Continuity of Primary Care: To Whom Does It Matter and When?

Paul A. Nutting, MD, MSPH[1]

Meredith A. Goodwin, MS[2,3,6]

Susan A. Flocke, PhD[2,3,5,6]

Stephen J. Zyzanski, PhD[2,3,5,6]

Kurt C. Stange, MD, PhD[2,3,4,5,6]

[1]Center for Research Strategies and the Department of Family Medicine, University of Colorado Health Sciences Center, Denver, Colo

[2]Department of Family Medicine, Case Western Reserve University, Cleveland, Ohio

[3]Department of Epidemiology and Bio-statistics, Case Western Reserve University, Cleveland, Ohio

[4]Department of Sociology, Case Western Reserve University, Cleveland, Ohio

[5]Ireland Comprehensive Cancer Center, University Hospitals of Cleveland and Case Western Reserve University, Cleveland, Ohio

[6]Center for Research in Family Practice and Primary Care, Case Western Reserve University, Cleveland, Ohio

ABSTRACT

BACKGROUND Inconsistent findings on the value of continuity of care can stem from variability in its importance to different subsets of patients. We therefore examined the association among patient and visit characteristics and extent to which the patient valued continuity of care (PVC). We hypothesized that continuity would be more important to patients who are older, sicker, and female, who have established a relationship with their physician, and whose visit addresses more complex problems.

METHODS A study of 4,454 consecutive outpatient visits to 138 community-based family physicians used a 3-item measure ($\alpha = 0.67$) of PVC. The patient's report of (1) the adequacy of primary care for the visit and (2) satisfaction with the physician on that visit was assessed with multiple measures. Analyses examined the associations among PVC and patient-reported satisfaction with the physician and adequacy of the visit.

RESULTS Extremes of age, female sex, less education, Medicare and Medicaid insurance, number of chronic conditions and medications, number of visits to the practice, and worse self-reported health status were associated with higher value placed on continuity ($P < .001$ for all except sex, where $P = .015$). Patients who value continuity and did not see a regular physician rated adequacy of the visit lower (for 7 attributes of the visit) than those seeing their own physician. Satisfaction with the physician for the visit was greatest among patients who value continuity and saw their regular physician.

CONCLUSIONS Continuity of physician care is associated with more positive assessments of the visit and appears to be particularly important for more vulnerable patients. Health care systems and primary care practices should devote additional effort to maintaining a continuity relationship with these vulnerable patients.

Conflicts of interest: none reported

CORRESPONDING AUTHOR

Paul A. Nutting, MD, MSPH
Center for Research Strategies
225 E 16th Ave, Suite 1150
Denver, CO 80203
Paul.Nutting@CRSLLC.org

INTRODUCTION

Continuity of care has been conceptualized as a fundamental aspect of primary care since the resurgence of family practice more than 3 decades ago.[1-3] More recently, a sustained patient-physician partnership has been advanced as a defining characteristic of primary care,[4,5] for which continuity is seen as a necessary, but not sufficient, condition.[5,6]

There is evidence for a positive effect of continuity of care on both physician[7] and patient[8-11] satisfaction with care and patient adherence to medical regimens,[12] pregnancy outcomes,[13] emergency department[14,15] and hospital[14,16-18] utilization, overall service utilization, and cost.[19,20] Research has failed, however, to show an effect of provider continuity on quality of care for patients with tonsillectomies,[21] hospital mortality in patients transferred from nursing homes,[22] utilization and costs of ambulatory care,[23] and patient satisfaction during prenatal visits and pregnancy complications.[24]

In addition, there appears to be variability in the extent to which patients value continuity. Although patients often report more satisfaction with their care from a regular physician, recent studies have suggested that many might not be willing to wait to see their regular physician for acute illness.[25,26] The literature leaves unanswered the important questions of when continuity matters, to whom, and under what circumstances. Answering these questions will help to determine whether this theoretically fundamental tenet of primary care is relevant to the modern practice of medicine and to the design of health care systems.

In this study, we examined patients' ratings of the importance of continuity of care with their family physician and their ratings of the adequacy of their visit according to physician seen and nature of the visit. We hypothesized that continuity of physician is more important to older, sicker, female patients and those with an established relationship with a physician. Further, we hypothesized that patients who place a higher value on continuity will rate the visit as less adequate when not seeing their regular physician and when the visit involves more complex problems.

