

Diagnosis of Skin Disease by Nondermatologists

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Abstract

Objective: To determine how often primary care physicians diagnose and treat skin disease and to compare their experience with that of dermatologists.

Study Design: Retrospective review of National Ambulatory Medical Care Survey data.

Methods: We reviewed data from the 1990-1994 National Ambulatory Medical Care Survey on outpatient visits to physicians for both dermatologic and nondermatologic disorders.

Results: Dermatitis is the most common dermatologic problem diagnosed by internists, family physicians, and pediatricians and is the 35th, 17th, and 15th most common diagnosis made by these providers, respectively. Dermatologists had 728 and 352 office visits per year for acne and contact dermatitis, respectively, whereas internists averaged 3 and 9 visits, family physicians averaged 8 and 27 visits, and pediatricians averaged 8 and 37 visits. Overall, dermatologists spent 930 outpatient hours per year with patients with dermatologic conditions, compared with 21, 53, and 56 hours per year for internists, family physicians, and pediatricians.

Conclusions: Although most visits for skin disease are managed by primary care physicians, these physicians treat few cases of individual skin conditions. The different levels of experience between dermatologists and nondermatologists may affect the quality of dermatologic care and may explain in part the greater expertise dermatologists have in diagnosing and treating skin disease. This should be considered in decisions about the delivery of dermatologic healthcare services and in planning educational programs designed to improve dermatologic care.

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The healthcare system in the United States is rapidly changing. One change is that managed care systems often employ primary care providers as coordinators of care, or gatekeepers, to reduce the need for expensive specialized care,¹⁻⁴ which might include care from a dermatologist. Yet several studies have shown that dermatologists have particular expertise in treating skin disease when compared with nondermatologists and that care from a dermatologist is cost effective.⁵⁻⁹

What accounts for the expertise of dermatologists in the care of patients with skin disease? Certainly one component of this is the 3-year period of specialized, intensive training in a dermatology residency.^{6,10} Although approximately 10% of all outpatient visits are for dermatologic conditions, the average dermatology requirement in US medical schools is just 21 hours.^{10,11} Graduate training in dermatologic disease in many internal medicine and pediatrics programs is quite limited.^{10,12}

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Clinical experience is another factor affecting physicians' level of expertise. The effect of greater physician experience on improved quality of care has been demonstrated for a variety of surgical procedures; physicians who perform more procedures provide a higher quality of care than do those with less experience.¹³⁻¹⁷ The level of experience of physicians with different specialties in treating skin disease and the effect of this experience on the quality of dermatologic care have not yet been analyzed.

Primary care providers do frequently see patients with skin disease in their practice. Five percent of all outpatient visits to internists and 7% of all visits to family physicians are for dermatologic disease.^{18,19} The purpose of our study was to quantify the relative exposure to specific dermatologic problems in the individual practices of dermatologists and primary care providers. This information does not directly show differences in quality between dermatologists and other physicians in the care of patients with skin disease. For this, outcome measurements are needed, but studies have already demonstrated differences in quality of care as discussed above.⁵⁻⁹ However, data on the relative exposure to specific dermatologic problems can be helpful for understanding the clinical experience underlying the previously observed differences in quality. Understanding this mechanism may provide a basis for developing targeted programs for improving quality of care.

... METHODS ...

The National Ambulatory Medical Care Survey (NAMCS) is a national survey of office-based physicians conducted by the Division of Health Care Statistics of the National Center for Health Statistics of the Centers for Disease Control and Prevention.²⁰ This survey contains data on individual outpatient office visits that are then weighted to reflect national estimates describing the utilization of ambulatory medical care services in the United States. The physician-patient encounter or outpatient visit is the basic sampling unit for the NAMCS. Nonfederal physicians (ie, those not employed by the Federal government) classified by the American Medical Association or the American Osteopathic Association as providing office-based patient care and all physician specialties except anesthesiology, pathology, and radiology are included in the NAMCS. Data are collected from physicians or office staff who complete a patient

record form providing patient demographic data, physician specialty, duration of the outpatient visit (actual time the physician spent in face-to-face contact with the patient; this does not include time spent in other aspects of the patient's care), and diagnoses made at the visit. In small practices, 100% of patient visit data are available, while in very large practices, 20% of patient visits are randomly sampled.²⁰

