

The Abilities of Primary Care Physicians in Dermatology: Implications for Quality of Care

Daniel G. Federman, MD, and Robert S. Kirsner, MD

Abstract

Quality of care in medicine has become an increasingly important issue as the nature of healthcare delivery has changed. Many managed care systems rely on the primary care physician to serve as a gatekeeper, thereby limiting access to specialist care. Controversy has arisen regarding the abilities of primary care physicians in one such specialty: dermatology. We reviewed the many studies conducted in the United States evaluating primary care physicians' abilities in dermatology. Despite inherent flaws in many of the studies, one can conclude that primary care providers are inferior to dermatologists in the diagnosis and treatment of skin disease. Whether these process-based data predict outcome is not known.

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Quality of care in medicine has become an increasingly important issue as healthcare delivery has changed.¹ Managed care systems were developed in an attempt to provide quality care at a lower cost.² Decreased lengths of hospitalization for common medical problems, utilization review, and preapproval through case managers are some of the ways in which the cost of medical care has been decreased.³ Additionally, the growth of managed care has led to an emphasis on healthcare delivery by primary care physicians and less care by specialists. These pri-

mary care physicians serve as gatekeepers and have attempted to reduce costs by limiting access to specialists.⁴ In the gatekeeper system, it is incumbent upon the primary care physician to make an initial assessment and either initiate treatment or observation or refer the patient for evaluation and treatment by a specialist. Although capitated health plans have achieved some form of control over healthcare expenditures, considerable debate has arisen as to the quality of healthcare delivered.^{5,6}

Defining quality medical care is a difficult task. The parameters may differ depending on who is defining quality. Physicians may place importance on disease-specific parameters. Patients, on the other hand, may care more about quality-of-life factors, and insurance or managed care companies may prefer to evaluate financial parameters. Regardless, quality is measured by three types of parameters.^{7,8} The first type is structurally oriented parameters, such as how many physicians or hospitals are in a specific area or region.⁹ The second type is process-oriented parameters. In these cases, the interaction between the physician (or other healthcare provider) and the patient is evaluated.¹⁰ The third method to evaluate quality is outcome-oriented parameters. With this method, the patient's status is evaluated sometime after an interaction with a healthcare provider to determine how that patient is doing, independent of the process.

Although structural and process data can correlate with outcomes, they are not outcome measures.¹¹ Outcomes data may fail because they may not account for patient characteristics such as severity of disease; therefore, they may be of limited value. In addition, outcomes assessments are costly, difficult to perform, and not immune to potential study biases. Interestingly, physicians tend to prefer process-oriented measures to assess quality.¹⁰ For example, most physicians would find fault if a patient who was experiencing a myocardial infarction and who was eligible for thrombolytic therapy did not receive it, regardless of the patient's outcome.

From the Department of Medicine, Yale University School of Medicine, New Haven, CT, and the West Haven VA Medical Center, West Haven, CT (D.G.F.), and the Department of Dermatology & Cutaneous Surgery and the Department of Epidemiology & Public Health, University of Miami School of Medicine, Miami, FL (R.S.K.).

Address correspondence to: Robert S. Kirsner, MD, Cedars' Medical Center (6 South/Dermatology), 1400 NW 12th Ave, Miami, FL 33136.

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On the basis of various measures of quality, primary care providers have performed well compared with subspecialists in the treatment of hypertension and non-insulin dependent diabetes mellitus.¹² Compared with specialists, however, primary care providers have not fared as well in the interpretation of pulmonary function testing,¹³ nor in the diagnosis and/or treatment of acute myocardial infarction,^{14,15} depression and anxiety,¹⁶ and cutaneous disease.¹⁷

The point regarding cutaneous disease has generated a great deal of controversy^{18,19} and is underscored by the prevalence of skin disease. Approximately 6% of outpatient office visits are for diseases of the skin, hair, and nails,²⁰ and nondermatologists treat almost 60% of these patients.²¹ Although nondermatologists receive some training in dermatology, both during medical school^{22,23} and in postgraduate training, it is possible that the limited mortality from skin diseases affords the primary care providers a relative comfort level in attempting to diagnose and treat skin disease.²⁴

Cost analysis of care is of importance as well, as the cost of skin disease to the United States is more than \$2 billion annually. The cost of specialist care is often related to the use of costly technology, which may not be applicable to dermatology because it is a relatively low-tech specialty. The relative cost of care delivered by various groups of physicians is also important information.