METHODS

This study analyzed data from the Direct Observation of Primary Care Study, a multimethod cross-sectional study designed to describe the content and context of outpatient visits to family physicians.[27,28]

Study Sites and Subjects
One hundred thirty-eight family physicians from 84 practices in northeast Ohio participated. They are members of the Research Association of Practices, a regional practice-based research network. The patient sample consisted of consecutive patients seen during the 2 days of observation between October 1994 and August 1995. Patients provided informed consent in the waiting room before meeting with their physicians. To avoid biasing their behavior, physicians and patients were informed only that the study was examining the content of family practice.

Data Collection
Research nurses collected data using direct observation of the patient visit, patient exit questionnaires, medical record review, and billing data for the observed visits. The patient exit questionnaire was completed after the visit by adult patients or parents or guardians of children.

Measures
Demographic data, including patient age, sex, race, and educational level, were reported on the patient questionnaire. Health status was measured with 5 items ($\alpha = .81$)[29] from the Medical Outcomes Study (MOS) 6-item General Health Survey.[30] Three aspects of adequacy of primary care were assessed with the Components of Primary Care Instrument (CPCI): 5 items on physician's knowledge of the patient ($\alpha = .75$), 4 items on coordination of care ($\alpha = .79$), and 4 items on interpersonal communication ($\alpha = .68$).[29] Patients also reported whether they saw their regular physician during the directly observed visit, the duration of the patient-physician relationship, and the number of different physicians seen in the past year. The number of visits to the regular physician and to other physicians in the past year were also reported. The usual provider continuity index was measured as the proportion of visits to the index physician relative to the total number of visits to all physicians in the past year.[31]

A 3-item measure ($\alpha = .67$) from the CPCI[29] was used to measure the degree to which patients value continuity of care (PVC), which included the following items: "My medical care improves when I see the same doctor that I have seen before," "It is very important to me to see my regular doctor," and "I want one doctor to coordinate all of the health care I receive." For one analysis that assessed dose-response effects, the PVC data were converted to a categorical variable with responses (mean of 3 components) of high (5), medium (4–4.9), and low (less than 4), based on the distribution of responses on the 5-point Likert-type scale. The categories accounted for 46.8%, 31.8%, and 21.5% of the sample, respectively.

The medical record for all observed patient visits was reviewed to determine the number of chronic illnesses and medications, as well as the number of years the patient visited the practice. Visit complexity was measured from the medical record based on criteria established by the American Medical Association for visit coding.[32] Two items assessed complexity of medical decision making during the visit (straightforward, low complexity, moderate complexity, and high complexity) and severity of presenting problem (minimal, self-limited, low severity, moderate severity, and high severity). These 2 items were standardized, and the complexity of the visit was calculated as the mean of the 2 items. Reason for visit was assessed by direct observation and included chronic illness, acute illness, well-patient visit, and other.[27]

Patient satisfaction with the visit was measured with the 9-item Visit Rating Form from the MOS.[33] An additional satisfaction item asked, "To what extent were your expectations met today?" with potential responses including: a lot, quite a bit, moderately, slightly, and not at all. Satisfaction with the physician for the visit was assessed with a 4-item subscale of the MOS form ($\alpha = .90$).[27]

Table 1. Characteristics of Patients and Patient Value of Continuity of Care (PVC)

