts RS, et al. Improvement of medication compliance in uncontrolled hypertension. Lancet 1976; 1:1265-8.
7. Hulka BS, Cassel JC, Kupper LL, Burdette JA. Communication, compliance, and concordance between physicians and patients with prescribed medications. Am J Public Health 1976; 66:847-53.
8. Inui TS, Yourtee EL, Williamson JW. Improved outcomes in hypertension after physician tutorials: a controlled trial. Ann Intern Med 1976; 84: 646-51.
9. Bertakis KD. The communication of information from physician to patient: a method for increasing patient retention and satisfaction. J Fam Pract 1977; 5:217-22.
10. Macdonald ET, Macdonald JB, Phoenix M. Improving drug compliance after hospital discharge. Br Med J 1977; 2:618-21.
11. Rodnick JE, Bubb K. Patient education and multiphasic screening: it can change behavior. J Fam Pract 1978; 6:599-607.
12. Legge JS, Massey VM, Vena CI, Reilly BJ. Evaluating patient education: a case study of a diabetes program. Health Educ Q 1980; 7:148-58.
13. Windsor RA, Green LW, Roseman JM. Health promotion and maintenance for patients with chronic obstructive pulmonary disease: a review. J Chronic Dis 1980; 33:5-12.
14. Morisky DE, Levine DM, Green LW, Shapiro S, Russell RP, Smith CR. Five-year blood pressure control and mortality following health education for hypertensive patients. Am J Public Health 1983; 73:153-62.
15. Marshall WR, Rothenberger LA, Bunnell SL. The efficacy of personalized audiovisual patient-education materials. J Fam Pract 1984; 19:659-63.
16. Taggart VS, Zuckerman AE, Lucas S, Acty-Lindsey A, Bellanti JA. Adapting a self-management education program for asthma for use in an outpatient clinic. Ann Allergy 1987; 58:173-8.

17. Moore SH, LoGerfo J, Inui TS. Effect of a self-care book on physician visits: a randomized trial. JAMA 1980; 243:2317-20.
18. Kemper DW. Self-care education: impact on HMO costs. Med Care 1982; 20:710-8.
19. Roberts CR, Imrey PB, Turner JD, Hosokawa MC, Alster JM. Reducing physician visits for colds through consumer education. JAMA 1983; 250: 1986-9.
20. Vickery DM, Kalmer H, Lowry D, Constantine M, Wright E, Loren W. Effect of a self-care education program on medical visits. JAMA 1983; 250: 2952-6.
21. Vickery DM, Golaszewski TJ, Wright EC, Kalmer H. The effect of self-care interventions on the use of medical service within a medicare population. Med Care 1988; 26:580-8.
22. Vickery DM, Fries JF. Take care of yourself. Reading, MA: Addison-Wesley, 1976.
23. Laher M, O'Malley K, O'Brien E, O'Hanrahan M, O'Boyle C. Educational value of printed information for patients with hypertension. Br Med J 1981; 282:1360-1.
24. Miller G, Shank JC. Patient education: comparative effectiveness by means of presentation. J Fam Pract 1986; 22:178-81.
25. Bertakis KD. Educational impact of a family practice clinic patient medical advisor booklet. Fam Med 1986; 18:210-2.
26. Spadaro DC, Robinson LA, Smith LT. Assessing readability of patient information materials. Am J Hosp Pharm 1980; 37:215-21.
27. Vickery DM, Fries JF. Effect of self-care book. JAMA 1981; 245:341-2.
28. Berg AO, LoGerfo JP. Potential impact of self-care algorithms on the number of physician visits. N Engl J Med 1979; 300:535-7.
29. Kurylo LL. Measuring inappropriate utilization. Hosp Health Serv Admin 1976; 21:73-89.
30. Greenfield S. The state of outcome research: are we on target? N Engl J Med 1989; 320:1142-3.
31. Tarlov AR, Ware JE, Greenfield S, Nelson EC, Perrin E, Zubkoff M. The Medical Outcomes Study: an application of methods for monitoring the results of medical care. JAMA 1989; 262: 925-30.

NOTICE

Certificate of Added Qualifications in Geriatric Medicine Examination April 10, 1992

The next examination for the American Board of Family Practice Certificate of Added Qualifications in Geriatric Medicine will be administered on April 10, 1992. The application deadline of November 1, 1991, has passed; however, applications will be accepted until December 1, 1991, with the appropriate late fee.

Geriatric Medicine Examination
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