

The Quality of Care Provided by Family Physicians

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In the debate about which specialty should provide primary care for adults in the United States, part of the issue is the type of training given to the primary care provider and the overall quality of care provided by those who complete the training. This paper presents a literature review that summarizes the quality of care of family physicians by outcome and process measures. Studies in the literature are flawed by methodologic weaknesses, including the frequent lumping of all general and family physicians as a group and the general lack of description of the physicians involved. Some studies measuring the process of care indicate poorer process by family physicians or general practitioners, such as recording fewer medical process criteria used to measure quality of care. The quality of care by outcome measures, however, appears to be similar to that of other specialties. In general, the study of quality of care is in its infancy, and further work needs to be done to assess what training is needed to produce the highest quality primary care physicians.

Quality of care is inherently important. In the public debate over what type of physician is necessary and desirable to care for Americans, the quality of care provided by physicians with different training becomes particularly important. This review of quality of care by family physicians was developed in the context of public policy debate on the need for family physicians.

The existing belief that one can leave the practice of a specialty to enter general practice complicates the assessment of the quality of care of family physicians. Residency-trained family physicians represent overall a more uniform type of physician than do general practitioners. Some unknown percentage of those who identify themselves as general or family physicians are physicians who were previously in another specialty but left it for general practice without obtaining additional training. Physicians have many reasons for leaving specialties, some of which are potential indicators of lower quality of care, such as inability to get along with other physicians, or loss of hospital privileges to perform procedures necessary for the practice of their specialty. These physicians may attempt to isolate

themselves from further scrutiny and choose to practice where they are badly needed so that patients will overlook unscrupulous or bad care. Also, as a general rule, general practitioners have less training in both quantity and specificity for primary care practice than family physicians. Thus, lumping general practitioners with family physicians is not appropriate, but has often been done for the sake of completing research studies. In this review, the presence or absence of residency training in family practice of the physicians whose care is considered is noted so that the reader can gauge the strength of the research for assessing the quality of care by family physicians.

Quality of care is assessed in a variety of ways, including consideration of the structure of the health care system, the process of care (eg, types and numbers of tests, referrals, or hospitalization), strategies (essentially decision making), and outcome. Of these, the ultimate outcome should be the best measure of quality of care, as process becomes irrelevant if all aspects of the outcome are always excellent. This review is of outcome and process studies specifically comparing family physicians with other physicians.

METHODS

A literature search was done with the MEDLINE system. Using the search terms "comparative study," "outcome

Submitted, revised, November 8, 1988.

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and process," "medical audit," "quality assurance health care," "physicians family," "primary health care," and "family practice," the search was extended back to 1975. In addition, relevant articles from reference lists of the articles so identified were obtained. Articles were also identified by looking at two likely sources not included in the *Index Medicus: Family Practice Research Journal* and *Journal of the American Board of Family Practice*.

The articles in Tables 1 and 2 are those that met the following criteria:

1. Reported after January 1, 1975, and include only data from years since 1970
2. Present specific comparison of general practitioners and other specialties
3. Present original research concerning actual patients (simulated patients or surveys asking physicians what they would do in specific circumstances were excluded)
4. Researched and published in the United States, England, or Canada

Abstracts were excluded.

Since the emphasis was on quality of care by residency-trained family physicians, articles were chosen that were recent enough to include years since family practice residencies were begun. Specific attention was given to the description of the training of the general practitioners or family physicians; the study's setting—that is, whether the study was done in a teaching setting, and whether the care was provided by residents or attendings; the number of physicians; and the numbers and comparability of patients of the family physicians and the other specialty.

RESULTS

There were 1,607 articles identified from the literature search. Table 1¹⁻²⁴ and Table 2²⁵⁻³⁴ indicate the outcome and process studies, respectively, meeting the criteria. Studies that included both process and outcome are included in Table 1. Most articles excluded did not compare specialties, did not contain original research on patients, or did not focus on physician care.