Characteristic	PVC Mean (SD) or r	P Value	Characteristic	PVC Mean (SD) or r	P Value
Patient age, years			Insurance		
0–6 (n = 258)	4.48 (0.61)	<.001	Medicare (n = 594)	4.66 (0.58)	<.001
7–12 (n = 146	4.32 (0.81)		Undeterminable (n = 19)	4.58 (0.49)	
13–18 (n = 156)	4.25 (0.85)		Unclassified (n = 24)	4.47 (0.65)	
19–39 (n = 657)	4.19 (0.80)		Medicaid (n = 146)	4.45 (0.71)	
40–64 (n = 974)	4.46 (0.70)		Other (n = 32)	4.43 (0.67)	
≥65 (n = 557)	4.67 (0.56)		None (n = 185)	4.37 (0.87)	
Patient sex			Managed care (n = 1,087)	4.36 (0.73)	
Male (n = 1,049)	4.38 (0.73)	.015	Fee for service (n = 676)	4.29 (0.76)	
Female (n = 1,707)	4.44 (0.73)		Number of medications taken	0.19	<.001
Patient race			Number of chronic illnesses	0.20	<.001
White (n = 2,501)	4.42 (0.73)	.326	Self-reported health status		
Not white (n = 262)	4.38 (0.77)		In general	-0.09	<.001
Educational level attained			Health problems limit daily activities	-0.08	<.001
High school graduate or less (n = 1,014)	4.51 (0.70)	<.001	Bothered by emotional problems	-0.01	.576
More than high school (n = 1,155)	4.35 (0.73)		Amount of bodily pain	-0.07	<.001
Number of visits to practice in last year	0.20	<.001	Difficulty doing everyday work	-0.08	<.001
Usual provider continuity index	0.14	<.001	Summary measure	-0.09	<.001
Index physician is patient's regular doctor			Components of Primary Care Instrument		
No (n = 232)	4.00 (0.86)	<.001	Accumulated knowledge	0.40	<.001
Yes (n = 2,459)	4.46 (0.70)		Coordination of care	0.45	<.001
Years as a patient of the index physician	0.22	<.001	Interpersonal communication	0.39	<.001

Data Analysis

Univariate relationships between patient characteristics and the 3-item measure of the degree to which patients value continuity were tested using Pearson correlation for continuous independent variables and 1-way analysis of variance for categorical variables. The associations among the 3 category PVC measures, whether patients saw their regular physician, and their ratings of visit adequacy were examined with 2-way analyses of variance. Three sequential regression models were constructed to examine the relative effect of patient characteristics, visit characteristics, PVC, and whether the patient saw their regular physician on patient satisfaction with the physician. The first model entered patient characteristics into a backward selection regression model to eliminate patient variables that were not independently associated (if $P > .10$) with patient satisfaction with the visit. A second model forced in variables significant in the first model, then entered visit characteristics, again using backward selection. Finally, the third model included patient and visit characteristics from the second model, as well as the main effects and interaction term for PVC and seeing a regular physician on the visit. Adjustments were made for multiple hypothesis testing.[34,35]

RESULTS

The 138 participating physicians were demographically similar to national samples of family physicians, but contained a higher percentage of female and residency-trained physicians.[27,28]

A total of 4,454 of 4,994 patients (89%) visiting the 138 physicians on observation days agreed to participate in the study. Of these, 3,283 (74%) returned exit surveys. Although the patient sample was demographically similar to patients seeing family and general practitioners in the National Ambulatory Medical Care Survey, participants were more likely than nonparticipants to be older, female, white, and married and to have a greater number of chronic illnesses, a longer relationship with the practice, and Medicare or fee-for-service insurance.[27,28] Of the 3,283 patients returning the exit survey, 2,763 (84%) provided complete information required for this analysis. These patients represent 61% of the eligible study population and constitute the analytic sample.

Association of patient characteristics with the degree to which patients valued continuity is shown in Table 1. Patient age, sex, education, insurance, length of relationship with the physician, number of chronic conditions and medications, number of visits to the

Table 2. Patient's Assessment of the Adequacy of Their Primary Care Visit as a Function of Valuing Continuity of Care and Seeing Their Regular Physician

Assessment of Visit	Value of Continuity			Main Effects		Interaction
	Low	Medium	High	Value of Continuity	Regular Doctor	Value of Continuity with Regular Doctor
Expectations met						
Regular doctor	4.08	4.37	4.63	<.001	<.001	.06
Not regular doctor	3.86	4.19	4.14			
Things I wanted to bring up but could not						
Regular doctor	2.05	1.75	1.42	<.001	.48	.36
Not regular doctor	1.95	1.98	1.55			
Doctor addressed my main concern						
Regular doctor	4.34	4.67	4.87	<.001	.006	.32
Not regular doctor	4.29	4.50	4.65			
Satisfaction with physician						
Regular doctor	4.11	4.36	4.66	<.001	<.001	<.001
Not regular doctor	3.96	4.10	4.04			
Physician's accumulated knowledge of the patient						
Regular doctor	3.10	3.48	3.93	<.001	<.001	<.001
Not regular doctor	2.31	2.35	2.35			
Coordination of care						
Regular doctor	3.30	3.78	4.32	<.001	<.001	.004
Not regular doctor	2.92	3.01	3.30			
Interpersonal communication						
Regular doctor	3.95	4.31	4.63	<.001	<.001	<.001
Not regular doctor	3.67	3.76	3.79			

