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# Variability in Consultation Rates and Practitioner Level of Diagnostic Certainty

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**Background.** This study was designed to determine the variability in the consultation practices of family physicians and family nurse practitioners in an urban group practice, and to examine the relation between the referring practitioner's diagnostic certainty at the time of the consultation request, the specificity of the request to the consultant, and the frequency with which the practitioner ordered consultations in that specialty.

**Methods.** This study examined consultations requested by six family physicians and two family nurse practitioners that were directed to nine medical and surgical specialties in connection with 35,218 family practice visits made over a 19-month period in an urban family practice. Requests for consultation were scored based on the level of certainty of the referring practitioner's diagnosis at the time of consultation and the specificity of the consultation request.

**Results.** There was nearly a fivefold variation in the overall specialty consultation rates among providers, with even greater variation in each individual specialty

area studied. Referral rate correlated positively with certainty of diagnosis ( $r = .40$ ). There was no consistent relation between request specificity and referral rate.

**Conclusions.** Consultation rates vary widely, even among family physicians and nurse practitioners within the same practice. The rate at which a practitioner orders consultations in a specialty area increases in relation to the practitioner's certainty of the diagnosis at the time the consultation was requested. Diagnostic certainty is discussed as a possible indicator of a referring practitioner's knowledge in a specialty area, implying that the greater a practitioner's knowledge in a specialty area, the more he or she consults with specialists in the field. Financial incentives that attempt to decrease specialty consultation should be reexamined in light of these findings.

**Key words.** Referral and consultation; decision making; physician's practice patterns; reimbursement, incentive. *J Fam Pract* 1992; 35:31-38.

Skyrocketing health care costs have created a situation in which all parties involved in the financing and delivery of health care are feeling pressure to decrease utilization of health services. Most health care costs are incurred by patients for services or products ordered by their physicians. Many efforts to cut health care costs, then, involve influencing the way in which diagnostic and therapeutic decisions are made by practitioners.<sup>1,2</sup> One method used for limiting the ordering of costly medical services by physicians involves changing the financial incentives from a fee-for-service system to a prepaid, capitation system.<sup>3,4</sup> Many prepayment systems reward physicians

financially for decreasing the use of laboratory, radiology, and other ancillary testing, for treating patients on an ambulatory care basis rather than hospitalizing them, and for limiting expenditures related to specialty consultations.

Financial incentives to decrease consultations by family physicians are appropriate only if consultations are currently used in excess of a preestablished standard. Yet standards for consultation decisions have not been developed, and standardization of consultation practices will only be possible when the factors that influence the primary care physician's decision to consult a specialist are identified and fully understood.

The utilization of health services varies widely among physicians. The degree of variation has been linked to the degree of the physician's ambiguity in a given clinical situation.<sup>5</sup> In addition, it is thought that the greater the variability of practitioner response to a particular clinical problem, the more likely that financial

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incentives will alter a practitioner's practice patterns. On the other hand, clinical decisions that are clear-cut, based on a high degree of professional consensus as to appropriate care, demonstrate less physician variability and are less likely to be influenced by financial incentives.

This study was designed to investigate aspects of the consultation decision-making process. Although there have been previous studies of consultation rates of family physicians,<sup>6-8</sup> none has examined the differences in consultation practices among practitioners within the same setting to determine interpractitioner variability and to examine factors related to this variability. In addition, this study examines the degree of diagnostic certainty expressed in the written consultation request form at the time of referral and the specificity of the request made of the consulting specialist as an indication of whether those practitioners with greater diagnostic acumen and ability in a given specialty area make consultation requests to specialists in that field more or less often than their less knowledgeable colleagues.

## Methods

### *Procedures for Consultations*

This study was based on a review of the consultations arranged by six family physicians and two family nurse practitioners at the Soundview Health Center, a federally funded community health center in the Bronx. A total of 35,218 family practice visits were made to the Center during the 19-month study period from July 1984 through January 1986. New patients at the Center were assigned to individual practitioners based on the practitioner's availability at the time of the patient's first visit. Once assigned, the patient's medical record was marked with the name of the primary care practitioner. Continuity was maintained between the patient and his or her primary care practitioner unless the practitioner was unavailable at the time the patient needed emergent care. Frequent case discussions took place among the family physicians and nurse practitioners. When ordering outside consultations, the patient's primary care practitioner was responsible for completing the consultation request and arranging the consultation.

