Health Services Research

Dermatologic Disease in Family Medicine

Farah Awadalla; Daryl A. Rosenbaum, MD; Fabian Camacho, MS; Alan B. Fleischer, Jr, MD; Steven R. Feldman, MD, PhD

Background and Objectives: *Because dermatologic complaints are encountered frequently in primary care, the education of family physicians about skin disorders is important. Data are needed to help define areas of dermatology that deserve the most time and emphasis. This study determined what types of skin problems and medications family physicians most commonly diagnose and prescribe.* Methods: *Study researchers analyzed the National Ambulatory Medical Care Survey data from 2002 to 2005 for dermatologic diagnoses and most common prescriptions by family physicians. The data from 2002–2005 were compared to data from 1990–1994.* Results: *Skin conditions accounted for 8% of all visits to family physicians in 2002–2005. The five most common skin disorders diagnosed by family physicians were dermatitis, pyoderma, tinea, benign neoplasms, and candida. The top 20 diagnoses accounted for 70% of the visits. The three most commonly prescribed medication classes for skin problems from 2002–2005 were antihistamines, topical anti-infectives, and adrenal corticosteroids. Between 1990–1994 and 2002–2005, family physicians increased the number of less common dermatologic diagnoses they make by 10% and have concurrently increased the prescribing of medications they use to treat these disorders.* Conclusions: *Family physicians diagnose a wide range of skin disorders and prescribe drugs to treat them. Family physicians make more dermatologic diagnoses and prescribe more treatments than previously.*

(Fam Med 2008;40(7):507-11.)

The current US health care system relies heavily on primary care clinics to manage a variety of conditions, including dermatologic problems. In fact, dermatologists treat only 30%–40% of patients with skin disease.[1] This leaves the majority of skin disorders to be seen by clinicians in other specialties, 22% of whom are family physicians.[2] Studies in the mid 1990s reported that many physicians provided suboptimal care for patients with skin disorders.[1,3,4] In one study, dermatologists determined that only 40% of patients with skin disease received optimal care.[5]

As medical knowledge expands, family physicians face an ever-increasing challenge in diagnosis and treatment of skin disorders. They must be skilled in disease recognition and management, as well as understanding when to refer patients to the appropriate specialist. Although it might be expected that family physicians refer patients for more uncommon skin disorders, it is notable that primary care physicians often refer patients to dermatologic specialists for common and straightforward skin conditions.[6] This behavior may be a reflection of the quantity and quality of dermatologic training received during family medicine residency.

Dermatology is but one of a variety fields to which family medicine residents must devote their attention during a 3-year training period. Determining which skin diseases are most commonly seen by family physicians could lead to increased awareness of these conditions and subsequently the development of relevant diagnosis and treatment education. We investigated the most common dermatologic conditions seen in US family medicine practice from 2002 to 2005 and the medications used to treat them. We compared that 2002–2005 treatment data to data from the 1990s to see if there had been changes in the presenting of dermatologic drugs.

Methods

Data were obtained from the National Ambulatory Medical Care Survey (NAMCS), an ongoing survey of US office-based physician practice conducted by the National Center for Health Statistics. Sampling was limited to non-federally employed physicians

From the Department of Dermatology (Mr Awadalla, Drs Fleischer and Feldman), Department of Family and Community Medicine (Dr Rosenbaum), and Department of Public Health Services (Mr Camacho and Dr Feldman), Center for Dermatology Research, Wake Forest University.

principally engaged in outpatient care activities. The multistage probability sampling design of NAMCS was stratified first by primary sampling unit (county, contiguous counties, or standard metropolitan statistical area), then by physician practices within the sampling unit, and finally by patient visit within the 52 weekly randomized periods. Within small practices, all patient encounters during a 1-week period were sampled. For large practices, 20% of patient visits were randomly sampled. The resulting national estimates describe the utilization of ambulatory services in the United States since 1974.[7,8]

The study interval, 2002–2005, was determined by the most recent data available from the NAMCS. From 2002 to 2005, a total of 104,899 records were obtained to estimate the experience of more than 3.6 billion outpatient-based physician visits in the United States. For each visit sampled, a one-page patient log was completed that included demographic data, reasons for patient visits, physician's diagnoses, services provided, and referral practices.