Note: For the above comparisons, the 6 cell sizes for each comparison ranged from 32–1,167.

practice, and self-reported health status are associated with the value patients place on continuity. Parents of patients aged 0 to 6 years, and patients aged 40 to 64 years and 65 years and older reported greater value of continuity of care. The greatest PVC was reported by patients with Medicare and Medicaid, and by a small group with undetermined insurance status. All measures of poorer health status, with the exception of dysfunction associated with emotional problems, were strongly associated with PVC.

Patients reported seeing their regular physician on 2,459 (89%) of index visits. Those who value continuity were more likely to see their regular physician on the index visit and to report a longer duration of relationship with their physician. Patients valuing continuity rated the physician more highly on the key primary care components of accumulated knowledge of the patients, coordination of care, and interpersonal communication. Because most patients who valued continuity in our sample were able to see their regular physician, we lacked sufficient power to evaluate the independent effect of visit complexity.

Analyses shown in Table 2 examine the effect of seeing the regular physician, PVC, and their interaction on several measures of patient assessment of the adequacy of their visit. The data show a consistent dose-response relationship between the degree to which patients value continuity and their assessments of the adequacy of and their satisfaction with the visit. By convention, if the association with the interaction term is statistically significant, the interaction should be interpreted, but not the individual main effects.[36] Although the study had adequate statistical power to detect relatively small differences, the main effects shown in Table 2 all have moderate to large effect sizes (0.34–0.73) and the 4 interaction terms have large effect sizes (0.99–1.76).

To test the association of PVC with patient satisfaction with the physician, while controlling for confounding patient and visit characteristics, a series of regression models were evaluated. As shown in Table 3, model 1 examines the effect of patient characteristics alone. Model 2 adds visit characteristics, resulting in an increase in the strength of the model as reflected in a near doubling of the percentage of variance explained (R^2 value). Model 3 adds the main effects and the interaction term for seeing the regular physician and value of continuity. These analyses show that patient

Table 3. Regression Models Examining Patient Characteristics, Visit Characteristics, Seeing Regular Physician, and Patient's Valuing Continuity as Predictors of Patient Rating of Satisfaction with the Physician Visit

Characteristics	Model 1			Model 2*			Model 3†		
	β	SE(β)	P Value	β	SE(β)	P Value	β	SE(β)	P Value
Patient characteristics									
Age, years									
13-39‡									
0-12	.042	.044	.340	.051	.044	.251	-.001	.045	.984
40 and older	.179	.033	< .001	.156	.034	<.001	.080	.034	.019
Sex§	.052	.027	.055	.037	.027	.178	.018	.028	.514
Health status	.086	.018	< .001	.103	.018	<.001	.084	.019	< .001
Number of visits in previous year	.009	.005	.090	.013	.005	.020	.000	.006	.998
Insurance type									
Fee for service‡									
Managed care	-.029	.034	.387	-.032	.034	.341	-.053	.034	.120
Medicare	.071	.042	.087	.071	.042	.092	-.006	.044	.901
Medicaid	.047	.065	.471	.071	.065	.275	.030	.066	.649
None	-.025	.056	.663	-.037	.057	.516	-.096	.059	.103
Other	-.038	.078	.623	-.012	.078	.878	-.075	.085	.374
Visit characteristics									
Length of visit				.013	.002	< .001	.013	.003	<.001
Number of problems addressed				.024	.013	.062	.010	.013	.443
Continuity									
Visit made to regular physician							-.555	.231	.017
Patient value of continuity							.105	.052	.044
Interaction of patient value of continuity with regular physician							.207	.056	<.001
Model R²		**.025**			**.042**			**.148**	

* Model 2 includes visit characteristics (length and number of problems).
† Model 3 Includes visit characteristics and interaction of value of continuity and regular physician.
‡ Reference category for categorical variables.
§ Reference category is male.

age, health status, and length of the index visit, all independently influence patient satisfaction with the physician. The significant interaction between PVC and visit to regular physician suggests that the effect of seeing a regular physician varies depending on the degree to which patients value continuity of care. Adding the interaction between the degree to which patients value and achieve continuity of care in model 3 more than triples the percentage of variance accounted for in patient satisfaction with the physician.