### *Data Collection Procedures*

A consultation referral and tracking form had been used at the Soundview Health Center for 3 years before the initiation of this study. This form was completed by the practitioner at the time a referral for consultation was made for a patient. One copy was removed and analyzed

retrospectively. At the time of the consultation requests, the practitioners were unaware that any review of their consultation patterns would be made. All services at the Center during the study period were billed as either fee-for-service or fee-for-visit; no prepayment programs had begun. During the study period, some consultations were performed by paid, on-site consultants, and were not consistently documented. These specialties (gynecology, obstetrics, allergy, and cardiology) therefore were not included in the study. Other specialties were excluded from the analysis if the numbers of consultations were insufficient to analyze utilization rates (rehabilitation, endocrinology, pulmonary, podiatry, hematology, dentistry, rheumatology, nephrology, and genetics). The analyses consisted of nine specialties with mean composite rates greater than 1 consultation per 1000 visits. These were surgery, ophthalmology, neurology, orthopedics, dermatology, urology, otolaryngology, gastroenterology, and psychiatry.

The following information was extracted from all consultation forms: the name of the ordering practitioner, the specialty consulted, a coded measure of the level of diagnostic certainty at the time of consultation, and a coded measure of the specificity of the ordering practitioner's consultation request.

Diagnostic certainty and request specificity were rated based on the notes written by the family practitioner at the time the patient was sent for consultation. On some consultation forms, only a description of the patient's presenting symptom or sign had been noted and no apparent attempt had been made to establish a diagnosis ("Patient with lump in abdominal wall"). These requests received a score of 1, the lowest score for diagnostic certainty. On other request forms, a tentative diagnosis had been made or a report of previously attempted treatments had been listed ("Patient with chest pain, not related to exertion, rule out atypical angina"). These received a score of 2. Finally, some consultations were made after a definite diagnosis was established ("Patient with known pulmonary tuberculosis"). Those received a certainty score of 3. No attempt was made to confirm the correctness of these diagnoses since this was not relevant to the hypotheses being considered.

Request specificity was also analyzed by a detailed review of the consultation forms. The lowest specificity score of 1 was given to those forms on which no request was made for the consultant to perform specific testing or treatment ("Please evaluate and treat"). A score of 2 was given when the form indicated some direction or multiple possible directions for the consultant ("Please order bronchoscopy or chest CT as you deem appropriate"). A score of 3 indicated a specific request, either for a particular test or therapy, or to answer a well-defined question

about the diagnosis or treatment of the patient ("Please do colposcopy and colposcopic-directed biopsy").

Coding for diagnostic certainty and request specificity was done independently by two of the authors (N. S. C. and W. L.). When different codes were given for data elements (approximately 10% of codes), a consensus was reached between the two reviewers. A random sample of 99 forms was re-reviewed after 3 years by the original reviewers, independently. Statistical analysis of the results of the two reviews provided kappas of 0.79 and 0.82 for diagnostic certainty and 0.79 and 0.81 for request specificity. A comparison of the reviewers' second coding yielded kappas of 0.82 for diagnostic certainty and 0.79 for request specificity. These data suggest that these measures have high interrater reliability.

### Statistical Analyses

To determine the degree of variability in consultation rates between different practitioners for each specialty, a raw consultation rate was first calculated for each practitioner by dividing the total number of consultations made by the practitioner to that specialty by the practitioner's total number of patient visits. These ratios were then compared to determine the practitioner with the highest consultation rate in a specialty and the practitioner with the lowest consultation rate in that specialty.

Further analyses used each individual practitioner's comparative consultation rate for each specialty as the dependent variable. This was calculated by (1) determining the composite referral rate for the specialty by dividing the total number of consultations ordered by all practitioners in that specialty by the total number of visits; (2) calculating each practitioner's individual rate in each specialty by dividing the number of consultations that practitioner arranged by the total number of that practitioner's patient visits; and (3) dividing each practitioner's rate by the composite rate in the specialty. Thus, a comparative rate of 1.00 indicates a rate exactly equal to the composite rate for the group. A value of 2.00 indicates a referral rate twice that of the composite for the group in that specialty. By using comparative rates, analyses were normalized such that the differences in individual providers' rates could be compared without the impact of the overall greater consultation rate in some specialties.

