

Variability in Physician Referral Decisions

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Background: Because it is possible that part of the variability in frequency of interventions and even in outcomes results from the variability in referral patterns of primary care physicians, our objectives were to examine primary care physician decision making about referrals for several common adult and childhood conditions.

Methods: One hundred thirty-six family physicians in 80 office-based practices recorded reasons for referral to the most common types of specialists and the expectation of the specialist for conditions with at least seven referrals to each specialist.

Results: By far the most referrals were expected to be short-term (<12 months); for more than 50%, the referrals were for consultation only (rather than direct intervention). For most of the 10 types of conditions, there were no apparent differences in reason for or expectation of the referral that would explain the choice of different types of specialists for referral. Expectations for shared care were generally more common in referrals to nonphysicians than to physicians.

Conclusions: This study revealed unexplained variability among family physicians in the specialists to whom patients are referred for specific conditions. Why some patients with the same condition are referred to surgeons and others to medical specialists is unclear, at least in the context of expectations for referral as being long-term vs short-term or consultative vs referral for definitive management. The impact of this variability on costs and outcome could be considerable and deserves more intensive study. (J Am Board Fam Pract 2002;15:473–80.)

Variability across clinical practices is a well-described phenomenon in health services. The seminal studies of Wennberg and Gittelsohn¹ have been followed by subsequent ones, all confirming the initial observation that characteristics such as hospitalization rates, both overall and for specific conditions, vary greatly from area to area, as do rates of performance of surgery and diagnostic procedures.²

Various explanations have been sought for these variations in specialized services. Among them are differences in the availability of resources (eg, personnel, hospitals, hospital capacity),² the epidemi-

ology of disease or differences in severity of disease, financial incentives, socioeconomic characteristics of population in the area,³ rates of inappropriate procedures in different areas,⁴ and different patient propensities to seek care.⁵ The main conclusion has been that this variability is accounted for primarily by practice styles, even within small geographic areas.⁶ Although these variations might derive, at least in part, from different experiences with ambulatory care,⁷ this possibility has not been systematically explored.

Despite the salience of issues related to practice variations among specialists, little attention has been given to the way in which primary care physicians decide which patients to refer to specialists for specific types of problems and, hence, influence the types of interventions they will receive for those conditions. That is, it may be hypothesized that at least part of the variability in frequency of interventions and even in outcomes is a result of variability in referral patterns of primary care physicians. For example, Roos⁸ found that children with otitis media who had been referred to specialists by primary care physicians had operations that were more appropriate to their condition than children who self-referred to the same specialists.

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The referral process occurs in two phases: whether to refer and to whom to refer. The first step of the process is described in a previous article.⁹

This article concerns the second step: primary care physician decision making about the type of specialists to whom patients are referred for a variety of common adult and childhood conditions.

Methods

Physician Sample

The study was implemented and coordinated by the staff of the Ambulatory Sentinel Practice Network (ASPN), a national primary care practice-based research network composed mainly of family physicians. Physician recruitment activities were directed to all physician members of ASPN, affiliated physician organizations, local and regional networks, and the larger community of primary care physicians. Overall, 342 physicians expressed interest in the study, 182 completed some aspect of data collection, and 141 family practice physicians (41% of whom were members of ASPN) completed the study, with 94% of the physicians completing data collection during 1998. Residents and those in fellowship training were excluded. These 141 physicians practiced in 87 practices located in 31 states.

Mean age of the physicians was 45.3 years, mean years in practice 14.0 years, and percentage of female physicians was 21.3%. Slightly more than one quarter were in solo practice, and one third were in a family practice of more than 3 physicians.

Procedures

Office staff recorded all referrals in a log, and physicians completed a questionnaire for each referral made during the 15 practice-day study period. The response rate for the questionnaire was 94%. A referral was defined as a recommendation that a patient should have a face-to-face encounter with another practitioner. We excluded referrals made to laboratories, radiologic facilities, emergency departments, hospitals for inpatient admission, and curbside consultations (ie, referring physician obtains advice from a specialist but does not send the patient for a visit).