In addition, there are two articles in the dermatologic literature^{35,36} that involve Kodachrome slides or color transparencies shown to physicians. While these articles do not meet the criteria explicitly for involvement in patients, they come close. The primary care physician subjects attended continuing medical education meetings. In both cases dermatologists recognized or treated better the conditions presented on the slides. Possible explanations for these findings in the area of dermatology include inappropriate study population, greater experience of der-

matologists viewing slides for diagnosis, and less ability on the part of the primary care physicians. There are several recurrent design flaws in the articles listed in Tables 1 and 2.

Noncomparability of patients between groups. It is rarely possible to randomize care to different specialties in the United States. Patients who select family physicians are likely to be different from those who choose specialists for their care. When the differences are potentially important for the outcome of care, the characteristics must be considered and controlled for statistically, if possible. Many studies did not even consider the comparability of the patients.

Noncomparability of the patients can occur for reasons other than lack of randomization. For example, in the study of Hayes and Harries,¹¹ patients were said to be randomized for follow-up by general practitioners or specialty clinics. Unfortunately, the patients seen by the general practitioner group more often had a history of heart disease and smoking, but had fewer abnormal electrocardiograms, and were less obese. With these differences, that they were more likely to die of heart disease and had higher glycosylated hemoglobins could be due to premorbid characteristics rather than the specific care received.

Insufficient numbers of patients. Whenever major types of complications or outcome measures are uncommon, many patients are required to determine any real differences. Even when complications are not particularly uncommon, one needs sufficient patients to prevent a beta error, ie, concluding there is no difference when there is a real difference. Of the studies reported here that concluded there were no differences, none calculated the statistical likelihood of actually determining a difference. For example, the study of Wagner et al³⁷ found that dermatology residents better diagnosed than internal medicine residents, surgery residents, or medical students those dermatologic conditions presented as color transparencies. They further concluded that internal medicine residents who had the dermatology one-month rotation did no better. There were only 12 residents, however, and there was no attempt to calculate the possibility of missing a true difference in those with the one-month rotation. Other possible explanations include that the dermatology residents had previously seen the same or similar slides and that the actual dermatology rotation, rather than the time spent, was insufficient.

Nonobjective outcome measures. Outcome measures should be unequivocal or be objectively measured. Relying on physician record keeping or physician reporting¹² may mean that other factors affecting reporting will in-

TABLE 1. OUTCOME OF CARE STUDIES COMPARING GENERAL PRACTITIONERS OR FAMILY PHYSICIANS WITH OTHER SPECIALISTS

Author and Year	GP/FP	Country	Teaching or Nonteaching	Patient Number	Comparability of Patients	Disease or Condition Considered	Conclusions
Pediatrics							
Roos, ¹ 1973	NS	Canada	NS	Total = 2,448 GP 940 ENT 1,290 GS 218	Considered patient source (referral or not). Also separately analyzed those over and under 15 years	Tonsillectomies	No differences in postoperative complications. ENT better than GP or GS on process of selection by external criteria (overall only 15% met criteria) but only on patients referred by pediatricians. Same true for decreased respiratory episodes and decreased otitis media after surgery
Leduc and Pless, ² NS	FP	Canada	Residents	Ped 148 GP 111	No difference age, sex, complaints, temperature	Acute febrile illnesses	Same time to symptom resolution
Adult Medicine and Surgery							
Singh et al, ³ 1970-1981	GP	England	NS	GP 221 Hosp 221 clinic	Matched for sex, age, duration of disease, and general treatment group	Outpatient diabetes	No difference in mean blood glucose or glycosylated hemoglobin
Klein et al, ⁴ 1979	Both	US	Community physicians	IM 2,610 GP 1,702 FP ?	Patients were different in type of treatment given; similar age and duration of disease	Outpatient diabetes diagnosed after age 30	No difference in control of hyperglycemia between GP and IM (FP excluded from this analysis)
Franks and Dickinson, ⁵ 1982-1983	Most FP	US	Teaching community hospital	1989	Random samples had same severity of illness	Inpatients	No differences in length of stay, total charges, charges per day, number of procedures, disposition, or readmission rates
Garg et al, ⁶ 1974	NS	US	NS	GP 232 IM 382 UR 176 Card 306	No comparison provided	Selected inpatient urologic and cardiac diagnoses	Greater length of stay for primary care patients. Ancillary charges higher for primary care patients. Similar quality of care by Payne Physician Performance Index
Strauss et al, ⁷ NS	Both	US	NS	IM 181 GP 32	Similar entry FEV ₁	Chronic obstructive pulmonary disease	No difference in cost or outcome by pulmonary function, functional ability, or deaths. Overall, great variability