To examine the variability of diagnostic certainty and request specificity by provider and by specialty, two-way analysis of variance (ANOVA) was performed with each consultation request considered as a case. Psychiatry had zero consultations by two providers; therefore, psychiatry cases were removed from the analysis. Since the small numbers in many remaining cells made these two-

Table 1. Number of Consultations Ordered and Consultation Rate of Eight Family Practitioners for 35,218 Patient Visits, by Specialty

Specialty	No. of Consultations Ordered	Rate of Referrals*
Surgery	177	5.03
Ophthalmology	135	3.83
Neurology	123	3.49
Orthopedics	103	2.92
Dermatology	94	2.67
Urology	84	2.39
Otolaryngology	72	2.04
Gastroenterology	42	1.19
Psychiatry	38	1.08
Total referrals	868	24.6

\*Per 1000 patient visits.

way ANOVA results somewhat tentative, one-way analysis of variance (using all specialties including psychiatry) was also performed. For the post hoc comparisons of specific pair of means, the Tukey HSD and Bonferroni *t* procedures were used.<sup>9</sup>

To investigate whether a practitioner's diagnostic certainty or request specificity was related to the practitioner's consultation rate within a specialty, Pearson correlations and multiple regression analyses were performed. For these analyses, average diagnostic certainty and request specificity scores were calculated both for all providers for each specialty and for each provider across all specialties.

Statistical significance was not evaluated for the multiple regression analyses of individual practitioners and specialty areas because sample sizes for each practitioner alone and each specialty alone were too small. When all consultations were analyzed as a group, however, tests of statistical significance were performed.

## Results

### Variation in Consultation Rates

A total of 868 consultations were arranged during the study period in the nine specialty areas analyzed (Table 1). The consultation rates for these nine specialty areas were higher than those of previously published studies done in family practice settings; however, differences in patient population and practice setting, as well as probable differences in the availability of local consultants, made meaningful comparisons between studies difficult.<sup>6-8</sup>

Table 2 presents the summary descriptive statistics for the calculated consultation rates. The minimum and

Table 2. Consultation Rates of Eight Family Practitioners, by Medical Specialty Areas

Specialty	Mean Rate (SD)	Minimum Rate	Maximum Rate	Maximum: Minimum Ratio
Surgery	5.72 (3.01)	1.26	12.00	9.52
Ophthalmology	3.72 (2.86)	.42	8.88	21.14
Neurology	3.56 (2.44)	.69	7.68	11.13
Orthopedics	2.71 (1.73)	.42	4.84	11.52
Dermatology	2.46 (1.53)	.42	4.58	10.90
Urology	2.65 (1.47)	.46	5.44	11.83
Otolaryngology	2.02 (1.06)	.61	3.84	6.29
Gastroenterology	1.30 (.81)	.46	2.88	6.26
Psychiatry	1.33 (1.16)	.00	3.26	*

\*Maximum:minimum ratio cannot be calculated, as the minimum rate is zero.

maximum of the individual providers' rates for each specialty area are shown. The range of values in ophthalmology shows that the relative chance of being sent for an ophthalmology consultation by one provider was more than 21 times the chance of being sent for a consultation by another provider. The standard deviations for consultation rates in each specialty indicate that there was enormous variation in the consultation rates in each specialty studied.

Figure 1 displays the comparative consultation rates for each practitioner in each specialty consulted and indicates great variation among providers in consultation rates for each specialty studied and great variability for each provider among specialties. Practitioners with high rates for one specialty, when compared with their colleagues, often had low rates for other specialties. This

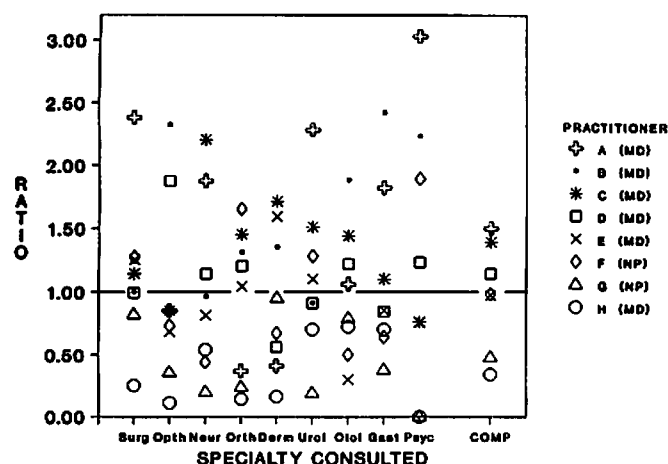


Figure 1. Ratio of individual consultation rates to composite rate for that specialty. Composite consultation rates are the ratio of the individual practitioner's consultation rate for a given specialty to the composite rate (total consultations divided by 35,218 total visits) for that specialty. A ratio of 1.00, therefore, indicates an individual practitioner rate equal to the composite rate for that specialty.

suggests that the consultation rate is not merely an intrinsic physician characteristic but, rather, that it relates to the specialty area of the patient's problems.

