

Variation in Physicians' Recommendations About Revisit Interval for Three Common Conditions

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Background. The appropriate revisit interval for most conditions is uncertain. This survey was done to gather information about physicians' recommendations on revisit intervals for three common conditions.

Methods. Data were gathered in a mailed survey of 116 primary care physicians in the University of California at San Francisco Collaborative Research Network. Physicians were given descriptions of three hypothetical patients, one with diabetes mellitus, one with angina, and one with hypertension, and were asked when they would recommend a follow-up visit for the condition.

Results. There were great variations in physicians' recommendations about revisit intervals for each hypothetical patient. Internists were significantly more likely than family physicians to recommend a longer revisit interval for the hypothetical patient with diabetes melli-

tus; a similar revisit pattern was found for the patient with hypertension. There were no significant associations with recommended revisit interval and many other physician characteristics.

Conclusions. As interest in containing the cost and improving the efficiency of medical care increases, knowing how often patients ought to be seen will be a topic of increasing importance. A rational, information-based approach to the choice of revisit interval for common conditions could yield substantial savings in medical care costs. The existence of great variation in recommended revisit interval suggests that physicians are uncertain about what interval is best.

Key words. Health services research; patient care management; appointments and schedules; office visits. (*J Fam Pract* 1993; 37:235-240)

A large proportion of all visits to primary care physicians is for the care of chronic illnesses. The interval between return visits for a chronic illness has a large impact on the overall volume of primary care visits. In turn, the volume of physician services is an important determinant of the total charge per patient in Medicare, Medicaid, and other fee-for-service insurance plans and of resource consumption in capitated systems.

Prior studies examining physician management of hypertension have found many variations in recommended and actual revisit intervals.^{1,2} A study of fol-

low-up visits scheduled for patients with hypertension also demonstrated lack of uniformity with regard to the length of time between visits.³ A study of academic internists found numerous variations in mean interval between follow-up appointments for patients unselected for a particular problem.⁴

Although it seems axiomatic that the revisit interval would affect patient outcome, we were unable to identify published studies establishing this link. In the absence of empiric data to support guidelines for appropriate revisit intervals, strategies to contain cost by reducing service volume through lengthening of the revisit interval are likely to be controversial.

This study was undertaken to determine the extent of variation in primary care physicians' recommendations about revisit interval for three common chronic conditions and to determine the physician characteristics associated with revisit interval.

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Table 1. Case Descriptions for Three Hypothetical Patients

Case Study 1: Diabetes mellitus

Mrs. A. is a 57-year-old housewife. She is overweight and has had adult-onset diabetes mellitus for 7 years but has had no complications of diabetes. There are no other acute problems. A hemoglobin A_{1C} 6 months ago was slightly elevated. At today's visit, her blood pressure is 120/80 and a random glucose is 160 mg/dL.

Case Study 2: Angina

Mr. B. is 68 years old. Three years ago, he had an acute myocardial infarction (MI). Following his MI, he had angina on exertion. In the past year, on medical management, he had about one episode of angina per month. Mr. B's only risk factor for MI was heavy cigarette smoking, and he quit after his MI. His cholesterol is 190 mg/dL. Besides occasional nitroglycerin, the patient takes atenolol (Tenormin) 100 mg qd and aspirin 75 mg qd. Today, his blood pressure is 120/80 and pulse 60. The frequency of angina attacks has been unchanged since his last visit.

Case Study 3: Hypertension

Mr. C. is 52 years old. He has chronic, severe hypertension. There is no history of coronary heart disease or cerebrovascular disease. Renal function is normal. Prior evaluation has ruled out secondary hypertension. His current antihypertensive regimen consists of chlorthalidone 25 mg qd, nifedipine-extended-release (Procardia XL) 90 mg qd, and atenolol (Tenormin) 100 mg qd. Blood pressure at today's visit is 140/90.

Methods

Information for this study was obtained from a survey mailed in the summer of 1992 to 120 primary care physicians in office-based practice who comprise the University of California at San Francisco (UCSF) Collaborative Research Network. The physicians in this network are members of the voluntary teaching faculty who have expressed an interest in practice-based research. They were identified in a mailed survey. The main purpose of the survey was to gather information on characteristics of the physicians in the network and the characteristics of their practices and their patients. The survey also included descriptions of three hypothetical patients, one with diabetes mellitus, one with angina, and one with hypertension. These conditions, which were "tracer" conditions in the Medical Outcomes Study,^{5,6} were selected for study because they are common chronic conditions in adults. For each patient, the physicians were asked when they would suggest that the patient return for a follow-up visit for the condition, assuming that the patient was established in the practice and that health care maintenance was up to date.