The referral questionnaire contained several questions about the referral decision. Reasons for referral response categories were based on a taxonomy previously developed,¹⁰ modified slightly for

Table 1. Number of Referrals, by Type of Specialist, Ambulatory Sentinel Practice Network Sample.

| Specialty | Number of Referrals |
|---------------------------|---------------------|
| Psychiatrist | 22 |
| Pulmonologist | 34 |
| Allergist | 35 |
| Psychologist | 35 |
| Obstetrician-gynecologist | 65 |
| Neurologist | 69 |
| Cardiologist | 69 |
| Urologist | 81 |
| Ophthalmologist | 87 |
| Dermatologist | 91 |
| Gastroenterologist | 107 |
| Otolaryngologist | 120 |
| General surgeon | 152 |
| Orthopedic surgeon | 197 |
| Nonphysician clinicians* | 215 |
| Total | 1,379 |

*Common nonphysician clinicians were physical therapists, podiatrists, nutritionists, and audiologists.

the ASPN referral study based on focus groups with family physicians.

A medical record abstractor assigned ICD-9-CM (*International Classification of Diseases, Ninth Revision, Clinical Modification*) codes to the primary diagnosis provided by the physician for each referral. We matched ICD codes to an expanded set of diagnosis clusters (EDCs). EDCs group ICD codes into clinically homogenous categories using the methods developed by Schneeweiss et al.¹¹

The analyses included 136 family physicians from 80 practices who documented at least one office visit referral during the study period. (Four physicians had no referrals, and 1 reported a referral but provided no information on it.) We limited our sample of referrals to those made during office visits because telephone referrals tended to be made for different reasons and are associated with different expectations.¹² Family physicians completed a total of 1,621 questionnaires for referrals made during office visits. The analyses focus on the 15 types of specialists most commonly referred to; Table 1 lists the number of referrals (total 1,379, each with at least 22 referrals) to each of these specialists.

Data Analysis

The most common types of specialists were compared by the reason for the referral and the refer-

Table 2. Types of Conditions with Most Referrals to Only One Type of Specialist.

| Condition | Number of Referrals to Main Specialist/Number of Referrals to all Specialists* | Main Specialist |
|--|--|--------------------|
| Urinary symptoms | 28/37 | Urologist |
| External abdominal hernias, hydroceles | 35/35 | General surgeon |
| Gastrointestinal signs and symptoms | 23/29 | Gastroenterologist |
| Deafness, hearing loss | 17/27 | Audiologist |
| Joint disorders from trauma | 21/25 | Orthopedic surgeon |
| Otitis media | 22/23 | Otolaryngologist |
| Fractures, excluding digits | 15/22 | Orthopedic surgeon |
| Anorectal condition | 11/22 | Gastroenterologist |
| Cholelithiasis, cholecystitis | 17/21 | General surgeon |
| Allergic rhinitis | 19/20 | Allergist |
| Cervical pain syndrome | 10/20 | Physical therapist |
| Chest pain | 14/18 | Cardiologist |
| Headaches | 13/18 | Neurologist |
| Acquired foot deformities | 15/18 | Podiatrist |
| Obesity | 10/17 | Nutritionist |
| Gastrointestinal reflux | 13/17 | Gastroenterologist |
| Vertiginous syndromes | 10/17 | Otolaryngologist |
| Cardiac arrhythmia | 15/16 | Cardiologist |
| Ophthalmic signs and symptoms | 14/16 | Ophthalmologist |
| Cardiovascular signs and symptoms | 10/13 | Cardiologist |
| Menstrual disorders | 10/13 | Gynecologist |
| Degenerative joint disease | 10/13 | Orthopedic surgeon |
| Sleep apnea | 11/13 | Pulmonologist |
| Ischemic heart disease | 11/12 | Cardiologist |
| Dermatitis, eczema | 12/12 | Dermatologist |

Note: Only specialists with at least 7 referrals are listed, and only for conditions with at least 12 referrals. Of the 147 conditions with referrals, 53 were referred to only one type of specialist.