For the purpose of this study, physicians in general practice, family medicine, family medicine geriatric medicine, and family medicine sports medicine were grouped as "family physicians." All other specialties, except for dermatology, were grouped into a category called "other."

To define dermatologic diagnoses, the *International Classification of Diseases, Ninth Revision, Clinical Modification*[9] codes were assessed for their relevance to dermatologic disease. In addition to codes for skin diseases, select infectious, neoplastic, and mucous membrane conditions were also included. "V" codes were eliminated as were other non-dermatologic diagnoses.[9] Data for all providers were studied to isolate those visits in which the primary diagnosis was a dermatologic diagnosis. After all diagnoses pertaining to dermatologic disease were extracted from NAMCS, certain diagnoses were grouped under a broad diagnostic group. For example, all the various tinea infections were combined into one category called "tinea, all" since the recognition and treatment of this disease does not vary tremendously with its location (Table 1). All diagnoses that were grouped under a diagnostic group are listed in Table 1. Cutaneous diagnoses consisting of at least 0.1% of all cutaneous diagnoses were included. Only diagnoses that were incorporated into a diagnostic group were included when falling below 0.1% of total diagnoses.

The NAMCS database was also examined for medications associated with skin-related visits seen by family physicians in 1990–1994 and 2002–2005. These analyses were done by drug class and by individual medication. Only medications and drug classes pertaining to skin disease were included in the final tabulation. The medications prednisone, hydrocortisone, and kenalog were assumed to be oral, topical, and injected, respectively. The drug class "miscellaneous dermatologics" included topical prescriptions, the majority of which include anti-infectives, corticosteroids, acne products, and moisturizers. In 1995 three drug classes, topical anti-infectives, topical corticosteroids, and acne products were formed by NAMCS. The majority of drugs composing these drug classes were not novel but rather originated from the miscellaneous dermatologics category. Therefore, in 2002–2005 the drug class miscellaneous dermatologics does not include topical anti-infectives, topical corticosteroids, and acne products. To correct for these changes, the newly formed drug classes topical anti-infectives, topical corticosteroids, and acne products were included under the 2002–2005 drug class of miscellaneous dermatologics. Their individual contribution to the drug class, in percentages, is shown in Table 2. The addition of these drug classes to miscellaneous dermatologics was done to compare the data from 1990–1994 to 2002–2005.

Sampling weights were applied to achieve the nationally representative estimates. All estimates derived from the NAMCS are subject to sampling variability. The relative sample error (SE) is a measure of sampling variability and is related to number of estimated patient visits. Representative relative SEs for the 1994 NAMCS are: 8.1% for estimates of 10 million visits, 23.9% for estimates of 1 million visits, 33.6% for estimates of 500,000 visits, and 74.8% for estimates of 100,000 visits. Relative SE rates from earlier years are similar, and details may be obtained from the National Center

Table 1

Diagnoses Combined for This Study

Combination Diagnosis	*Component ICD-9 Codes*
Dermatitis	454.10, 690.10, 691.00-691.90, 692.00-692.90
Pyoderma	680.00-682.90, 684.00, 686.00, 686.90
Malignant neoplasm*	173.00-173.90 and 238.00-238.90
Benign neoplasm*	214.10-214.90 and 216.00-216.90
Pruritis	698.00-698.90
Alopecia	704.00-704.10
Candida, all	112.00-112.90
Tinea, all	110.00-111.90
Chronic ulcer	707.00-707.90
Warts	078.10 and 078.19

* Benign neoplasm and malignant neoplasm do not include melanoma.

ICD-9—*International Classification of Diseases, Ninth Revision, Clinical Modification*

for Health Statistics published information.[7,8]

Results

From 2002–2005, skin conditions comprised 8% of all visits to family physicians, which translates into 20% of all dermatologic problems seen across all specialties (Table 3). Dermatitis, the most common skin condition identified by family physicians, accounted for 13.6% of all dermatologic diagnoses made by family physicians (Table 4). The second most common condition diagnosed were pyoderma or infections of the skin, which constituted 10.4% of all diagnoses. The three most common conditions, dermatitis, pyoderma and tinea infections combined made up more than 31.3 % of skin diagnoses by family physicians. The 10 most common conditions accounted for 56.7% of all the skin-related diagnoses made by family physicians. The 20 most common conditions accounted for 70.7% of all skin-related diagnoses. The remaining 30.3% of diagnoses were spread among those diseases each representing less than 0.1% of all diagnoses. Melanoma comprised only 0.15% of diagnoses.