In our study, we used data from a total of 181,446 NAMCS records from 1990 to 1994, which reflect the experience of more than 3.5 billion outpatient physician visits. To obtain these national estimates, each individual record is assigned an inflation factor called the patient visit weight that is then used to predict the total number of office visits made in the United States.²⁰ All estimates from the NAMCS are related to the number of patient visits and subject to sampling variability. The relative standard error is used to measure the sampling variability. Representative relative standard errors for estimates derived from the 1994 NAMCS are as follows: 8.1% for estimates of 10,000,000 visits, 23.9% for estimates of 1,000,000 visits, 33.6% for estimates of 500,000 visits, and 74.8% for estimates of 100,000 visits. Relative standard error rates from other years are similar. When considering the reliability of the estimates, the National Center for Health Statistics considers an estimate to be reliable if it has a relative standard error of 30% or less of the estimate.

To define visits for skin diseases, we identified the diagnoses commonly seen by dermatologists. The NAMCS records up to 3 diagnoses for each patient record. The 50 most common diagnoses made by dermatologists accounted for 84% of all visits to dermatologists. Visits for these diagnoses were initially used to identify dermatologic visits to all other specialties. To identify common skin disorders seen by other specialties that were not detected by this approach, we reviewed the list of all diagnoses made, but no missed diagnoses were identified. Specifically excluded from our analysis were V codes, such as "postoperative follow-up," that could not be identified definitively as a dermatologic visit. We also excluded blank or missing diagnoses.

To determine the number of physicians in each specialty, we obtained data from the American Medical Association for the midpoint of this study, January 1, 1992. The total number of office-based physicians used in the calculations was as follows: 6308 for dermatology, 88,795 for internal medicine, 58,603 for family medicine (including general prac-

tice and family physicians), 29,542 for pediatrics, and 173,793 for other physicians.

We calculated time estimates based on the diagnostic "content" of the visit. Each visit was classified according to the primary, secondary, and tertiary diagnoses listed. These categories consisted of the following: single dermatologic diagnosis, multiple dermatologic diagnoses, single nondermatologic diagnosis, multiple nondermatologic diagnoses, dermatologic diagnosis and nondermatologic diagnosis, V codes, V codes and nondermatologic diagnoses, and V codes and dermatologic diagnoses. Mean visit times and the estimated number of visits were calculated for each specialty group for each visit content. For single dermatologic diagnosis and multiple dermatologic diagnoses visits, we assumed the entire visit time was for dermatologic care. For visits with both dermatologic and nondermatologic diagnoses, we assumed that 50% of the visit time was devoted to dermatologic care. We suspect this overestimates the actual amount of time spent by nondermatologists on skin disease at multiple-diagnosis visits; this conservative assumption was made so as not to underestimate the total amount of time spent by nondermatologists managing patients with skin disease. A summation of all dermatologic content times was then calculated for each specialty group. We calculated the total patient care time to be the product of the total number of visits and the mean visit time for all visits.