DISCUSSION

Continuity of physician care does not appear to be universally important to patients, but it is particularly important for certain patients during certain types of visits. Patients who value continuity, but do not see their own physician, report lower ratings for a variety of different dimensions of adequacy of care they receive

on a given visit. Patients who value continuity tend to be female, at either end of the age spectrum, less educated, have Medicare or Medicaid coverage, have more health problems, require more medication, and report lower health status. Our study sample lacked sufficient statistical power to detect an association with complexity of visit. Nonetheless, we observed significant associations with older age and poorer reported health that suggest the potential importance of visit complexity and should encourage further study.

This study shows that some of the ambiguity in the literature could result from studies that do not distinguish among the types of patients and circumstances in which continuity might be particularly important. Consider 2 patients arranging a visit for an upper respiratory tract infection. One patient, a 35-year-old man specifically seeking an antibiotic might value a same-day appointment more than a visit with a regular physician. On the other hand, an elderly woman with

marginal health insurance and substantial chronic obstructive pulmonary disease, who is concerned about the importance of her symptoms and who has already established a relationship with a primary care physician, might judge her care to be of higher quality if seen by a regular physician whom she trusts.

An important strength of this study is its ability to relate patient's report of the value they place on continuity to their report of specific aspects of the perceived adequacy of primary care and satisfaction for a given visit, either with their regular or with another physician. Nonetheless, we acknowledge several limitations. Patients might have selected these family practices in part because of the opportunities for continuity of physician. For example, continuity of physician has been reported to be lower in health maintenance organization (HMO) clinics,[37] whereas only two practices in this study were closed-panel HMOs. In addition, the selection factors involved in the return of questionnaires might have biased the sample toward patients with greater experience of continuity. These factors, however, are likely to have reduced the variability among the independent variables and would tend to bias findings toward the null. Only 10% of our patient sample was not white, and there appeared to be no differences by race in value placed on continuity. Although other work has shown representativeness of physicians, patients,[38,39] and physicians' practice patterns[40] from practice-based research networks, the possibility that the physicians or patients participating in this study were atypical in important ways cannot be completely eliminated. Finally, we assessed only a limited array of possible outcomes of continuity of care.

In the practice settings examined in this report, more than 90% of patients saw their regular physician. In these family practices it appears that patients were able to achieve continuity for many of those visits in which it is hypothesized to be important. Other study designs might examine effects of continuity on patient populations with more variation in the value placed on continuity and their ability to achieve it. It is also a concern to speculate about the extent to which continuity can be valued in the increasing number of settings in which it has not been experienced – it is hard to appreciate something that one has not experienced. The current organizational and financial restructuring of the health care system creates strong pressures against continuity, with employers changing plans and plans changing providers.[41,42] Forced disruption in continuity of care is common, particularly for those with a managed care type of insurance, and results in lower quality of primary care.[43] Forced disruption in continuity is more difficult for patients who are older, have more chronic illness, are in the middle of a workup for

a new problem, or who have a longstanding relationship with the physician.[44] Only about 50% of patients in previous studies report continuity of physician,[37,45,46] and these rates could be lower for elderly minority patients[46,47] and those without health insurance.[48]

Because continuity appears to have greater importance to vulnerable populations,[46,47,49.50] who in turn might experience greater difficulty achieving continuity, additional research to understand the complex effects of continuity takes on urgent policy importance. Until further evidence is available, the findings of this study should encourage design of practice systems that enhance provision of continuous, relationship-centered care, particularly for those vulnerable populations who most value and appear to benefit from it. These patients are more likely to be female, very young or old, less educated, insured through Medicare or Medicaid, and sicker by multiple measures. Because patients who have established a continuity relationship with a physician tend to value it and to report greater satisfaction and quality of care when they achieve continuity with this physician, systems to expand the experience of continuous care are needed to extend these benefits.