In this review, we describe studies conducted in the United States comparing primary care practitioners with dermatologists in the diagnosis and treatment of skin disease. Despite inherent flaws in many of these studies, one might logically conclude that nondermatologists are inferior to dermatologists in the diagnosis and treatment of skin disease. Importantly, all of these studies were process oriented. Whether these process-oriented data predicted outcome is not known.

Studies with Kodachrome Slides or Photographs

The seminal study comparing primary care providers' and dermatologists' ability to diagnose common dermatoses was published by Ramsay and Fox in 1981.²⁵ They showed slides of the 20 most common dermatologic diseases to 268 primary care physicians attending postgraduate medical education courses and 17 internal medicine residents attending a lecture at New York University. Then, the researchers compared the primary care physicians' and internal medicine residents' diagnoses with those of 30 faculty members and 18 dermatology residents from New

York University's Department of Dermatology. Primary care physicians' performance was worse than that of dermatology residents and faculty (mean scores of 54%, 91%, and 96%, respectively). The authors correctly noted that the primary care physicians attending educational courses in dermatology may not be representative of all primary care physicians; they may have been aware of their own personal deficiencies in diagnosing and treating skin disease.

Subsequently, several other studies that assessed diagnostic abilities by using Kodachrome slides were published. Wagner et al²⁶ showed Kodachrome transparencies of benign and malignant lesions to 45 subjects and evaluated the responses both on the basis of correct diagnosis and the need for biopsy. They found that nondermatologists were inferior in the accuracy of their identification and their diagnostic decision making. It must be emphasized that this study was rather small and participants were either physician's assistants (n = 8) or people still in training: senior medical students (n = 7), internal medicine residents (n = 12), residents in surgery (n = 10), and residents in dermatology (n = 8).

Clark and Rietschel²⁷ showed Kodachrome slides of 10 cutaneous diseases to 41 Atlanta-area family physicians and 41 dermatologist members of the Atlanta Dermatologic Association and asked participants questions regarding not only diagnosis, but also management. Overall, dermatologists were correct in the diagnosis 98% of the time, whereas family physicians diagnosed 60% of the conditions correctly. Dermatologists would have treated 99% and referred 1% of the cases shown; the family physicians would have treated 69% and referred 31%. In less than half of the cases would the family physician have administered correct therapy for the disease shown. In an economic analysis, the authors concluded that the average cost of appropriate care was slightly less when that care was initiated by a dermatologist, although this difference did not reach statistical significance. They found that the higher professional fees and prescription costs associated with dermatologists were offset by more laboratory tests, more incorrect diagnoses, and more referrals by the family physicians. Although the authors only evaluated direct costs, it is possible that if indirect costs (eg, cost of missed work, travel time) were evaluated, the results would have favored care rendered by dermatologists even more.

Cassileth et al²⁸ performed a study focusing on abilities to distinguish malignant melanoma or precancerous lesions from benign disorders. They showed color slides to 73 attendees of an internal medicine board review course and 48 Delaware Valley

dermatologists and showed color photographs to 32 senior medical residents at the University of Pennsylvania. Whereas only 12% of nondermatologists correctly identified at least five of six melanomas, 69% of dermatologists did so. Dermatologists were superior in correctly diagnosing all lesions. Unfortunately, among the nondermatologist group, there was an overrepresentation of physicians early in their training; 82 of the 105 nondermatologists were either internal medicine residents, interns, or medical students. The mean age of the nondermatologists was 32 years, compared to 41 years for the dermatologists, further highlighting this difference in experience.