When each practitioner's consultation rate for all specialties combined was analyzed, the highest overall rate was 4.45 times greater than the lowest overall consultation rate. This variation was small compared with the variations in practitioners' rates for individual specialties, since practitioners with high rates for some specialties had low rates for other specialties. The composite, therefore, hides the greater degree of variability that was seen in individual rates by specialty.

### Variability of Diagnostic Certainty at the Time of Consultation

Consultations take place at various stages in the diagnostic and treatment process. The consultation referral form was used to review and indicate the degree of diagnostic certainty that the referring practitioner expressed at the time of consultation.

Diagnostic certainty levels, as shown in Table 3, varied for different practitioners over all specialties ( $F = 4.83$ ;  $P < .001$ ). The nine specialties also differed with respect to level of diagnostic certainty ( $F = 5.56$ ;  $P < .001$ ).

Results of the two-way ANOVA using diagnostic certainty as the dependent variable, and specialty and practitioner as the independent variables (data not shown), resulted in a statistically significant interaction ( $F = 1.44$ ,  $P = .029$ ) and two statistically significant main effects (provider:  $F = 2.74$ ,  $P = .008$ ; specialty:  $F = 3.85$ ,  $P < .001$ ). Diagnostic certainty for each specialty differed for each provider; thus, it was impossible to interpret the effects of specialty and practitioner independently. It is therefore necessary, according to the analysis, to know both the individual practitioner and the specific specialty in order to explain the variation in diagnostic certainty.

### Variability of Request Specificity at the Time of Consultation

There were statistically significant differences in level of request specificity among the eight different practitioners as shown in Table 3 ( $F = 2.80$ ;  $P = .007$ ). In addition, there were statistically significant differences in the level of request specificity among the nine different specialties ( $F = 12.52$ ;  $P < .001$ ).

The two-way ANOVA with request specificity as the dependent variable (data not shown) indicated a nonsignificant interaction and a nonsignificant effect for

Table 3. Means and Standard Deviations of Diagnostic Certainty and Request Specificity Scores, by Practitioner and Specialty Consulted

	No.	Diagnostic Certainty*	Request Specificity*
		Mean ( $\pm$ SD)	Mean ( $\pm$ SD)
By Practitioner			
A	34	2.24 (0.92)	1.47 (0.75)
B	150	1.83 (0.84)	1.45 (0.75)
C	209	2.11 (0.74)	1.57 (0.81)
D	169	2.10 (0.72)	1.44 (0.77)
E	119	2.04 (0.84)	1.68 (0.77)
F	95	1.85 (0.80)	1.33 (0.68)
G	52	1.81 (0.84)	1.31 (0.70)
H	40	1.60 (0.71)	1.65 (0.83)
		$F = 4.83; P < .001$	$F = 2.80; P = .007$
By Specialty			
Dermatology	94	1.74 (0.78)	1.34 (0.65)
Otolaryngology	72	1.94 (0.85)	1.37 (0.62)
Gastroenterology	42	1.81 (0.74)	1.93 (0.97)
Neurology	123	1.82 (0.61)	1.93 (0.95)
Ophthalmology	135	1.99 (0.80)	1.34 (0.70)
Orthopedics	103	2.07 (0.76)	1.14 (0.42)
Psychiatry	38	2.16 (0.92)	1.58 (0.86)
Surgery	177	2.27 (0.79)	1.58 (0.73)
Urology	84	1.86 (0.91)	1.40 (0.70)
		$F = 5.56; P < .001$	$F = 12.52; P = <.001$
All Practitioners and Specialties	868	1.99 (0.80)	1.50 (0.77)

\*Range of scores, from 1 (low) to 3 (high).  
SD denotes standard deviation.

practitioner, but a statistically significant effect for specialty ( $F = 6.33, P < .001$ ). Thus, specialty alone was sufficient to explain the variability in request specificity.