*A total of 1,621 referrals were made during office visits.

ring physician's expectation of the specialist. Physicians could select one primary reason for referral and multiple additional reasons for referral. On average, physicians indicated a total of 1.8 reasons for referral. The primary and additional reasons for referral were combined and then collapsed into four mutually exclusive categories: patient or third party request, specialized skill and advice, advice only, and specialized skill only. If a patient or third party request was listed as either the primary or an additional reason for referral, then the patient or third party request was taken as the reason for referral.

The expectation of the specialist and the expected duration of the involvement with the specialist were combined to describe the referral as a short-term consultation, a long-term consultation, a short-term referral, or a long-term referral.

Short-term was defined as a referral or consultation that was expected to last less than 12 months; those expected to last 12 or more months were considered long-term. In a consultation, the specialist is expected to provide consultative advice or to perform tests. In a referral, the specialist is expected to share or assume total responsibility for specific interventions or for on-going management of the referred health problem.

Referrals by the family physicians were further broken down by type of referred condition. We focused on conditions (EDCs) that were referred to more than one type of specialist. To provide sufficiently stable estimates of the characteristics of referrals, the type of specialist was included in the analysis only if they had at least seven referrals for that condition. Only 10 of 150 referred conditions, all them among the most common 50 referred

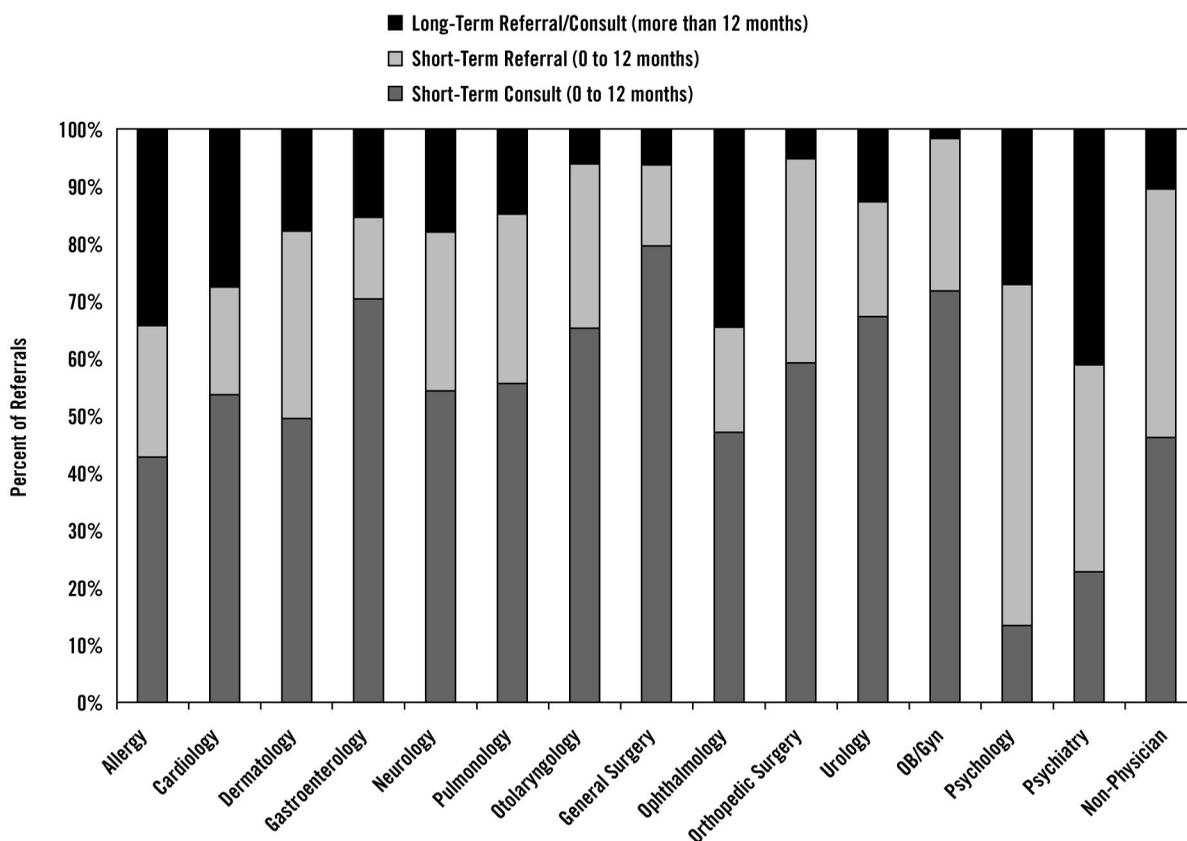


Figure 1. Type of consultation and referral (percentage of referrals).

conditions, were referred at least seven times to more than one type of specialist and hence eligible for evaluation of variability.