Table 1. Ten Most Common Dermatologic Diagnoses by Specialty, 1990 to 1994

Specialty	Rank	Diagnosis [ICD-9]	Visits (Thousands)	Percent of Total	Visits Per Physician (Per Year)
Dermatology	1	Acne vulgaris [706.1]	23,000	16.4	728
	2	Actinic keratosis [702.0]	14,700	10.5	464
	3	Contact dermatitis [692.9]	11,100	7.9	352
	4	Viral wart [078.1]	8520	6.1	270
	5	Skin cancer NOS [173.9]	7450	5.3	236
	6	Psoriasis [696.1]	6130	4.4	195
	7	Benign tumor NOS [216.9]	6110	4.4	194
	8	Cyst [706.2]	3710	2.7	118
	9	Seborrheic keratosis [702.1]	3320	2.4	105
	10	Rosacea [695.3]	2820	2.0	89
Internal medicine	35	Contact dermatitis [692.9]	3940	0.6	9
	63	Cellulitis NOS [682.9]	1920	0.3	4
	80	Acne vulgaris [706.1]	1530	0.2	3
	82	Herpes zoster [053.9]	1520	0.2	3
	99	Cyst [706.2]	1310	0.2	3
	134	Malignant neoplasm without site [199.1]	909	0.1	2
	149	Herpes simplex [054.9]	797	0.1	2
	160	Urticaria [708.9]	738	0.1	2
	184	Connective tissue disease, multiple sites [709.9]	635	0.1	1
	203	Actinic keratosis [702.0]	578	0.1	1
Family medicine	17	Contact dermatitis [692.9]	7930	0.8	27
	30	Viral wart [078.1]	5480	0.6	19
	52	Cellulitis NOS [682.9]	3530	0.4	12
	53	Cyst [706.2]	3520	0.4	12
	73	Acne vulgaris [706.1]	2404	0.3	8
	93	Dermatosis NOS [709.9]	1890	0.2	6
	94	Actinic keratosis [702.0]	1860	0.2	6
	106	Plant dermatitis [692.6]	1630	0.2	6
	107	Herpes zoster [053.9]	1590	0.2	5
	109	Benign tumor [216.9]	1560	0.2	5
Pediatrics	15	Contact dermatitis [692.9]	5530	1.3	37
	28	Impetigo [684]	1980	0.5	13
	42	Viral wart [078.1]	1340	0.3	9
	45	Acne vulgaris [706.1]	1200	0.3	8
	47	Urticaria [708.9]	1090	0.3	7
	66	Dermatophytosis [110.9]	724	0.2	5
	70	Cellulitis NOS [682.9]	689	0.2	5
	74	Scabies [133]	636	0.2	4
	80	Atopic dermatitis [691.8]	592	0.1	4
	89	Plant dermatitis [692.6]	508	0.1	4
Other	35	Cyst [706.2]	5280	0.4	36
	70	Dermatosis NOS [709.9]	3390	0.3	4
	127	Viral wart [078.1]	2050	0.2	2
	147	Contact dermatitis [692.9]	1830	0.1	2
	218	Skin cancer NOS [173.9]	1160	0.1	1
	222	Malignant neoplasm without site [199.1]	1140	0.1	1
	236	Skin cancer, face [173.3]	1100	0.1	1
	248	Benign tumor NOS [216.9]	1050	0.1	1
	292	Keloid scar [701.4]	878	0.1	1
	320	Acquired keratoderma [701.1]	751	0.1	1

NOS = not otherwise specified.

Table 2. Ten Most Common Diagnoses by Specialty, 1990 to 1994

... RESULTS ...

Specialty	Rank	Diagnosis [ICD-9]	Visits (Thousands)	Percent of Total	Visits Per Physician (Per Year)
Dermatology	1	Acne vulgaris [706.1]	23,000	16.4	728
	2	Actinic keratosis [702.0]	14,700	10.5	464
	3	Contact dermatitis [692.9]	11,100	7.9	352
	4	Viral wart [078.1]	8520	6.1	270
	5	Skin cancer NOS [173.9]	7450	5.3	236
	6	Psoriasis [696.1]	6130	4.4	195
	7	Benign tumor NOS [216.9]	6110	4.4	194
	8	Cyst [706.2]	3710	2.7	118
	9	Seborrheic keratosis [702.1]	3320	2.4	105
	10	Rosacea [695.3]	2820	2.0	89
Internal medicine	1	Essential hypertension [401.9]	63,060	9.1	142
	2	Diabetes mellitus [250.0]	27,003	3.9	61
	3	Allergic rhinitis [477.9]	21,446	3.1	48
	4	Acute upper respiratory infection [465.9]	16,240	2.3	37
	5	Bronchiectasis [493.9]	14,817	2.1	33
	6	Unspecified sinusitis [473.9]	12,958	1.9	29
	7	Bronchitis [490.0]	11,805	1.7	27
	8	Osteoarthritis [715.9]	10,812	1.6	24
	9	Breast cancer [174.9]	8602	1.2	19
	10	Chronic airway obstruction [496.0]	8410	1.2	19
Family medicine	1	Essential hypertension [401.9]	56,749	6.0	194
	2	Acute upper respiratory infection [465.9]	35,829	3.8	122
	3	Unspecified sinusitis [473.9]	28,584	3.0	98
	4	Bronchitis [490]	28,582	3.0	98
	5	Otitis media [382.9]	28,386	3.0	97
	6	Acute pharyngitis [462.0]	26,346	2.8	90
	7	Diabetes mellitus [250.0]	18,671	2.0	64
	8	Routine infant/child check [V20.2]	15,022	1.6	51
	9	Unspecified general medical exam [V70.9]	13,931	1.5	48
	10	Supervision of normal pregnancy [V22.2]	11,769	1.2	40
Pediatrics	1	Routine infant or child check [V20.2]	69,360	16.7	470
	2	Otitis media [382.9]	49,017	11.8	332
	3	Acute upper respiratory infection [465.9]	33,705	8.1	228
	4	Acute pharyngitis [462]	17,326	4.2	117
	5	Unspecified general medical exam [V70.9]	9847	2.4	67
	6	Bronchitis [490.0]	9787	2.4	66
	7	Unspecified sinusitis [473.9]	9420	2.3	63
	8	Asthma [493.9]	9234	2.2	63
	9	Noninfectious gastroenteritis/colitis [558.9]	7644	1.8	52
	10	History of disorder of the nervous system [V12.4]	7420	1.8	50

NOS = not otherwise specified.