Hamburger et al, ⁸ 1980	FP	US	Residents	IM 12 FP 18	No comparison initial patient variables	Inpatient diabetic ketoacidosis	IM patients had longer lengths of stay, more x-ray and laboratory tests. Discharge serum and urine glucoses similar
Mowat et al, ⁹ NS	NS	England	NS	132 patients	Patients randomized	Outpatient rheumatoid arthritis	No difference in four functional status measures, percentage disabled, work record, disease knowledge, and others. By process criteria (one reviewer), GP worse than hospital clinics
Ruben et al, ¹⁰ NS	NS	England	NS	IM 44 GP 107	No comparison provided	Outpatient diabetes	No difference in blood glucose or glycosylated hemoglobin
Hayes and Harries, ¹¹ NS	NS	England	NS	GP 103 IM 97	Patients randomized; GP patients more frequently had history of heart disease, smoking, less abnormal ECGs, and obesity	Outpatient diabetes	Five years later, GP patients had fewer blood glucose tests, higher glycosylated hemoglobins, more hospitalizations, and more deaths
Kendrick et al, ¹² 1983	Both	US	NS	61,155	No comparison provided	Vasectomies	Physicians who did fewer vasectomies had higher complication rates; after adjusting for the numbers, more FP and GS than UR reported hematomas
Obstetrics							
Klein et al, ¹³ 1978	NS	England	NS	OB 1188 GP 248	Slight differences in BP, height, age	Low-risk deliveries	GP/midwife group had fewer infants with low Apgars, and fewer requiring intubation
Klein et al, ¹⁴ 1978	NS	England	NS	GP 126 OB 126	Random sample. GP group had more smokers, no other differences	Low-risk deliveries	GP/midwife group had longer labor, but less epidural analgesia, less monitoring, less use of forceps, less fetal distress, less intubation
Meyer, ¹⁵ 1978	Both	US	Nonteaching	OB 50 FP 50	Similar in age, parity, insurance, but FP group more likely to be unmarried	Deliveries	FP group had less analgesia. Same 3rd and 4th degree lacerations, infant weight, gestational age, Apgar score, postpartum complications. Postpartum stays shorter for FP group
Caetano, ¹⁶ 1973	NS	US	NS	GP 1421 OB 5191	No comparison provided	Birth certificates	Reported complications during pregnancy and delivery same. GP group reported higher birth injury and complications