Primary and additional reasons for referral were combined so that the reasons presented are not mutually exclusive. *P*-values presented in the tables are based on chi-square tests.

Results

There were 1,621 referrals made in office visits. Of the 147 conditions with referrals, 53 were referred to only one type of specialist. (Table 2 lists the 23 most commonly referred conditions, with at least 12 referrals, for which most referrals were to only one type of specialist.) Twenty-eight conditions had referrals to both physicians and nonphysicians.

Figure 1 indicates that only in the case of psychiatrists, allergists, and ophthalmologists were more than one third of referrals expected to be long-term (12 months or more). That is, most referrals were expected to have a duration of less than 1 year.

Figure 2 shows that, for most specialists, more than 50% of referrals were expected to be for con-

sultation only. In the case of allergists, psychologists, psychiatrists, and nonphysicians, most referrals were for shared management and, to a much lesser degree, for transferred management.

Four of the 10 conditions with more than seven referrals to each type of specialist had referrals to both medical and surgical specialists (Table 3). To explore the possibility that referrals to different types of specialists are associated with different expectations for referrals, we examined these characteristics for the 10 types of condition. Table 4 shows the results regarding expected length of specialist involvement and requests for consultation compared with referral for the three types of conditions in which the distribution was statistically significantly different according to specialty. For the other seven conditions, there were no statistically significant differences across the different types of specialists in expectations of type and duration of involvement for the problem.

Table 5 shows the expectation of the specialist with regard to definitive treatment, sharing of responsibility for management, or ongoing manage-