The descriptions, reproduced as Table 1, were worded to try to minimize uncertainty about the stability of the patients' conditions. Several experienced clinicians reviewed the descriptions of each hypothetical patient to identify any aspects of the case that suggested that the condition described was unstable. The descriptions were

revised and reviewed until all of the reviewers agreed that the description was a description of a "stable" patient.

In indicating a follow-up visit interval, the physicians were asked to select one of 8 intervals (2 weeks, 1 month, 2 months, 3 months, 4 months, 5 months, 6 months, 1 year) or to specify another interval. None of the physicians specified intervals other than those provided. For the main statistical analysis, the intervals were grouped in four categories: 1 month or less, 2 months, 3 to 4 months, and 6 or more months. The results are presented in three categories (≤ 1 month, 2 to 4 months, and ≥ 6 months) for ease of interpretation.

The chi-square statistic was used to assess the statistical significance of differences in revisit interval according to various practice and physician variables. A two-tailed probability value less than .05 was considered significant. The Spearman correlation coefficient was used to assess correlations among individual physicians' recommendations for revisit intervals for the three patients.

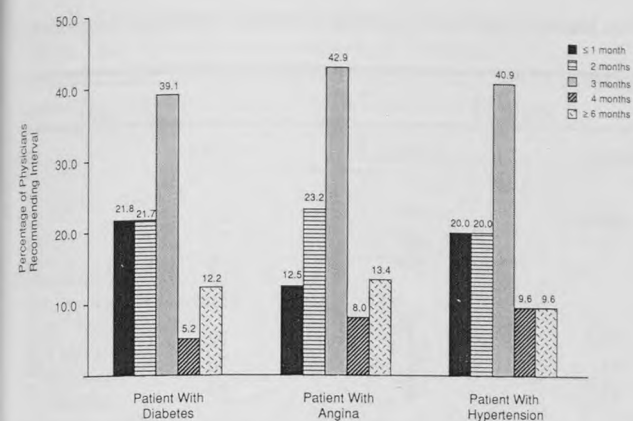
Multiple linear regression was used in the multivariate analysis. In this analysis, visit interval was the dependent variable. It was treated as continuously distributed with values from 1 to 4.

Results

Of the 120 primary care physicians who responded to our survey, 116 answered at least one revisit question. These 116 physicians were mostly male, middle-aged, and white. Eighty percent were board certified in family practice, and almost all of the rest were board certified in internal medicine. Most of the physicians (98%) were in solo or small group practices. The majority (81%) were in small (2 to 7 physicians) practices. Forty percent of the physicians had practices with 1800 or fewer patients, 32% had 1800 to 2775 patients, and the remainder had larger practices (more than 2775 patients). Sources of payment were diverse. Almost all practices had a high proportion (>50%) of fee-for-service or private, prepaid patients. In 75% of practices, less than 10% of patients were insured under Medicare. In a similarly large percentage of practices (67%), less than 10% of patients received Medicaid.

There was a great variation in physicians' recommendations about revisit intervals for each of the hypothetical patients (Figure). For each condition, about 40% of physicians would recommend a revisit at 3 months, but from 12% to 20% would recommend a revisit at 1 month, and more than 10% at 6 months or longer.

For the patient with diabetes mellitus, a significantly higher percentage of internists recommended a relatively



For a patient with diabetes mellitus, angina, or hypertension, percentage of physicians recommending the stated revisit interval.

longer revisit interval (at 2, 3, or 4 months) compared with family physicians (Table 2). The same follow-up pattern was seen for the patient with hypertension, although the *P* value was marginal (*P* = .06). Physician age and sex were not significantly associated with recommended revisit interval for any of the hypothetical patients (all *P* values ≥ .05).

Physicians with a larger percentage of Medicare patients were significantly (*P* < .05) more likely to recommend a longer revisit interval for the diabetic patient, but not for the other two patients (Table 3). After adjustment for the lower percentage of Medicare patients among family physicians using multiple regression, the association of revisit interval with percentage of Medicare patients was no longer significant (data not shown). Neither the percentage of fee-for-service patients nor the

percentage of Medicaid patients was significantly associated with recommended revisit interval for any of the three hypothetical patients (all *P* values ≥ .05).