To read commentaries or to post a response to this article, see the online version at http://annfammed/cgi/content/full/1/3/149.

References

1. Institute of Medicine. *A Manpower Policy for Primary Care: Report of a study*. Washington, DC: National Academy Press; 1978.

2. McWhinney IR. *An Introduction to Family Medicine*. New York, NY: Oxford University Press; 1981.

3. Stephens GG. *The Intellectual Basis of Family Practice*. Tucson, Ariz: Winter Publishing Co; 1982.

4. Institute of Medicine. *Primary Care: America's Health in a New Era*. Washington, DC: National Academy Press; 1996.

5. Starfield B. *Primary Care: Concept, Evaluation, and Policy*. New York, NY: Oxford University Press; 1992.

6. Leopold N, Cooper J, Clancy C. Sustained partnership in primary care. *J Fam Pract* 1996;42:129-137.

7. Blankfield RP, Kelly RB, Alemagno SA, King CM. Continuity of care in a family practice residency program. Impact on physician satisfaction. *J Fam Pract* 1990;31:69-73.

8. Hjortdahl P, Laerum E. Continuity of care in general practice: Effect on patient satisfaction. *BMJ* 1992;304:1287-1290.

9. Weyrauch KF. Does continuity of care increase HMO patients' satisfaction with physician performance? *J Am Board Fam Pract* 1996;9:31-36.

10. DiMatteo MR, Hays R. The significance of patients' perceptions of physician conduct: A study of patient satisfaction in a family health center. *J Community Health* 1980;6:18-34.

11. Christakis DA, Wright JA, Zimmerman FJ, Bassett AL, Connell FA. Continuity of care is associated with high-quality care by parental report. *Pediatrics* 2002;109:e54.

12. Becker MH, Drachman RH, Kirscht JP. Predicting mothers' compliance with pediatric medical regimens. *J Pediatr* 1972;81:843-54.

13. Shear CL, Gipe BT, Mattheis JK, et al. Provider continuity and quality of medical care: A retrospective analysis of prenatal and perinatal outcome. *Med Care* 1983;21:1204-1210.

14. Wasson JH, Sauvigne AE, Mogielnicki P, et al. Continuity of outpatient medical care in elderly men: a randomized trial. *JAMA* 1984; 252:2413-2417.

15. Christakis DA, Mell L, Koepsell TD, Zimmerman FJ, Connell FA. Association of lower continuity of care with greater risk of emergency department use and hospitalization in children. *Pediatrics* 2001; 107:524-529.

16. Gill JM, Mainous AG. The role of provider continuity in preventing hospitalizations. *Arch Fam Med* 1998;7:352-357.

17. Mainous AG, Gill JM. The importance of continuity of care in the likelihood of future hospitalization: Is site of care equivalent to a primary clinician? *Am J Public Health* 1998;88:1539-1541.

18. Billings J, Teicholz N. Data Watch. Uninsured patient in District of Columbia Hospitals. *Health Affairs* 1990;9:158-165.

19. Raddish M, Horn SD, Sharkey PD. Continuity of care: is it cost effective? *Am J Manag Care* 1999;5:727-34.

20. Weiss LJ, Blustein J. Faithful patients: The effect of long-term physician-patient relationships on the costs and use of health care by older Americans. *Am J Public Health* 1996;86:1742-1747.

21. Roos LL, Roos NP, Gilbert P, Nicol JP. Continuity of care: does it contribute to quality of care? *Med Care* 1980;18:174-184

22. Susman J, Zervanos NJ, Byerly B. Continuity of care and outcome in nursing home patients transferred to a community hospital. *Fam Med* 1989;21:118-121

23. Chao J. Continuity of care: incorporating patient perceptions. *Fam Med* 1988;20:333-337

24. Flynn SP. Continuity of care during pregnancy: the effect of provider continuity on outcome. *J Fam Pract* 1985;21:375-380.

25. Love MM, Mainous AG. Commitment to a regular physician: How long will patients wait to see their own physician for acute illness? *J Fam Pract* 1999;48:202-207.