Table 2

Most Common Drug Classes Prescribed for Visits with a Cutaneous Diagnosis

Rank	*1990–1994*	*Percent*	*2002–2005*	*Percent*
1	Dermatologics, misc.	37.32	Dermatologics, misc.	30.13
			Topical anti-infectives	10.99
			Topical corticosteroids	9.03
			Acne products	2.30
2	Adrenal corticosteroids	14.64	Antihistamines	12.15
3	Cephalosporins	11.83	Adrenal corticosteroids	10.87
4	Penicillins	6.21	Cephalosporins	10.15
5	Erythromycins/lincosamides/macrolides	5.54	Penicillins	5.05
6	Skin/mucous membrane, unspecified	5.36	Miscellaneous antibacterial agents	4.33
7	Antifungals	5.31	Tetracyclines	4.31
8	Antihistamines	4.93	Quinolones/derivatives	3.59
9	Tetracyclines	2.65	Antiprotozoals	3.38
10	Miscellaneous antibacterial agents	2.30	Antifungals	3.10
Total	Top 5	75.55	Top 5	90.68
Total	Top 10	96.09	Top 10	109.37

Table 3

2002–2005 NAMCS Data: Skin-Related Visits, by Physician Specialty (in Millions)

Specialty	*All Visits*	*Skin-related Visits*	*% of Visits That Were Skin Related*	*% of All Skin-related Visits*
Family medicine	861.5	68.6	7.96	22.49
Dermatology	128.3	114.6	89.32	37.57
Other	2,679	121.8	4.55	39.93

NAMCS—National Ambulatory Medical Care Survey

From 1990–1994 the most commonly prescribed drug and drug class for skin-related visits in family medicine offices was oral prednisone (3.04%) and miscellaneous dermatologics (21.95%), respectively (Table 2 and Table 5). From 2002–2005 the most commonly prescribed drug and drug class was cephalexin (2.85%) and antihistamines (5.22%), respectively. The top 10 drug classes from 1990–1994 and 2002–2005 accounted for 96% and 87%, respectively, of all dermatologic drug classes prescribed. The top 10 individual drugs from 1990–1994 and 2002–2005 accounted for 21% and 14%, respectively, of all dermatogically related prescriptions.

The third most common prescription from 1990–1994 was for sunscreen (2.4%). From 2002–2005, sunscreen was only prescribed for 0.07% all skin-related visits. Clotrimazole/betamethasone propionate was prescribed for 1.4% and 0.9% of all skin related visits in 1990–1994 and 2002–2005, respectively.

From 1990–1994, 37.3% of all prescriptions for skin disease were treated with prescriptions from the drug class miscellaneous dermatologics. From 2002–2005

Table 4

Most Common Dermatologic Diagnoses Made by Family Physicians from 2002–2005

Rank	Diagnosis	*Percent*
1	Dermatitis	13.58
	Contact	11.82
	Atopic	1.47
	Seborrheic	0.02
	Stasis	0.16
2	Pyoderma	10.38
	Cellulitis and abscess	5.64
	Carbuncle and faruncle	0.42
	Impetigo	0.57
	Other infection: skin, subcutaneous	0.91
3	Tinea, all	7.41
4	Benign neoplasm*	4.39
5	Candida, all	3.73
6	Dermatosis, NOS	3.62
7	Warts	3.44
8	Malignant neoplasm*	3.43
9	Sebaceous cyst	3.39
10	Acne	3.03
11	Actinic keratosis	2.41
12	Seborrheic keratosis	1.60
13	Ingrowing nail	1.50
14	Folliculitis	1.46
15	Urticaria, NOS	1.38
16	Chronic ulcer	1.27
17	Rosacea	1.13
18	Psoriasis	1.12
19	Pruritis	1.09
20	Atrophoderma	0.85
Total	Top 10 diagnoses	77.42
Total	Top 20 diagnoses	91.21

* Benign neoplasm and malignant neoplasm do not include melanoma. Melanoma only constituted 0.15% of all diagnoses.