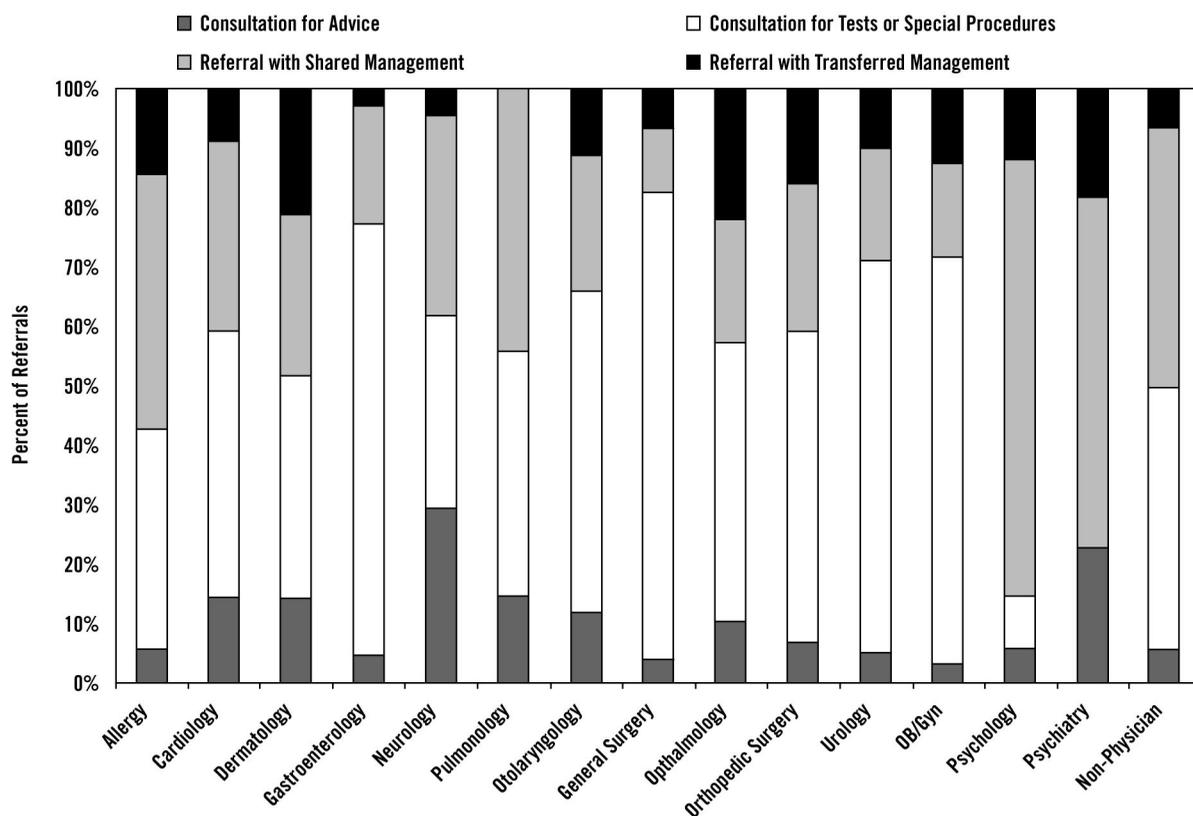


Figure 2. Ambulatory Sentinel Practice Network physicians' expectation of referral.

ment for the only two conditions (acute sprains and strains and diabetes mellitus) where there were statistically significant differences. (In no case was a referred patient coded as having uncontrolled diabetes.)

Table 6 indicates that shared care uniformly was more often expected with referrals to nonphysician specialists than to physician specialists.

Analyses that examined reasons for the referral, when alternatively categorized as a need for advice, need for performance of specialized tests or procedures, patient or third-party request, and other reasons (such as medicolegal concerns and failed current therapy) showed some differences by the type of specialist. For low back pain, advice on both diagnosis and treatment was much more common as a reason for referral to neurosurgeons and orthopedic surgeons (58% and 47%, respectively, compared with 12% and 8% for physical therapists and anesthesiologists). In contrast, relatively higher percentages of reasons for referrals to physical therapists and anesthesiologists were for nonsurgical procedures (35% and 31%, respectively,

compared with almost none in the case of neurosurgeons and orthopedic surgeons). For musculoskeletal signs and symptoms, direct surgical management was the reason for referral in 63% and 45% of referrals to orthopedic surgeons and podiatrists, whereas 50% of referrals to physical therapists were for a nonsurgical technical procedure or test.

There were marked and statistically significant differences in need for advice on both treatment and diagnosis of benign and unspecified neoplasms, with much lower percentages of referrals to gastrointestinal physicians and plastic surgeons (9% and 15%, respectively), much greater percentages for direct medical management (36%) and endoscopy (64%) in the case of gastrointestinal specialists, and higher percentages for direct surgical management for general surgeons and plastic surgeons (88% and 92%, respectively).