The most common dermatologic problem diagnosed by internists, family physicians, and pediatricians is contact dermatitis (Table 1). It is, however, only the 35th most common diagnosis made by internists (accounting for an average of 9 visits per physician per year), the 17th most common diagnosis made by family physicians (27 visits per year), and the 15th most common diagnosis made by pediatricians (37 visits per year) (Table 1). In contrast, it is the third most common diagnosis made by dermatologists, who had 352 visits per year for this diagnosis.

All other skin disorders seen by internists accounted for 0.3% of visits (4 annual visits per physician) or less. Other skin disorders diagnosed at least 10 times annually by family physicians included warts (19 visits per year), cellulitis (12 visits per year), and cyst (12 visits per year). Impetigo was the only other condition diagnosed during at least 10 visits per year by pediatricians (13 visits). Acne vulgaris, the most common disorder diagnosed by dermatologists (728 visits per year), was diagnosed at 3 visits per year by internists and at 8 visits per year by family physicians and pediatricians. The rank order and frequency data shown in Table 1 reveal that individual skin disorders are not among the most common diseases diagnosed by primary care providers.

To gain an understanding of the seriousness of disor-

ders more commonly seen by primary care providers, we identified the most common diagnoses made by different specialists (Table 2). For internists, conditions that were more frequent than the most common skin disorder included hypertension, diabetes, upper respiratory tract infections, pulmonary disorders, breast cancer, and cardiac diseases, including atherosclerosis, congestive heart failure, and angina (data not shown). For family physicians, hypertension, upper respiratory tract diseases, diabetes, preventive care, urinary tract infections, gastroenteritis, and depression were diagnosed at more visits than was the most common skin disorder (data not shown). Pediatricians had more visits for upper respiratory tract and pulmonary diseases, general examinations, gastroenteritis, and conditions of the nervous system than for the most common dermatologic diagnosis.

Another way to measure primary care physicians' ongoing exposure to dermatology is to determine how much time they spend with patients who have a dermatologic disease. For dermatologists, this time was 930 hours per year, as compared with internists who spent 21 hours per year, family physicians who spent 53 hours per year, and pediatricians who spent 56 hours per year on skin conditions (Table 3).

The percentage of time devoted to the care of patients with skin disease as a proportion of all outpatient practice time also reflects ongoing exposure to patients with dermatologic problems. To determine the relative amount of time different specialties spend providing dermatologic care as a proportion of all care provided, we divided the total dermatologic disease care time per physician (Table 3) by the total outpatient care time per physician (Table 4). We found that internists spent 4.1% of their outpatient time on visits for dermatologic diagnoses; family physicians, 6.2%; pediatricians, 8.1%; and all other physicians, 2.9% (Table 3). In comparison, dermatologists spent 86.9% of their outpatient time on dermatologic conditions. The relative amount of continuing exposure to dermatologic problems was as follows: dermatologists > pediatricians > family physicians > internists.

... DISCUSSION ...

Primary care providers have a difficult role to play within the managed care system. They are faced with patient chief complaints that may be indicative of conditions that range from severe and life-threatening to minor. Moreover, they are being charged with

Table 3. Outpatient Care Time for Dermatologic Conditions

Specialty	Visits with One Dermatologic Diagnosis (Million Minutes)	Visits with Multiple Dermatologic Diagnoses (Million Minutes)	Dermatologic Care Time for Visits with Dermatologic Diagnoses and Nondermatologic Diagnoses (Million Minutes)	Total Dermatologic Disease Care Time Per Physician (Hours/Year)	Proportion of Dermatologic Care Time to Total Patient Care
Dermatology	1239	440	81	930	86.9%
Internal medicine	332	54	174	21	4.1%
Family medicine	610	76	242	53	6.2%
Pediatrics	252	25	219	56	8.1%
Other	718	46	37	15	2.9%

the role of coordinator of care, with attached financial incentives and disincentives. Determining where dermatology fits into the healthcare model is difficult. Most visits for skin disease in the United States are to nondermatologists, with dermatologic diagnoses accounting for 5% and 7% of outpatient visits to internists and family physicians, respectively.^{18,19}