NOS—not otherwise specified

this category accounted for 27.8% of all prescriptions for cutaneous disease, which is 9.5% percent lower than in 1990-1994.

Discussion

The variety of skin disease seen by family physicians has evolved in the last decade. From 1990–1994, the 20 most common dermatologic diagnoses accounted for 81% of all skin disease seen by family physicians.[2] On the other hand, data from 2002–2005 suggest that the 20 most common cutaneous diagnoses represent only 71% of all skin disorders seen by family physicians. This indicates that there was an increase of 10% in less common dermatologic diagnoses made by family physicians over a 10-year interval. However, the percentage of all skin disease, 20%, seen by family physicians in 1990–1994 and 2002–2005 did not change. Therefore, the increased variety of skin disease in family medicine is not due to an increase in total dermatologic disease. One possible explanation for this increase is that there was a shift in overall skin disease incidence within the last 10 years, but this seems unlikely. Another possible explanation is that family physicians may be diagnosing the same skin diseases into more accurate diagnostic categories.

With an increasing variety of dermatologic diagnoses made by family medicine physicians, we examined whether there was also a change in dermatologic drugs used to treat them. The top 10 skin specific drug classes prescribed from 1990–1994 and 2002–2005 account for 96% and 87%, respectively, of the total skin-specific drug classes prescribed. In fact, family physicians are currently using twice as many skin-specific drug classes to treat skin disease overall than they were a decade ago. This could be directly related to the more diverse skin disease diagnosed by family physicians. However, an increase in available dermatologic drug classes or an artifact due to an increased number of drug classes created by NAMCS could also account for this finding.

To determine whether this was due to an artifact of changes in the NAMC's classification system for dermatologic drug classes, we examined individual drugs. The top 20 dermatologic drugs used by family physicians from 1990–1994 accounted for 33% of all dermatologic drugs. From 2002–2005 the top 20 dermatologic drugs accounted for only 21%. The 12% decline between the two time periods indicates that family physicians are using a wider variety of dermatologic drugs. The finding with individual dermatologic medications is consistent with that in dermatologic medication classes. Therefore, this change in prescription must be due to an increasing variety of dermatologic drugs used by family physicians.

Our results thus suggest that family physicians are diagnosing more diverse skin disease than a decade ago. Interestingly, the increase in variety of skin disease, 10%, correlates closely to the 9% and 12% increase in the variety of dermatologic drug classes and drugs, respectively, used by family physicians. Together, these data suggest that family physicians are seeing a 10% increase in the variety of skin disease and augmenting treatment plans accordingly.

One concerning issue, however, is that family physicians are prescribing more antibiotics. In 2002–2005

Table 5

Most Common Medications Prescribed for Visits With a Cutaneous Diagnosis

Rank	*1990–1994*	*Percent*	*2002–2005*	*Percent*
1	Prednisone	3.08	Keflex	2.95
2	Nizoral	2.51	Zyrtec	1.63
3	Sunscreen	2.42	Prednisone	1.47
4	Keflex	2.06	Lamisil	1.28
5	Duricef	2.04	Diflucan	1.27
6	Benadryl	1.99	Allegra	1.25
7	Polysporin	1.81	Augmentin	1.19
8	Hydrocortisone	1.78	Triamcinolone	1.14
9	Lotrimin	1.65	Benadryl	1.04
10	Terazol	1.57	Lotrisone	0.97
11	Lotrisone	1.47	ASA	0.95
12	Other	1.31	Kenalog	0.89
13	Tetracycline	1.31	Cephalexin	0.9
14	Ciprofloxacin	1.28	Ibuprofin	0.76
15	Amoxicillin	1.23	Doxycycline	0.76
16	Medrol	1.23	Hydrocortisone	0.74
17	Amoxil	1.11	Medrol	0.74
18	Elocon	1.11	Liquid nitrogen	0.74
19	Lidocaine	1.04	Nizoral	0.73
20	Erythromycin	1.01	Bactroban	0.69
Total	Top 10	20.91	Top 10	14.21
Total	Top 20	33.00	Top 20	21.28

Cephalexin displaced oral prednisone as the most commonly prescribed dermatologic drug. Further, while antibiotic drug classes composed approximately 23% of all dermatologic drugs from 1990–1994, they increased to 27% from 2002–2005. The increased prescribing of antibiotics may contribute to drug resistance.