Table continued

TABLE 1. OUTCOME OF CARE STUDIES COMPARING GENERAL PRACTITIONERS OR FAMILY PHYSICIANS WITH OTHER SPECIALISTS, CONTINUED

Author and Year	GP/FP	Country	Teaching or Nonteaching	Patient Number	Comparability of Patients	Disease or Condition Considered	Conclusions
Obstetrics							
Ely et al, ¹⁷ 1972-1975	NS	US	Teaching	FP 111 (most resident) OB 1197	OB service patients at higher risk	Deliveries	FP patients had more endometritis and hemorrhage. FP patients had less anesthesia and shorter postpartum stays. Similar infant outcomes
Phillips et al, ¹⁸ 1976	Both	US	Teaching	FP 50 GP 50 OB 30	FP resident patients were at highest risk	Deliveries	FP resident patients had fewer inductions, less analgesia, more 4th degree lacerations. Type of delivery, infant outcome and postpartum complications rates similar
Taylor et al, ¹⁹ NS	NS	England	NS	GP 1686 OB 1271	Maternal height 1.8 cm greater, maternal age 1.2 years greater, percentage primigravidae lower in GP than OB cases.	Pregnancy + deliveries	Maternal complications similar except OB group had more hypertension and preeclampsia. Antepartum hemorrhage and premature rupture of membrane greater in GP group. More often malpresentation and postpartum hemorrhage in OB group. There were more infants with low Apgars in OB group. Mortality rate was the same
Richards and Richards, ²⁰ 1977-1979	NS	US	Teaching	FP 427 OB 667	FP groups had more premature rupture of membranes as indication for cesarean section	Cesarean section	Endometritis higher in OB group; FP group had more use of two or more antibiotics; No other differences in other infections. Pediatric morbidity 9.2% for OB, 8.2% for FP. FP group had more low temperature in infants
Shear et al, ²¹ 1981	NS	US	Residents	FP 48 OB 69	Same demographic characteristics, parity, gravity.	Prenatal care and deliveries	Same duration of labor, presence of episiotomy, use of oxytocics, rate of cesarean section, gestational age, Apgars. OB infants were smaller. Mothers equally satisfied with care. FP provider continuity higher

Author(s)	Year	Country	Teaching hospital	Community hospital	Physician(s)	Random sample rate of high risk	Deliveries	Similar percentage of adverse outcomes
Franks and Eisinger, ²²	1981-1984	US	Teaching hospital	Community hospital	FP 713 OB 6413 Some FP residents Subset FP 117 with OB 468 controls FP 81 OB 81	Multivariate adjustment	Deliveries	Risk ratio for FP as attending 0.99
Rosenberg and Klein, ²³	1983-1984	Canada	Teaching		FP 81 OB 81	Case-control; controlled for age, parity, gestational age, social class, birth setting	Deliveries	FP group had less induction, rupture of membranes, forceps, episiotomy. 1 FP infant with asphyxia
Hahn et al., ²⁴	1985	US	NS	NS	FP 248	OB ultrasound video reviewed by radiologist	OB ultrasound	86% acceptable by radiologist review; 10% repeated to correct technical errors. All repeats acceptable. 3% incorrect diagnosis

NS—not specified; FP—residency-trained family physicians; GP—non-residency-trained family or general practitioners; IM—internal medicine or subspecialty of internal medicine physicians; GS—general surgeon; UR—urologist; Ped—pediatrician; OB—obstetrician; Rad—radiologist; ENT—otolaryngologist; Card—cardiologist; FEV₁—forced expiratory volume in 1 second; BP—blood pressure

terfere with the results. For example, family physicians may be more¹⁶ or less likely to report obstetric complications.

Nonobjective measures may also mean that the specialty of the investigators could influence the conclusions of the study and whether the study is published in the literature of the investigator.

Inadequate outcome measures. The measures used were related mostly to only one specific area of care and were limited by being relatively short-term. The ideal outcome measures would be those that considered quality of care across the entire physician's care over many years.

Insufficient information about the physicians involved. As can be seen from the tables, few of the studies included information about the physicians sufficient to determine whether they were residency trained, what types of practices they were in, and whether the sites had trainees, all factors that could significantly influence the quality of care. There are few studies completed in the United States that would be appropriate for the consideration of quality of care by US family physicians.

The care of obstetric patients by family physicians and obstetricians has been the most widely reviewed. Mengel and Phillips,³⁸ in their review of the literature on obstetrics care (which includes most of the articles on obstetrics cited in Table 1 and some other older articles and studies from additional countries), concluded that "no published study meets the criteria for the ideal investigation capable of answering with high probability the question" of whether family physicians and obstetricians provide similar quality patient care. Mengel and Phillips cite the most frequent problems as "failure to include an adequate comparison group, failure to control for case mix, and failure to control for biases by assessing outcome in a blinded fashion." The same can be said of all articles for the areas of pediatric and adult medicine.

DISCUSSION

While there are many nuances in individual studies, the outcome measures indicate little or no difference between family physicians and other specialties, a finding that is strengthened when patient characteristics are sufficiently similar or controlled for in statistical analysis. Specific design flaws make some studies that suggest otherwise difficult to assess fully. The exception may be in the area of diagnosis of certain dermatologic problems, where two articles using pictures of patients found a poorer rate of correct identification by general practitioners or family physicians.