In our study, we examined in detail the frequency with which individual conditions are diagnosed by physicians of different specialties. When studied at the level of individual diagnoses, nondermatologists identify skin disorders rather infrequently. Even some of the most common cutaneous diagnoses made by family physicians, such as contact dermatitis, warts, cysts, and acne, were diagnosed at least 10 times more frequently by dermatologists.

This difference in experience is important if it affects the outcome of care. Previous work suggests that differences in experience do affect at least the process, if not the outcome, of care. For example, physicians' use of cost-effective treatment for cutaneous fungal infection follows the pattern of clinical experience in caring for patients with skin disease: dermatologists are most likely to use the most cost-effective treatment, followed by pediatricians, family physicians, and internists.⁸ These results should encourage further study of the outcomes of dermatologic care by specialists and nonspecialists.

Skin diseases are associated with significant morbidity and decreased health-related quality of life.^{21,22} Indeed, skin diseases can affect all dimensions of quality of life,²³ and the impact can be as

great or greater than that of other medical conditions.²⁴ Despite this and the evidence that dermatologists have special expertise, some authors question whether the benefits of seeing a dermatologist are necessary for patients with "minor" skin disorders.²⁵ Perhaps the perceived severity of the more common conditions seen by primary care providers accounts for this attitude. Patients with a skin problem may not share this perception.

One limitation of our study is that we relied on physician reporting of the diagnosis. It is possible that nondermatologists are less likely to report dermatologic than nondermatologic conditions. Even if this is true, however, we do not feel this contradicts our conclusions because it would imply that these physicians place a lower priority on dermatologic conditions. One other important limitation of the study is that we analyzed data gathered from 1990 to 1994. As healthcare delivery under managed care is rapidly changing, there may have been changes in the frequency of dermatologic care offered by nondermatologists. Primary care providers may have become busier overall without any increase in the proportion of care for dermatologic conditions or there may have been an increase in the proportion of dermatologic care provided by these physicians. Further analysis of more recent data may be of value.

Our analysis may actually overestimate the time nondermatologists spend caring for patients with skin disease. The analysis did not include the time these specialists spend on inpatient care, care that almost certainly includes less time on cutaneous complaints than is involved in outpatient practice. Moreover, we assumed for visits with both dermatologic and nondermatologic diagnoses that 50% of the time is spent on the dermatologic problem; we suspect that this, too, overestimates the amount of time spent on skin conditions.

It is not surprising that dermatologists have special expertise in the diagnosis and treatment of skin disorders,^{11,26} and we and others suggest that clinical

Table 4. Outpatient Care Time for All Conditions

Specialty	Total Number of Visits (Millions)	Mean Visit Time (All Diagnoses, Minutes)	Total Outpatient Care Time Per Physician (Hours/Year)
Dermatology	140	14.46	1069
Internal medicine	694	19.91	518
Family medicine	945	15.72	844
Pediatrics	416	14.63	686
Other	1340	20.81	534

experience is important to the development of clinical expertise.^{5,27,28} Primary care providers can and do see patients with skin disease on a regular basis, and many undoubtedly provide excellent care.²⁹ Yet a critical question for quality of care is, How much ongoing experience is required to develop and maintain good clinical skills? For any given condition or surgical procedure, is 1 case per week adequate, 1 per month, 1 per year? Another consideration for managed care is the opportunity cost of using primary care providers to treat patients with skin disease. Inefficiently used primary care resources spent caring for patients with skin disease^{30,31} may be of greater value for treating patients with other conditions.

This is not to say that nondermatologists have no role in treating patients with skin disease, but given the special expertise and cost-effective care offered by dermatologists, managed care systems that discourage the use of dermatologists may do so unwisely.^{9,30,31} Beyond use of dermatologists for treating patients with skin disease, another primary care strategy that may be effective for managed care systems would be to target a limited number of common skin conditions for primary care physicians to treat. It would be essential, however, to furnish these providers with relevant, targeted education for these specific conditions so they could offer a level of care comparable to that offered by dermatologists.³²

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