### *Diagnostic Certainty and Request Specificity as Predictors of Consultation Rate*

To determine whether diagnostic certainty and request specificity were correlated with comparative referral rates, correlation coefficients were calculated over all practitioners within each specialty and for each practitioner over all specialties as shown in Table 4. Although the magnitude of the correlation coefficients varied considerably, diagnostic certainty was consistently positively related to the comparative referral rate. For four practitioners, request specificity correlated negatively with referral rate, while for four practitioners it correlated positively or was zero. Thus, increased diagnostic certainty was associated consistently with higher referral rates, while results for request specificity showed no specific association with referral rate.

When practitioners' rates in each specialty across all practitioners and all specialties were correlated with the corresponding consultation rates, there was a statistically significant positive correlation between consultation rate

and diagnostic certainty ( $r = .40$ ) but not between consultation rate and request specificity ( $r = .13$ ).

Table 4 also presents the  $R^2$  values obtained from multiple regressions using both diagnostic certainty and request specificity to predict consultation rate. Overall, diagnostic certainty explained 16% of the variance in consultation rates. Request specificity explained no additional variance once diagnostic certainty was in the model.

*Differences between nurse practitioners and physicians.* The two nurse practitioners in the study had two of the lowest composite consultation rates. Since there were only two nurse practitioners in the study, tests of statistical significance comparing the consultation rates of nurse practitioners with those of physicians were not performed. The data indicate that nurse practitioners ordered fewer consultations, and had lower diagnostic certainty and request specificity scores than their physician colleagues.

## Discussion

Great ambiguity exists in the practice of medicine. This ambiguity includes inconsistencies among physicians in their interpretations of the patient history, physical find-

Table 4. Relation of Comparative Referral Rate to Diagnostic Certainty and Request Specificity, by Practitioner and by Specialty

	Diagnostic Certainty <i>r</i>	Request Specificity <i>r</i>	<i>R</i> <sup>2</sup>
By Practitioner (n = 9)			
A	.60	.64	.47
B	.48	-.06	.29
C	.15	.61	.46
D	.17	-.15	.07
E	.30	-.30	.15
F	.12	-.26	.07
G	.01	.08	.01
H	.13	.49	.28
By Specialty (n = 8)			
Ophthalmology	.29	-.10	.14
Surgery	.72	-.47	.73
Neurology	-.03	.28	.21
Orthopedics	.55	.63	.48
Dermatology	.90	.63	.83
Urology	.36	.05	.18
Otolaryngology	-.12	-.63	.58
Gastroenterology	.58	-.05	.42
Psychiatry	.12	.65	.43
All Practitioners and Specialties (n = 72)	.40 ( <i>P</i> = .001)	.13 (NS)	.16 ( <i>P</i> = .003)

All *r* values at least .55 for practitioner and .58 for specialty are significantly different from zero (1-tail, *P* < .05).  
NS denotes not significant.

ings, electrocardiogram and x-ray findings, and Papanicolaou smear cytology.<sup>10</sup> Huge variations have been reported in physician utilization rates for hospital facilities<sup>11</sup> and surgical services.<sup>12-14</sup> Utilization rates for laboratory, x-ray, and pharmacy services and hospitalization rates among practitioners in an HMO setting also vary.<sup>15</sup> Ambiguity in clinical decision making is one important factor in explaining these variations. At least one study refutes the notion that geographic variation in the utilization rates of some diagnostic and therapeutic procedures is a result of inappropriate use.<sup>16</sup>

The current study examined the extent of variation in the individual consultation rates of family physicians and family nurse practitioners. Looking at the consultation rates of individual providers in a single specialty area, there were huge variations in consultation rates in all specialties studied. This implies either that there is no well-accepted standard for when consultations should be ordered in a particular specialty or that practitioners vary dramatically in their need for specialty consultation based upon their own skill and experience in a particular specialty.

The analyses reported in this paper rely on the assumption that major differences in the case mix of the individual practitioners did not confound the variations in consultation rate. Patients who came to the Center were assigned arbitrarily to available practitioners unless

the patient requested a specific practitioner. It is possible that a particular physician or nurse practitioner who was particularly effective in treating a particular category of patients experienced a larger referral of other patients with similar conditions; however, very few patients came to the Center seeking a particular practitioner. Differences in the age or sex of patients or in the degree of illness might explain some of the variation in consultation rates; however, no information was collected on the characteristics of the patient population of the Center. Subsequent studies should evaluate the demographic data and presenting problems of each provider's patients to investigate potential confounding factors.