TABLE 2. PROCESS OF CARE STUDIES COMPARING GENERAL AND FAMILY PHYSICIANS WITH OTHER SPECIALISTS

Reference and Year	GP/FP	Country	Teaching or Nonteaching	Number of Patients Charts	Number of Physicians	Disease or Condition Considered	Conclusions
Hulka et al, ²⁵ NS	NS	US	NS	1,167	GP 34 OB 8 Ped 8 IM 11	Well-child, prenatal care, adult diabetes, heart failure	GP noted less in record for well-child and prenatal care, and did as well on the other two conditions. Overall, the process of care ranged 0.78-0.93 on a scale of 0.0-1.0.
Hulka et al, ²⁶ NS	NS	US	NS	363	38	Pregnancy	OB had better communication score than GP
				523	41	Well-child care	Ped had better communication score than GP. Correlation between maternal satisfaction with professional competence was positive for residency training but less for board-certified (grandfathered) family physicians
Brook and Williams, ²⁷ 1971-1973	Both	US	NS	92,145 billings	MD 232 DO 81 Groups and clinics 47	Injections	MD GPs had fewer injections denied per injection billed than IM, OB, GS, but more than Ped. All GPs had slightly higher numbers of injections denied per ambulatory visit and tended to give more injections on average per visit
Starfield et al, ²⁸ 1975-1977	Both	US	Not teaching	?	Ped 429 FP 364 GP 251	Ambulatory pediatric visits	Ped obtained more cultures for pharyngitis. Ped did more counseling about growth and development and diet. FP did more counseling about family and sex matters
Hocutt, ²⁹ 1976	NS	US	NS	GP 35 Onc 421	NS NS	Dosage (mg) narcotics for cancer	GP patients took less narcotics in spite of prn orders
Payne et al, ³⁰ 1974-1978	Both	US	NS	5,028	IM 524 GP 50 OB 133 Ped 218 Other 196	Nonmodal and modal for 10 conditions	All GP/FP care considered nonmodal, which also included all care provided outside a physician's specialty area. Modal care had an average score of 493 and nonmodal care 458, with higher scores indicating better process of care. Much nonmodal care occurred at sites without GPs.

Table continued

TABLE 2. PROCESS OF CARE STUDIES COMPARING GENERAL AND FAMILY PHYSICIANS WITH OTHER SPECIALISTS, CONTINUED

Reference and Year	GP/FP	Country	Teaching or Nonteaching	Number of Patients Charts	Number of Physicians	Disease or Condition Considered	Conclusions
Spasoff et al, ³¹ NS	Both	Canada	NS	685	ER 7 FP/GP 5	Urinary tract infection, back pain, headache, vaginal discharge, otitis media, chest pain, depression	Excluding hospitalization and consultation, FP/GP and ER process same—25% met criteria. If hospitalization and consultation mean equality for these conditions, ER did better than FP, GP. Consultation rates 31% for ER and 19% for FP/GP
Thompson and Osborne, ³² NS	NS	US	NS	10,500	FP 66 Ped 100	Well-child care and tonsillopharyngitis, asthma, and urinary tract infection	Only one half of charts met externally set criteria. FP recorded fewer of the health supervision criteria, but recorded as well on the disease items. One half of the physicians felt the audit did not adequately portray the care they were delivering. One third of the offices did not follow recommended method of chart selection
Otradovec et al, ³³ 1980–1982	NS	US	Teaching Residents	FP 143 IM 82 Ped 43	NS	Outpatient assessment cardiovascular risk factors	No statistical analysis provided. Most risk factors irregularly assessed by all three specialties
				FP 49 IM 98 Ped 45	NS	Inpatient assessment cardiovascular risk factors	No statistical analysis provided. Most risk factors irregularly assessed by all three specialties
McLain and Kirkwood, ³⁴ 1981–1982	NS	US	NS	294	NS	Emergency room x-ray examinations	9.2% interpretive disagreement between primary care physicians and radiologists, similar to disagreement rates between radiologists