Physician practice type and practice size were not significantly associated with recommended revisit interval for any of the three hypothetical patients (all *P* values ≥ .05), although there was a tendency of physicians with larger practices to recommend a shorter revisit interval for the patient with diabetes mellitus and the patient with hypertension (Table 4).

The correlations of revisit interval for the three patients were statistically significant, but not large. The correlation coefficients were .355 between the diabetes interval and the hypertension interval (*P* < .001), .212 between the diabetes interval and the angina interval (*P* = .02), and .409 between the angina interval and the hypertension interval (*P* < .001). Physicians who recommended a short revisit interval for one patient did not necessarily recommend a short revisit interval for all patients, although there was a tendency for responses to cluster (Table 5).

Discussion

This study found a wide range of variations in recommended revisit intervals for three common conditions in a relatively homogeneous group of primary care physicians in northern California. The use of written cases featuring hypothetical patients allowed the clinical situations to be described in a standard format that would be expected to minimize uncertainty and enhance agreement about patient management. The existence of wide varia-

Table 2. Percentage of Physicians Who Recommended Various Revisit Intervals for Patients with Diabetes Mellitus, Angina, and Hypertension, by Physician Specialty, Sex, and Age

Patient Condition and Recommended Revisit Interval	Specialty		Sex		Age		
	Family Practice	Internal Medicine	Male	Female	<40 y	40-49 y	≥50 y
Diabetes mellitus							
≤1 mo	23	0	24	12	12	21	35
2-4 mo	66	78	67	65	73	65	61
≥6 mo	11	22*	9	24	15	14	4
Angina							
≤1 mo	12	12	13	13	8	14	13
2-4 mo	72	82	73	80	77	72	78
≥6 mo	16	6	15	7	15	14	9
Hypertension							
≤1 mo	23	0	21	18	22	22	13
2-4 mo	66	95	70	77	60	71	83
≥6 mo	11	6†	9	6	19	8	4

**P* = .008

†*P* = .06.

NOTE: Numbers may not add to 100% because of rounding.

Table 3. Percentage of Physicians Who Recommended Various Revisit Intervals for Patients with Diabetes Mellitus, Angina, and Hypertension, by Patient Funding Source

Patient Condition and Recommended Revisit Interval	Fee-for-Service		Medicare		Medicaid	
	≤50%	>50%	≤10%	>10%	≤10%	>10%
Diabetes mellitus						
≤1 mo	22	21	23	17	19	27
2-4 mo	65	71	70	55	72	54
≥6 mo	13	8	7	28*	9	19†
Angina						
≤1 mo	14	9	13	11	12	14
2-4 mo	73	78	74	75	76	69
≥6 mo	14	13	13	14	12	17
Hypertension						
≤1 mo	22	13	22	14	18	24
2-4 mo	68	79	69	76	70	71
≥6 mo	10	8	9	10	12	5

*P = .03.

†P = .07.

NOTE: Numbers may not add to 100% because of rounding.

tions in recommended revisit intervals among a relatively homogeneous group of physicians responding to scenarios designed to be minimally controversial is the most important finding of the study.

The absence of physician or practice characteristics that are strongly predictive of recommended revisit intervals is also noteworthy. We had expected that payment source, practice size, and the number of patients seen per week would be associated with the physicians' recommendations about revisit interval. Specifically, we hypothesized that physicians with a higher proportion of fee-for-service patients, larger practices, and practices with more patient visits per week would recommend shorter revisit intervals. Although there was a suggestive

association of practice size with recommendations for a shorter revisit interval, neither the characteristics of the individual physicians nor structural characteristics of their practices were strong correlates of recommended revisit interval overall.

Observing the lack of association of recommended revisit interval with physician characteristics and practice organization, we expected that recommendations about the revisit interval might be indicative of the philosophy of the physician. That is, we expected to find that physicians might have a consistent policy of recommending some standard revisit interval for patients with chronic illnesses. The low correlations of revisit interval provides little support for this hypothesis.