For diabetes, advice on treatment was more commonly a reason for referral to nutritionists and endocrinologists than to ophthalmologists. Direct medical management and failed current therapy

Table 3. Conditions with Variability in Type of Specialist to Whom Patient is Referred.

| Type of Condition | Number of Referrals | Type of Specialist (Number of Referrals) | | | |
|------------------------------------|---------------------|--|--------------------------|-----------------------|---|
| | | Surgical Specialist (No.) | Medical Specialist (No.) | Other (No.) | Nonphysician Clinician (No.) |
| Benign and unspecified neoplasm | 127 | General surgeon (41) | Dermatologist (29) | | |
| | | Plastic surgeon (13) | Gastroenterologist (11) | | |
| | | Otolaryngologist (10) | | | |
| Musculoskeletal signs and symptoms | 109 | Orthopedic surgeon (64) | | | Podiatrist (11) Physical therapist (8) |
| Low back pain | 77 | Orthopedic surgeon (15) | | Anesthesiologist (13) | Physical therapist (26) |
| | | Neurosurgeon (12) | | | |
| Diabetes mellitus | 56 | Ophthalmologist (27) | Endocrinologist (8) | | Nutritionist (9) |
| Depression, anxiety, neurosis | 53 | | | Psychiatrist (14) | Psychologist (21) Social worker (7) |
| Bursitis, synovitis, tenosynovitis | 44 | Orthopedic surgeon (22) | | | Physical therapist (7) |
| | | Hand surgeon (7) | | | |
| Peripheral neuropathy, neuritis | 33 | Orthopedic surgeon (9) | Neurologist (7) | | |
| Deafness, hearing loss | 27 | Otolaryngologist (10) | | | Audiologist (17) |
| Acute sprains and strains | 27 | Orthopedic surgeon (9) | | | Physical therapist (12) |
| Abdominal pain | 23 | General surgeon (9) | Gastroenterologist (9) | | |

Note: only specialists with at least 7 referrals are included.

were the main reasons for referral to endocrinologists, and nontechnical procedures were a major reason for referrals to ophthalmologists.

It is noteworthy, however, that of the 170 comparisons of reasons for referral by type of specialist referred to (17 types of reasons for referral for 10 different conditions), only 28 reached statistical significance at $P \leq .05$, and only 20 at $P \leq .01$. Eleven of these differences concerned surgical vs medical management, with higher percentages of referral to surgeons for surgical management and to medical subspecialists for medical management.

As it is possible that differences in severity of specific conditions encompassed within the diagnostic groups accounts for variability in the type of physician to whom the patient is referred, we examined the commonality of specific ICD codes for the patients who were referred. Using the criterion for exact match on five digit codes, the similarity of diagnoses in at least two types of specialists referred

to ranged from 19% (for sprains and strains) to 98% (in the case of musculoskeletal conditions and diabetes). Using agreement at the four-digit level (wherein the fifth digit merely indicates the particular anatomic site rather than the nature of the condition), extent of agreement rose to between 62% (for sprains and strains) to 98% (for musculoskeletal conditions and diabetes). These findings suggest that differences in severity of conditions within the diagnostic groupings does not account for variability in type of specialist for referral. For particular conditions, however, there might be enough differences to account for unexplained variability, as perhaps in the case for strains and depression, where there was exact agreement (at the fourth-digit level) in less than 75% of patients referred.