Practitioners with high consultation rates compared with their peers in one specialty often had low rates in other specialties. This finding implies that practitioners manage cases differently according to the specialty areas involved, and that the practitioner's rate of consultation is not an intrinsic factor of practice style.

This study indicates that one factor influencing the consultation rate is the degree of certainty with which the referring family practitioner has made a diagnosis before calling for a specialty consultation. Results indicated statistically significant variability in the certainty scores among practitioners and among specialties. A possible explanation for this is that practitioners vary in the timing of their consultation requests; some consult based on

only a finding of a symptom, sign, or abnormal test result, while others consult only after they have made and confirmed a diagnosis. Alternatively, diagnostic certainty may represent the level of knowledge that a practitioner has in a specialty area.

Another factor that varied among practitioners was the specificity of the requests made to the consulting specialist. Again, there was significant variability both among specialties and among practitioners.

There was a significant, positive correlation between diagnostic certainty and comparative consultation rate. This implies that those practitioners with the highest degree of certainty of diagnosis at the time of consultation had the highest consultation rates for each specialty. In contrast, no consistent relationship was found between request specificity and consultation rate, and the correlation between diagnostic certainty and request specificity was low.

Researchers have speculated that practitioners are more likely to consult when they are less competent in a particular specialty area. If this had been confirmed by the current study, educational interventions designed to increase the competency of practitioners in areas where their specialty utilization was high might have proven fruitful to decrease the utilization of specialty consultation. In fact, prior studies have shown the failure of educational programs as a cost-containment strategy.<sup>17</sup> One possible explanation for the findings presented in this paper is that higher levels of competence, sensitivity, and diagnostic acumen of a practitioner in a given specialty area lead to a higher rate of consultation.

Of note, the lower overall consultation rate and diagnostic certainty and request specificity scores of the two nurse practitioners compared with the six physicians in the study further support the notion that less training, and presumably less knowledge in specialty areas, results in lower consultation rates and fewer referrals made based on lower levels of diagnostic certainty and request specificity.

Furthermore case-specific reviews were made of some of the specific consultation requests by the providers after completion of the study. The practitioner with the highest consultation rate in orthopedics had the greatest training in orthopedics and was thought by his colleagues in the practice to be the most competent of the family practitioners in this field. A review of this provider's consultation requests for an orthopedic specialist by two other providers revealed that some of the patients sent for consultation would not have been sent for consultation by the other two reviewing providers, as they would have missed the diagnosis of the problem and treated the patient in the office for another presumptive diagnosis. Further studies are needed with larger num-

bers of each type of practitioner to examine these differences.

## Conclusions

The wide variation in consultation rates found among the specialties studied is consistent with data presented nationally that indicate wide variations in many other health care process variables. These variations have many interpretations.<sup>5</sup> Major cost-containment programs such as prepaid medical care seek to alter physicians' practice patterns. If diagnostic certainty at the time of consultation represents greater expertise, then the results from this study indicate that practitioners who consult more frequently may do so because they better recognize problems in a particular organ system and therefore do more thorough histories and physical examinations in that area and diagnose more problems. High rates of consultation may not be due to practitioners who send patients to consultants excessively because of their own lack of knowledge or skill in a particular field of medicine, but rather to increased knowledge and diagnostic acumen in a particular specialty area.

Although this conclusion may seem counterintuitive, a recent study from Great Britain reached similar conclusions. In a suburban general practice, data on the referral patterns of five partners and one trainee were collected. Great variations were seen in the consultation rates of the practitioners in the group. A confidence questionnaire was administered to the practitioners and compared with their consultation rates. Practitioners with the highest rates in the specialty areas reported had the greatest self-confidence in those specialty areas.<sup>18</sup>

It is clear from the data presented here and from other studies that before attempting to decrease the number of consultations of physicians through financial incentives, it is important to know which consultations are the most appropriate to eliminate. Are those practitioners with high rates consulting too often, or are those with low rates failing to consult when consultation is needed?<sup>19-21</sup> It is possible that the correct rate varies for each individual practitioner based on his or her own level of knowledge and skill in a particular specialty area. Certain types of training (academic vs community-based) may predispose a practitioner to increased use of consultation, as other studies have shown the influence of type of practice on rates of diagnostic testing.<sup>22</sup> Regardless of consultation rate (a process measure), it is important to know how the patient's outcome is affected and whether overall health care costs are affected. In one inpatient study, family physicians treating patients who had congestive heart failure ordered significantly more specialty



consultations than internists in the same setting, yet had lower diagnostic testing costs and lower total hospital costs than the internists.<sup>23</sup>