Table 4. Percentage of Physicians Who Recommended Various Revisit Intervals for Patients with Diabetes Mellitus, Angina, and Hypertension, by Practice Characteristics

Patient Condition and Recommended Revisit Interval	Type of Practice		No. of Patients			Patients per Week		
	Solo	Group	<1800	1801-2775	>2775	<88	89-115	>115
Diabetes mellitus								
≤1 mo	28	19	11	32	24	10	32	30
2-4 mo	65	65	73	57	67	78	54	59
≥6 mo	8	15	16	11	9*	12	14	11
Angina								
≤1 mo	10	13	9	11	19	8	18	14
2-4 mo	74	76	80	75	66	73	71	78
≥6 mo	15	11	11	14	16	19	11	8
Hypertension								
≤1 mo	13	23	13	19	31	20	22	19
2-4 mo	77	67	85	68	53	73	63	73
≥6 mo	10	10	2	14	16†	8	15	8

*P = .05.

†P = .07.

NOTE: Numbers may not add to 100% because of rounding.

Table 5. Revisit Intervals for Patients with Hypertension or Angina That Were Recommended by Physicians Who Recommended Short (≤ 1 month) and Long (≥ 6 month) Revisit Intervals for Patients with Diabetes Mellitus

	Recommended Revisit Interval for Diabetic Patient	
	≤ 1 month (n = 25), %	≥ 6 months (n = 14), %
Recommended revisit interval for hypertension patient		
≤ 1 mo	40	7
2 mo	24	7
3-4 mo	28	50
≥ 6 mo	8	36
Recommended revisit interval for angina patient		
≤ 1 mo	28	0
2 mo	16	14
3-4 mo	48	64
≥ 6 mo	8	21

NOTE: Percentages may not add to 100 because of rounding.

Lichtenstein, Sweetner, and Elwood¹ also found large variations in British general practitioners' recommendations about revisit interval for patients with hypertension in a study that, like this one, presented physicians with written descriptions of hypothetical patients. Three other studies of actual revisit intervals for hypertension^{2,3} and unselected conditions⁴ similarly showed wide-ranging variations in revisit intervals. For several common conditions, the Medical Outcomes Study^{5,6} measured the actual number of office visits per patient per year. Information from this latter study on possible variation among individual physicians in visit frequency was not reported in a way that would allow comparison with our results. Our study differs from the published literature on revisit intervals in that it included conditions other than hypertension and surveyed United States physicians in office-based practice.

Our study has at least two important limitations. First, it did not measure actual physician behavior. Second, the physicians were not representative of all primary care physicians in the United States or even of those in the San Francisco area. Lichtenstein et al,² who reported great variations in recommended visit interval for hypothetical patients with hypertension,¹ also found variations in the actual measured interval between visits for hypertension for a group of 457 patients of 5 physicians. Their observation suggests that variation in recommendations made about hypothetical patients reflects real variations in practice, at least for hypertension.

As in all studies with findings of no significant association, the question of statistical power arises. Twenty-seven comparisons of revisit interval were made in this analysis, and the statistical power for each com-

parison is different. Because comparisons were made based on polychotomous variables, power calculations are technically difficult. Estimates of the 95% confidence limit for each percentage would give a better idea of the precision of the study. Presenting all of these intervals would make the tables extremely complex. Because the relation between revisit interval and size of practice was suggestive for the hypertension patient, we estimated the 95% confidence limits for the percentage of physicians with small and large practices who recommended a short (≤ 1 month) revisit interval. The confidence limits were 13.1 ± 9.6 for the percentage with a small practice (n = 46) and 15.6 ± 13.2 for the percentage with a large practice (n = 33). These calculations highlight the limitations of the study due to the relatively small sample size. A study with more subjects might have declared the differences we observed statistically significant.

Hypothetical patient scenarios have been used in many other studies of physician decision-making.⁷⁻¹¹ They have the advantage of permitting control over aspects of the case, such as severity of illness and presence of comorbidity, that probably affect decision-making. Responses about hypothetical cases capture the opinions of physicians about ideal management. Measurement of the actual interval between patient visits reflects not only the physician's recommendation but patient factors, such as education and income, and practice variables, such as appointment availability, that affect compliance with the physician's recommendation.

As interest in containing the cost and improving the efficiency of medical care mounts, knowing how often patients should be seen will be a topic of increasing importance. If examination of patient records shows that the variation in actual revisit interval is as great as for the hypothetical patients studied, then determining the effect of shorter and longer revisit intervals on patient outcome will be a high priority. The existence of great variations in revisit intervals will make examination of the relation between revisit interval and outcome feasible.

The potential for savings in medical care costs from a rational, information-based approach to the choice of revisit interval for common conditions is great. The existence of great variations in recommended revisit interval suggests that physicians are uncertain about which interval is best. The absence of associations with practice variables also points toward uncertainty as a key factor affecting choice of revisit interval.

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