Another issue of concern is that family physicians continue to refer common skin conditions to dermatologic specialists.[6] And, despite the documented lack of efficacy and toxicity of clotrimazole/betamethasone propionate when compared to antifungal monotherapy,[10,11] the frequency of prescribing monotherapy only dropped by 30%.

Since family physicians are diagnosing and treating a large array of skin disease, their residency training in skin disorders is important. Tailoring programs to cope with the diagnosis and treatment of cutaneous disease may prove challenging. In shaping their education objectives, residency directors may find it useful to know which disease entities are most commonly seen in family medicine. Recent studies also indicate that incorporating longitudinal methods, Internet-based teaching, and photography may prove equally if not more effective than traditional methods.[12-15] The results of this study can therefore help guide the development of focused tools for dermatology training of family medicine residents.

Acknowledgments: We thank Christina Goette for reviewing and editing this manuscript.

Corresponding Author: Address correspondence to Dr Feldman, Wake Forest University, Department of Dermatology, Medical Center Boulevard, Winston-Salem, NC 27157-1071. 336-716-7740. Fax: 336-716-7732. sfeldman@wfubmc.edu.

References

1. Ramsay DL, Weary PE. Primary care in dermatology: whose role should it be? J Am Acad Dermatol 1996;35(6):1005-8.
2. Fleischer AB Jr, Feldman SR, McConnell RC. The most common dermatologic problems identified by family physicians, 1990–1994. Fam Med 1997;29(9):648-52.
3. Kirsner RS, Federman DG. Lack of correlation between internists' ability in dermatology and their patterns of treating patients with skin disease. Arch Dermatol 1996;132(9):1043-6.
4. Gervert B, Maurer T, Berger T, et al. Primary care physicians as gatekeepers in managed care. Primary care physicians' and dermatologists' skills at secondary prevention of skin cancer. Arch Dermatol 1996;132(9):1030-8.
5. Johnson MT. On teaching dermatology to non-dermatologists. Arch Dermatol 1994;130:850-2.
6. Feldman SR, Fleischer AB, Chen JG. The gatekeeper model is inefficient for the delivery of dermatologic services. J Am Acad Dermatol 1999;40(3):426-32.
7. National Center for Health Statistics. Public use data tape documentation. 1990 National Ambulatory Medical Care Survey. Hyattsville, Md: US Department of Health and Human Services, Public Health Service, Centers for Disease Control, 1992.
8. Tenney JB, White KL, Williamson JW. National Ambulatory Medical Care Survey: background and methodology. National Center for Health Statistics. Vital Health Stat 1974;2:61.
9. International classification of diseases, ninth revision, clinical modification, sixth edition. Salt Lake City: Med-Index Publications, 2003.
10. Greenberg HL, Shwayder TA, Bieszk N, Fivenson DP. Clotrimazole/betamethasone diproprionate: a review of costs and complications in the treatment of common cutaneous fungal infections. Pediatr Dermatol 2002;19(1):78-81. Review.
11. Shaffer MP, Feldman SR, Fleischer AB. Use of clotrimazole/betamethasone diproprionate by family physicians. Fam Med 2000;32(8):561-5.
12. Reust CE. Longitudinal residency training: a survey of family practice residency programs. Fam Med 2001;33(10):740-5.
13. Cyr PR. Family practice center-based training in skin disorders: a photographic approach. Fam Med 1995;27(2):109-11.
14. Gerbert B, Bronstone A, Maurer T, Berger T, McPhee SJ, Caspers N. The effectiveness of an Internet-based tutorial in improving primary care physicians' skin cancer triage skills. J Camcer Educ 2002;17(1):7-11.
15. Gerbert B, Bronstone A, Wolff M, et al. Improving primary care residents' proficiency in the diagnosis of skin cancer. J Gen Intern Med 1998;13(2):91-7.