There is a need for more studies that assess the relation between knowledge and consultation rate. The implication that those who know more in a specialty area consult more frequently (as suggested by using the proxy measure of diagnostic certainty) suggests a potential danger in attempting to decrease consultation rates through financial incentives. Practice variations may result from factors other than poor protocols that determine the clinical decisions made by individual practitioners. In the current case, differences in knowledge and aptitude may lead to practice variations, and these differences must be examined carefully before manipulating the process by which practitioners decide on diagnostic and therapeutic interventions. Similar studies should be conducted in other practice settings with other reimbursement mechanisms as well.

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# Referral and Consultation in Primary Care: Do We Understand What We're Doing?

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Consultation and referral decisions by primary care physicians have an enormous impact on the cost and quality of care that patients receive. Studies suggest that for each dollar generated by a family physician, \$2 are generated by the consultant physician, and \$4 by the associated hospital.<sup>1-3</sup>

Patient health is also certainly affected. Appropriate consultation and referral may lead to prompt diagnosis and treatment of conditions that were beyond the immediate expertise of the primary care physician. Inappropriate referral, however, may lead to unnecessary testing and a cascade of increasingly expensive, invasive, and risky procedures in an often futile search for diagnostic certainty.<sup>4,5</sup>

Although studied extensively in the United Kingdom, we know very little about the process and results of consultation and referral practices in the United States. The article by Neil Calman and his co-workers in this issue<sup>6</sup> raises interesting questions about the current consultation patterns in family practice. Although based on the practices of one group of six family physicians and two nurse practitioners, the study results are consistent with data from the literature suggesting great interphysician variation in frequency of consultation and referral. Calman et al also found that there was substantial intra-physician variation by specialty consulted, and that this variation correlated with diagnostic specificity in the referral letter. The results are similar to a British study,<sup>7</sup>

also involving only one practice, which concluded that physicians with greater expertise had higher referral rates.

These apparently counterintuitive results are intriguing. Does increased knowledge result in increased referrals because of a better assessment of patient need? Or, does the higher referral rate simply reflect the greater interest or curiosity that a physician has as manifested by his or her increased knowledge? Alternatively, is increased knowledge one response to a physician's intolerance of uncertainty, which is also manifested in an increased referral rate? Studies have suggested that physicians who are willing to tolerate more uncertainty generate less intense services, including laboratory testing<sup>8</sup> and referral.<sup>9</sup> The finding that referral decisions vary by problem domain is consistent with Elstein's work describing physicians' problem-solving strategies, which indicates that physicians' strategies are not similar across all content areas.<sup>10</sup>

In their article, Calman et al do not clearly distinguish between consultation and referral. Though these terms are used interchangeably by many authors, there is an important distinction based on the transfer of responsibility for the patient.<sup>11-13</sup> A *consultation* involves another physician performing a specific diagnostic or therapeutic task, without transfer of responsibility for the patient's care or even for ongoing management of the problem. *Referral*, on the other hand, involves sending a patient to another physician for ongoing management of a specific problem with the expectation that the patient will continue to see the original physician for coordination of total care.

Consultation and referral comprise a spectrum. At one extreme is the informal "sidewalk consult." At the other extreme, full responsibility for coordinating patient care is referred to another physician, as in the care of patients with end-stage renal disease. In between the extremes are varying levels of interaction between the primary care physician and consultant, which may result

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in improved care for the patient, or in misunderstanding, duplicate testing, or inadequate care.

More research is needed if physicians are to understand the consultation and referral process and improve their ability to effectively consult with and refer patients to specialists. In particular, research is needed in four areas: describing the pattern of consultation and referral; understanding the components of the consultation and referral decision; describing the costs and outcomes of consultation and referral; and developing better strategies for consultation and referral.