26. Freeman GK, Richards SC. Is personal continuity of care compatible with free choice of doctor? Patients' views on seeing the same doctor. *Br J Gen Pract* 1994;43:493-497.

27. Stange KC, Zyzanski SJ, Jaen CR, et al. Illuminating the "black box": a description of 4454 patient visits to 138 family physicians. *J Fam Pract* 1998;46:377-389.

28. Stange KC, Zyzanski SJ, Smith TF. How valid are medical records and patient questionnaires for physician profiling and health services research? A comparison with direct observation of patient visits. *Med Care* 1988:36:851-867.

29. Flocke SA. Measuring attributes of primary care: Development of a new instrument. *J Fam Pract* 1975;45:65-74.

30. Ware J, Nelson E, Sherbourne C, Stewart A. Preliminary tests of a 6-item general health survey: A patient application. In: Ware J, ed. *Measuring functioning and well-being*. Durham, NC: Duke University Press; 1992:291-307.

31. Breslau N, Reeb K. Continuity of care in a university-based practice. *J Med Educ* 1975;50:965-969.

32. Kirschner CG, Burkett RC, Coy JA, et al. *Physicians' Current Procedural Terminology: CPT '95*. Chicago, Ill: American Medical Association; 1994.

33. Rubin H, Gandek B, Roger WH, Kosinski M, McHorney C, Ware J. Patients' ratings of outpatient visits in different practice settings. *JAMA* 1993;270:835-840.

34. Benjamini Y, Hochberg Y. Controlling the false discovery rate: A practical and powerful approach to multiple testing. *J R Stat Soc B* 1995; 57:289-300.

35. Hochberg Y. A sharper Bonferroni procedure for multiple tests of significance. *Biometrika* 1988;75:800-802.

36. Keppel G. *Design and analysis: A researcher's handbook*. Englewood Cliffs, NJ: Prentice-Hall; 1973:179.

37. Rubin HR, Gandek B, Rogers WH, Kosinski M, McHorney CA, Ware JE. Patients' ratings of outpatient visits in different practice settings. Results from the Medical Outcomes Study. *JAMA* 1993;270:835-840.

38. Green LA, Miller RS, Reed FM, Iverson DC, Barley GE: How representative of typical practice are practice-based research networks? A report from ASPN. *Arch Fam Med* 1993;2:939-949,

39. Gilchrist V, Miller RS, Gillanders WR, et al. Does family practice at residency teaching sites reflect community practice? *J Fam Pract* 1993;37:555-563.

40. Nutting PA, Baier M, Werner JJ, et al: Practice patterns of family physicians in practice based research networks. A report from ASPN. *J Am Board Fam Pract* 1999;12:278-284.

41. Hurley RE, Gage BJ, Freund DA. Rollover effects in gatekeeper programs: Cushioning the impact of restricted choice. *Inquiry* 1991;28: 375-384.

42. *The community tracking study*. Washington, DC: Center for Studying Health System Change; 1997.

43. Flocke SA, Stange KC, Zyzanski S. The impact of insurance type and forced discontinuity on the delivery of primary care. *J Fam Pract* 1997;45:129-135.

44. Kahana E, Stange K, Meehan R, Raff L. Forced disruption in continuity of primary care: The patients' perspective. *Soc Focus* 1997;30: 172-182.

45. Freeman GK, Richards SC. How much personal care in four group practice? *BMJ* 1990;301:1028-1030.

46. Cornelius LJ. The degree of usual provider continuity for African and Latino Americans. *J Health Care Poor Underserved* 1997;8:170-185.

47. Berk ML, Bernstein AB. Regular source of care and the minority aged. *J Am Geriatr Soc* 1982;30:251-254.

48. Forrest CB, Starfield B. Entry into primary care and continuity: the effects of access. *Am J Public Health* 1998;88:1330-1336.

49. Breslau N. Continuity reexamined: differential impact on satisfaction with medical care for disabled and normal children. *Med Care* 1982; 20:347-360.

50. Love MM, Mainous AG, Talbert JC, Hager GL. Continuity of care and the physician-patient relationship: The importance of continuity to patients with asthma. *J Fam Pract* 2000;49:998-1004.