As part of an effort to determine skin cancer control practices among physicians within a university general medicine practice, Dolan and colleagues²⁹ asked 13 general medicine faculty members, 39 medical residents, 7 dermatology faculty members, and 8 dermatology residents to evaluate 10 photographs of skin lesions. Each physician was asked to diagnose the classic lesion depicted in the photograph and to decide whether a biopsy was needed. Medical residents diagnosed correctly 50% of the photographs, and general medicine faculty members correctly diagnosed 57%. By contrast, dermatology residents and faculty members correctly diagnosed 78% and 91%, respectively. Internists performed better when establishing the need for a biopsy, with a sensitivity of 92% overall (combined for both resident and faculty internists) compared with 100% for dermatologists and a specificity of 85% compared with 76% for dermatologists. These authors suggested that the internists were more successful with the more clinically relevant endpoint: determining the need for a biopsy. A weakness of this study was the small number of photographs shown to each physician and the small number of physicians in each subgroup. The authors also did not consider the type of biopsy (shave biopsy vs. punch or excisional biopsy) recommended by each physician. This may be important because the type of biopsy recommended for malignant melanoma differs from that recommended for nonmelanoma skin cancers, and a correct working diagnosing may be critical for choosing the correct biopsy technique.

In a study that attempted to assess the development of expertise in dermatology, Norman et al³⁰ showed 100 color slides of 20 common cutaneous diseases (two typical and three atypical presentations for each entity) and provided a brief history to six subjects each from the following groups: second-year medical students, final-year clinical clerks, second-year family medicine residents, general practitioners, and dermatologists. Although their performance was

worse than that of the dermatologists, who had a diagnostic accuracy of 87%, nondermatologists exhibited improvement with increasing levels of training: 21% for second-year medical students, 31% for senior clerks, 55% for the second-year family medicine residents, and 66% for the general practitioners. This study suffers not only from a relatively small sample size, but also from the inclusion of a determination of the speed of the answer. Timing the answers might heighten anxiety among the participants and thus further increase the potential advantage dermatologists possess when Kodachrome slides are used as an examination tool, as they are more frequently used in dermatology than in medicine training.

McCarthy et al³¹ presented 20 cases seen in their clinic with brief histories (between two and six photographs per case) to 17 internal medicine faculty and questioned them regarding both diagnosis and management. The answers of three dermatologists (whose answers had 100% concordance) served as the gold standard. Overall, the internists, who averaged 3 weeks of formal dermatology training, correctly diagnosed 60% of the cases. In 40% of the cases diagnosed incorrectly, the internists chose to manage the patients themselves without referral, and 64% of these cases would have been treated inappropriately. Internists would have referred only 63% of the cases that the dermatologists deemed appropriate for referral. Of the cases deemed inappropriate for referral, internists would have referred 33%. As with many of the previous studies, this study can be criticized for its small sample size, the fact that the correct answers were determined by a small panel of control dermatologists, and "appropriateness of referral" was determined by that same small control group.

In an attempt to correlate performance on an examination with patterns of treating patients with skin disease, Kirsner and Federman²⁴ showed 20 Kodachrome slides (representing the same diseases as in the Ramsay and Fox study²⁵) to 84 internists, medical subspecialists, and medical residents in both New Haven, Connecticut, and Miami, Florida, and asked participants questions regarding the amount of training in dermatology they received and their actual treatment patterns. The 41 general internists were correct in their diagnosis 57% of the time, whereas the 19 subspecialists and 24 medical residents were correct 46% and 43% of the time, respectively (compared with 93% diagnostic accuracy by a control group of 23 dermatologists). Of note, "there was a trend toward a significant correlation between the score on the examination and the dermatology training internists received while in medical school." Furthermore, there

was a lack of correlation between how the internists performed on the Kodachrome examination and the percentage of patients they encountered and treated who had skin disease. This study also demonstrated that less than half of the participants performed diagnostic procedures (eg, skin biopsy, potassium hydroxide preparation) and that internists were more satisfied with dermatologists' assistance in patient care than in their educational efforts.