*Consultation and referral patterns.* Most of the research on consultation and referral patterns comes from the United Kingdom, where there is evidence of a great deal of variation.<sup>14-21</sup> The most common factor that influences referral rates is the availability of qualified consultants.<sup>16</sup> Little correlation has been found between referral rates and the quality of referrals,<sup>22-24</sup> and most of the observed variation remains unexplained.<sup>14</sup> Some evidence points to variation in consultation and referral patterns among primary care physicians in the United States as well.<sup>6,11,25,26</sup> There are few data to explain variation in the United States, although patient characteristics,<sup>11,12,25,27</sup> physician specialty,<sup>28-30</sup> length of training,<sup>31</sup> and reimbursement plan<sup>11,28,32</sup> appear to be important.

*The decision to consult and refer.* Consultation and referral decisions are firmly embedded in general clinical decision-making processes. There is, however, little understanding of the clinical decision processes that govern consultation and referral practices, although some work has been done to develop theoretical models.<sup>12,18,20,30</sup>

Several authors in the United Kingdom<sup>20,33-36</sup> and the United States<sup>31,37,38</sup> have examined physicians' reasons for consultation and referral. These include diagnosis or confirmation of diagnosis; diagnosis and treatment recommendations; advice on treatment; treatment of a previous condition; reassurance of patient, relative, or referring physician; specific investigations or specialty procedure; routine specialty examination; referring physician's education; specific request by patient; and medical-legal reasons.

The results of Calman et al suggest the need for a complex model to account for the variability of the decision-making process in consultation and referral. Additional research is needed on the psychological determinants, including perception and tolerance of ambiguity, perception of role and competence of both primary physician and consultant, fear of exposing lack of knowledge, fear of losing the patient, effect on the doctor-patient relationship, and the role of the patient.<sup>12,25</sup>

The challenge of understanding the decision-making processes of physicians and their patients with regard to

consultation and referral is immense. This may be an ideal area for application of qualitative research methods. Dowie's work,<sup>20</sup> based on in-depth interviews of 65 British general practitioners, is an important start in the right direction. She demonstrated the complexity of the referral decision-making process and identified three sets of variables that drive the process: professional attributes, knowledge of the health care system, and personal style.

*Cost and outcomes of consultation and referral.* Mounting evidence for dramatic variation in use of high-cost diagnostic and therapeutic services has led to a major federal research initiative on outcomes and medical effectiveness research. There is little work, however, examining the extent to which such variations are explained by variations in referrals from primary care. The variation that has been observed in consultation and referral practices suggests that both underreferral and overreferral may be prevalent. Both have significant cost and outcomes implications. Research strategies must consider that the appropriateness and timing of a consultation and referral will vary by the interests and capabilities of primary care physicians, the availability of qualified consultants, and the characteristics of the practice setting.

Most studies of the outcomes of consultation and referral have used intermediate outcomes, such as services provided, the adequacy of the answer to the referring physician's request, and patient satisfaction, as well as the perception of the value of the consultation and referral held by the patient, the referring physician, and the specialist. Research is needed as well that examines outcomes in terms of measurable changes in health and functional status.

*Consultation and referral strategies.* The components of the consultation and referral include the following: (1) the primary care physician and the patient recognize the need for consultation and referral; (2) the primary care physician communicates the reason for the consultation and referral along with relevant clinical information to the specialist; (3) the specialist evaluates the patient's condition; (4) the specialist communicates the findings and recommendations to the primary care physician; and (5) the patient, primary care physician, and specialist understand their responsibilities for continuing care.<sup>26,37</sup> Problems in the consultation and referral process, however, have been identified at every step,<sup>26</sup> many of them attributed to failures in communication and discordant expectations.

Research is needed to develop and test strategies for improving communication among the three parties and establishing clear expectations regarding responsibility. The use of computer and communications technology may provide opportunities to facilitate the consultation process. Enhanced communication could also encourage preconsultation testing and avoid wasteful duplication.

Strategies for teaching techniques of consultation and referral need to be developed, tested, and incorporated into the medical school and continuing education curricula for primary care physicians and subspecialists. Finally, the potential of consultation and referral to contribute to the continuing education of practicing physicians needs further development.<sup>37,39,40</sup>

In summary, we have outlined a research agenda for consultation and referral. This area is of enormous policy relevance, particularly at a time when most health care reform proposals assume a central role for primary care physicians in ensuring coordination of care for all Americans. Consultation and referral are the major avenues through which family physicians bring to bear the considerable capacity of the health care system on the care of their patients. A better understanding of and more effective strategies for consultation and referral, therefore, will have an important beneficial impact on the cost and quality of care that patients receive. Ultimately, this body of research will demonstrate the key role of primary care physicians in providing optimal care for all patients.

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