Discussion

The findings of this study showed considerable variability among primary care physicians in the

Table 4. Expected Length and Type of Referral (percent distribution).

| Condition and Specialist | Short-term Consultation | Short-term Referral | Long-term Consultation and Referral |
|-------------------------------------|-------------------------|---------------------|-------------------------------------|
| Benign and unspecified neoplasms* | | | |
| General surgeon | 80.0 | 12.5 | 7.5 |
| Dermatologist | 72.4 | 17.2 | 10.3 |
| Plastic surgeon | 61.5 | 30.8 | 7.7 |
| Gastroenterologist | 54.6 | 9.1 | 36.4 |
| Otolaryngologist | 80.0 | 20.0 | 0.0 |
| Musculoskeletal signs and symptoms* | | | |
| Orthopedic surgeon | 60.3 | 33.3 | 6.4 |
| Podiatrist | 36.4 | 54.5 | 9.1 |
| Physical therapist | 12.5 | 87.5 | 0.0 |
| Diabetes mellitus* | | | |
| Ophthalmologist | 40.7 | 0.0 | 59.2 |
| Nutritionist | 33.3 | 44.4 | 22.2 |
| Endocrinologist | 12.5 | 12.5 | 75.0 |

Note: there were no statistically significant differences across specialist type for the other conditions in expected length and type of referral.

* $P < .01$.

type of specialist to whom patients are referred for specific conditions. For the most part, these differences are not explainable by differences in expectations for the referral.

The relatively low percentage of patients who are referred for long-term care is notable. Apparently, primary care physicians want to maintain involvement in the care of most referred patients. Except in the case of referrals to allergists, ophthalmologists, and psychiatrists, more than 70% of referrals were expected to be of short term (less than 1 year). Referring physicians expected management to be shared in about 75% of referrals to psychologists, in about 45% of referrals to nonphy-

Table 6. Percentage of Referrals to Physicians and Nonphysician Specialists with the Expectation of Shared Responsibility.

| Condition* | To Physicians | To Nonphysicians | <i>P</i> Value |
|------------------------------------|---------------|------------------|----------------|
| Low back pain | 30.8 | 50.0 | .1185 |
| Musculoskeletal signs and symptoms | 30.2 | 57.9 | .0278 |
| Depression and anxiety | 57.1 | 88.9 | .0199 |
| Bursitis, synovitis | 20.7 | 57.1 | .0533 |
| Deafness, hearing loss | 10.0 | 5.9 | .6932 |
| Acute sprains and strains | 11.1 | 58.3 | .0274 |
| Diabetes mellitus | 40.0 | 55.6 | .4008 |

*Only those conditions for which at least 7 referrals were made to physicians or nonphysicians.

sicians, in about 60% of referrals to psychiatrists, and in about 40% of referrals to allergists and pulmonologists. In contrast, a considerable majority of referrals to general surgeons (about 85%), to gastroenterologists (75%), to obstetricians-gynecologists (65%), and to otolaryngologists (50%) were for tests or special procedures.

Where differences in expectations for referral by type of specialist were found, they were found in referrals for only one or two conditions. For the most part, these few differences in expectation are clinically cogent. For example, it is clinically plausible that primary care physicians could refer patients with diabetes to different types of specialists depending on the particular types of problems, eg, ophthalmologists for testing or monitoring of vision, nutritionists for short-term diet advice, and endocrinologists for ongoing shared management of blood glucose control. When the differences for specific conditions were examined, only in the case

Table 5. Expectation for Specialist Involvement (percent distribution).

| Condition and Specialist | Consultative Advice | Perform Specific Procedure | Shared Responsibility for Management | Assume Total Responsibility for Management |
|----------------------------|---------------------|----------------------------|--------------------------------------|--|
| Acute sprains and strains* | | | | |
| Orthopedic surgeon | 11.1 | 44.4 | 11.1 | 33.3 |
| Physical therapist | 0.0 | 41.7 | 58.3 | 0.0 |
| Diabetes mellitus† | | | | |
| Ophthalmologist | 7.4 | 59.3 | 33.3 | 0.0 |
| Nutritionist | 22.2 | 22.2 | 55.6 | 0.0 |
| Endocrinologist | 0.0 | 12.5 | 62.5 | 25.0 |

Note: there was no statistically significant difference across specialist type in the expectation for specialist involvement for any of the other conditions.

* $P = .04$.