NS—not specified; FP—residency-trained family physicians; GP—non-residency trained family or general physicians; IM—internal medicine or subspecialty of internal medicine physicians; GS—general surgeons; Ped—pediatricians; OB—obstetricians; DO—osteopaths; Onc—oncologists; ER—emergency medicine; prn—as needed

Other than the cited dermatologic studies, the quality differences found have been in studies that either did not specifically consider family physicians as they are trained today in the United States or involved process, almost invariably by chart audit. While there are no studies that specifically address the quality of care of residency-trained as compared with non-residency-trained family physicians, there are some indications in comparison studies on practice content that residency-trained physicians pro-

vide better care by process criteria.^{39,40} The articles in Tables 1 and 2 also do not provide clarification.

Poorer performance by process criteria may mean several things:

1. *Poorer recording.* Poorer recording is suggested in a few studies such as that of Franks and Dickinson⁵ or Thompson and Osborne³² and Cherkin et al.⁴¹ There are several possibilities for poorer recording. First, the work-

load of family physicians may adversely affect their recording the process of care that does occur. Physicians' workload has been inversely related to performance on process criteria, and busier physicians tend to perform and record fewer care items than colleagues who see fewer patient per unit time.⁴² Second, in general, physicians in solo practice record less than do group practice physicians,³² and family physicians are more likely to be in solo practice. The reasons solo physicians record less could be multiple. Group practice physicians who must cover other physicians' patients may record more to help the continuity of records. Group practice may emphasize more traditional and process-oriented quality of care, or, perhaps, having other physicians in a group allows for more interchange and overall better quality of care. Last, some physicians may choose solo practice so they have more control over their environment and fewer people "looking over their shoulder" and thus keep records that are less adequate by process criteria.

2. *Inappropriate study methodology.* To assess family physicians by process criteria may require a broader review of more charts because of less consistency from one diagnosis to another.⁴³ It is likely that each physician has areas of greater and lesser expertise, and the family physicians vary in which areas of medicine they are personally interested and most competent.

3. *Poorer quality of care.* Process, particularly by chart audit, may^{44,45} or may not⁴⁶⁻⁴⁹ relate to outcome, probably because of differing medical problems studied, the host of factors that determine patient outcome, and the study criteria and methodology. Also, family physicians individually or as a group may be better at some diagnoses or conditions than others. Process criteria may be agreed to in advance by physicians, but they find that reviews based on these quality criteria do not accurately measure their quality,³² and find they often do not follow their own criteria.⁵⁰ While less recording may mean poorer quality, the studies above do not indicate that differences in outcomes have been found.

4. *Better ability.* Family physicians could be better at choosing the process that is pertinent to the individual patient and situation, thus resulting in the same or better outcome, ie, family physicians may be more expert with the ambulatory common problems. "Most researchers report that the amount of information gathered varies inversely with the level of education and experience of the subjects."⁵¹ One study⁵² found that experienced physicians typically obtained most of the appropriate information and chose the appropriate hypothesis within the first ten minutes of the interview and that no adverse effect on the accuracy of the physician would have occurred had the interviews stopped at that point. Kleinmutz⁵³ found that experienced clinicians used questions that maximized their yield and asked fewer questions.

The study of quality of care seems as yet in infancy.

Many studies have methodologic problems, particularly low numbers of cases and inadequate control for potential confounding factors. Evidence indicates, however, that the different types of training for the specialties does not lead as such to different outcomes of care. Studies thus far have also not shown that the philosophy and practice of family medicine improves the outcomes of patients. It may well be that the practice environment is more important in determining outcome than the training of the physician.⁵⁴ Family physicians have an obligation to assess their own quality of care and modify their practice accordingly. Better studies that consider patients and families over extended periods of time would be necessary to answer the question of the long-term outcome for families of physicians specifically trained in family practice—first-contact, continuous, comprehensive care in the context of family, occupation, community, and society.

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