The largest study was conducted by Solomon et al,³² who showed 20 Kodachrome slides of frequently encountered or serious diseases to 723 family practice residents and attending physicians, as well as to 443 dermatology residents and attending physicians. In addition to asking participants for diagnoses, they also evaluated the family physicians' formal dermatology training, the number of primary dermatologic patients they encounter in their practice, and the procedures they perform. For the 579 family practice residents, the overall mean score on the Kodachrome examination was 48% (which showed progressive improvement from 34% for first-year residents to 63% for senior residents), whereas the 144 family practice faculty members scored 77%. As in other studies, the performance of the dermatologists was superior to that of the nondermatologists: 93% for the 285 residents and 97% for the faculty. Additionally, the authors found that 97% to 99% of the family practice physicians received none to 4 weeks of dermatology training before beginning practice, but a majority of them performed procedures, such as shave, punch, and excisional biopsies with suture placement. Although performing poorly on testing, the family practitioners in this study assumed a fairly significant burden of care; 83% admitted to examining between 6 and 20 *primary* dermatology patients per week, yet they referred fewer than five patients weekly.

Studies Using Actual Patients with Skin Disease

The first study that used actual patients with skin disease to examine differences between dermatologists and internists was conducted by Federman et al³³ in Miami. Consecutive patients presenting to outpatient medical clinics or the emergency room with previously undiagnosed skin conditions were evaluated on the same day by three groups: second- or third-year medical residents, internal medicine faculty members, and dermatology faculty. Participants then completed a questionnaire in which they were asked to identify the skin condition, which tests they would order, and which therapies they would use. For this study, the dermatologists' assessment was consid-

ered to be correct. Of 56 patients, 29 had inflammatory conditions, 18 had infectious conditions, 6 had neoplastic conditions, and 3 had infestations. Consistent with the Kodachrome studies, internal medicine residents performed worse (43% correct) than faculty (52% correct). Additionally, incorrect therapy was given to 28 of the 56 patients by the residents (50%) and 24 of the 56 patients by the attending physicians (43%). In this study, both the internal medicine residents and faculty were more likely to request skin biopsies as part of their evaluation of the patients. Extrapolating from this study, the authors concluded that more than 5 million inappropriate biopsies would be performed during the 30 million outpatient visits seen by nondermatologists per year, at a cost of over \$765 million. One criticism of this study is that only one dermatologist's diagnosis served as the gold standard for each patient; against this diagnosis the internists' diagnoses were compared and deemed correct or not.

Other studies have evaluated primary care physicians' diagnostic abilities with patients with known skin disease. Paauw et al³⁴ recruited experienced general internists, family practitioners, and general practitioners from several northwest states. After being provided with a brief history that was meant to direct them to the responsible lesion, the participating physicians were allowed 20 minutes to perform a history and physical examination. Of 89 physicians who encountered a patient with Kaposi's sarcoma, only 42 (47%) detected the abnormality, and only 23 (26%) were able to correctly diagnose it. Similarly, of 97 patients who examined a patient with oral hairy leukoplakia, only 54 (56%) detected an abnormality, and only 22 (23%) correctly diagnosed it. This study did fail to include a control group of dermatologists for comparison purposes.

Robinson and McGaghie³⁵ used a patient with a clinically suspect pigmented lesion in a sun-exposed area of the skin. Only 1 of 285 fourth-year medical students who evaluated the patients detected the lesion. These authors claimed that their findings "suggest that primary care physicians would overlook many early lesions in the course of a visit for an acute illness." However, this study examined the abilities of medical students, who not only lacked residency training, but were not definitely embarking on careers in primary care.