† $P < .01$.

of benign neoplasms and musculoskeletal signs and symptoms were there statistically significant differences across specialists in expected length and type of referral. Furthermore, only in the case of acute sprains and strains were there differences in the expected reasons for referral across the different specialties to which patients were referred. Only in a small minority of referrals for specific conditions were there differences across specialists in the reasons for referral.

Thus, most of the variability in types of specialists to which patients are referred remains unexplained. Why some patients with the same condition are referred to surgeons and others for medical management is unclear, at least in the context of expectations for referral as being for long-term vs short-term or for consultative vs referral for definitive management.

There are several potential limitations of our analyses. First, several conditions for which there were a sufficient number of referrals to be included in the study were acute conditions, although most have the potential for becoming chronic. Second, the numbers of referrals might have been too small to detect differences. There was little evidence of tendency in any direction, however, so that larger samples would have been unlikely to produce differences of any clinical significance. Third, we have not included in our analysis the relative availability or accessibility of the various types of specialists, which might explain a predisposition to refer to one type of specialist rather than another. Fourth, there might be undetectable differences in severity of conditions within the specific ICD codes that were included.

A strength of the data are that they derive from a national sample of physicians which, although not nationally representative, show evidence of being similar, if not identical to, the nationally representative National Ambulatory Medical Care Survey sample of family physicians, in particular for referral rates and condition-specific referral rates.⁹

The findings of this study suggest that referral predispositions of family physicians might heavily influence the nature of subsequent care that pa-

tients undergo, particularly with respect to surgical vs medical management and the extent of testing and procedures that patients undergo. The impact both on overall costs as well as on health outcomes of this unexplained variability is considerable and deserves more intensive study.

References

1. Wennberg J, Gittelsohn A. Small-area variations in health care delivery. *Science* 1973;182:1102-8.
2. Dartmouth Medical School, Center for the Evaluative Clinical Sciences. *The Dartmouth atlas of health care 1998*. Chicago: American Hospital Publishing, 1998.
3. McLaughlin CG, Normolle DP, Wolfe RA, McMahon LF Jr, Griffith JR. Small-area variation in hospital discharge rates. Do socioeconomic variables matter? *Med Care* 1989;27:507-21.
4. Chassin MR, Koseoff J, Park RE, et al. Does inappropriate use explain geographic variations in the use of health care services? A study of three procedures. *JAMA* 1987;258:2533-7.
5. Escarce JJ. Would eliminating differences in physician practice style reduce geographic variations in cataract surgery rates? *Med Care* 1993;31:1106-18.
6. Wennberg JE. Understanding geographic variations in health care delivery. *N Engl J Med* 1999;340:52-3.
7. Ashton CM, Petersen NJ, Soucek J, et al. Geographic variations in utilization rates in Veterans Affairs hospitals and clinics. *N Engl J Med* 1999;340:32-9.
8. Roos NP. Who should do the surgery? Tonsillectomy-adenoidectomy in one Canadian province. *Inquiry* 1979;16:73-83.
9. Forrest CB, Nutting P, von Schrader S, Starfield B. Family physicians' referral decisions: results from the ASPN referral study. *J Fam Pract* 2002;51:215-22.
10. Forrest CB, Glade GB, Baker AE, Bocian AB, Kang M, Starfield B. The pediatric primary-specialty care interface: how pediatricians refer children and adolescents to specialty care. *Arch Pediatr Adolesc Med* 1999;153:705-14.
11. Schneeweiss R, Rosenblatt RA, Cherkin DC, Kirkwood CR, Hart G. Diagnosis clusters: a new tool for analyzing the content of ambulatory medical care. *Med Care* 1983;21:105-22.
12. Glade GB, Forrest CB, Starfield B, Baker AE, Bocian AB, Wasserman RC. Specialty referrals made during telephone conversations with parents: a study from the pediatric research in office settings network. *Ambul Pediatr* 2002;2:93-8.