In an effort to determine primary care physicians' performance in detecting actinic keratosis and skin cancer, Whited and colleagues³⁶ had 12 primary care physicians (9 internists and 3 physician assistants) and 8 dermatologists examine the skin of 190 patients.

Eight hundred and eighty-three lesions were identified. Using the clinical diagnosis of the dermatologist as the gold standard, primary care physicians were significantly less likely ($P=0.06$) to detect a malignant lesion. Primary care providers' diagnoses had high specificity (88% when the patient was the unit of analysis and 95% when the lesion was the unit of analysis) but low sensitivity (57% for the patient and 38% for the lesion). These authors concluded that because the primary care providers had low sensitivity in detecting skin cancers, they may be ineffective in screening for skin cancer. Although there were a significant number of skin lesions and patients, the number of primary care physicians was small. Additionally, this study included both physicians and nonphysicians and did not stratify the analysis for the subgroups of primary care physicians.

Studies Using Both Kodachrome Slides and Actual Patients

In an effort to assess differences between primary care physicians and dermatologists in the diagnosis and treatment of skin cancer and simultaneously examine differences in testing modalities, Gerbert et al³⁷ presented Kodachrome slides, computerized images, and actual patients to two physician groups. Seventy-one internal medicine and family medicine residents recruited from the San Francisco area were compared with 15 dermatology residents and faculty. Overall, the primary care residents were correct in diagnosis 40% of the time, compared with 73% for the dermatologists. Similarly, the primary care residents were correct in treatment and diagnostic planning 39% of the time, versus 72% for the dermatologists. As in the study by Federman et al,³³ the primary care group recommended an excess of biopsies because they overdiagnosed benign lesions as malignancies and suggested biopsy in 27% of these cases. Dermatologists in this study performed worse than dermatologists in previous studies; for example, in 19% of cases they failed to recommend a biopsy of a cancerous lesion because of an error in diagnosis.

An interesting finding of this study was that no difference in diagnostic accuracy was found for the dermatologists among the three testing methods (slides, computer images, or actual patients), whereas primary care residents were significantly better at diagnosis from slides compared with actual patients. No difference was apparent between slides and computer images, perhaps validating the latter's use in future educational endeavors. This also suggests that one specific deficiency in primary care physicians' skills in dermatology is their ability to zero in on the

relevant lesion as a prerequisite for a correct diagnosis. This study also suffers from the comparison of a group of internal and family medicine residents (32% of whom were first-year residents) with a group of dermatologists that included more experienced faculty.

Conclusion

Efforts have been made in our country to reduce some of the economic burden of healthcare by limiting access to specialists. Implicit is the assumption that primary care practitioners can provide quality healthcare at a lower cost than specialists. As strategies are formulated to reduce costs of healthcare, it is imperative that we are cognizant of their potential impact on quality. Several studies—the majority of which were conducted by dermatologists—attempted to examine primary care practitioners' performance in the diagnosis and treatment of cutaneous disease. Although the preponderance of evidence suggests that dermatologists provide superior care for patients with skin disease, many of the studies suffer from inherent biases or the inclusion of small numbers of participants, or both. The superiority of dermatologists is not a surprising finding as they receive considerably more training in the care of patients with cutaneous disease than their primary care counterparts and encounter a greater number of patients with skin disease in their daily practice.

An important question awaiting an answer is whether outcomes of patients with skin diseases (many of which are not life threatening and resolve spontaneously) differ depending on the treating group of physicians. Additionally, there is a need for studies with actual patients to ascertain whether the care—direct and indirect—rendered by nondermatologist gatekeepers is actually more expensive than that of dermatologists when factoring in costs of incorrect diagnosis and treatment, inappropriate testing and biopsies, treatment failures and patients' subsequent need for return visits, and so forth. Such efforts are presently under way, and their results are anxiously anticipated.

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