

# Dermatologists and Office-Based Care of Dermatologic Disease in the 21st Century

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**Most professional care of skin diseases is provided in physicians' offices. In the past 25 y, medical practice has changed substantially. Since 1973, the National Ambulatory Medical Care Survey has provided data about patients seen in physicians' offices. Using 1974, 1980, and 1989 data, we have previously analyzed these data as they pertain to skin diseases. To provide a more current assessment of dermatologists' practices and the care of skin diseases in office-based practice, we analyzed National Ambulatory Medical Care Survey data for 1999 to 2000. We used statistical methods for survey data to estimate the number and characteristics of visits to dermatologists and others for skin diseases. We compared the characteristics of dermatologists' office-based practices with those of other physicians. In 1999 to 2000, there were approximately 35 million visits annually to office-based dermatologists, double the number for 1974. Eight diagnostic groups account for 65% of all visits to dermatologists. Acne is still the most frequent primary diagnosis at visits to dermatologists, but since 1974 the proportion of all visits that were for acne has decreased by half. Compared to other office-based physicians, dermatologists are significantly more likely to own their practices (OR, 2.78; 95% CI, 1.52–5.02) and much less likely to see capitated patients (OR, 0.30; 95% CI, 0.17–0.53). Over 26 y, utilization of dermatologists' services has grown in proportion to the increase in the number of office-based dermatologists. The organization of their practices has changed little. Dermatologists dominate the care of many of the same diagnoses as they did 20 y ago.**

J Investig Dermatol Symp Proc 9:126–130, 2004

The resources devoted to caring for skin disease provide one measure of the burden of skin disease. In the United States, most care of skin diseases occurs in physicians' offices. Historically, dermatologists have provided the majority of care for skin conditions.

Since the 1970s, office-based practice of ambulatory care in the United States has grown greatly (Delozier and Gagnon, 1975; Cherry and Woodwell, 2002). In the past 20 y, the number of physicians in office-based nonfederal ambulatory practice including dermatologists has nearly doubled, an increase four times greater than the US population (Infoplease, 2003; U.S. Dept. of Health and Human Services, 1982, 2002a,b; Ramsay *et al*, 1984). Since 1980, overall expenditures for health care have more than tripled. Now totaling more than 1.2 trillion dollars, health-care expenditures account for 13% of the gross domestic product (Stanford, 2000). Despite this spending level, nearly one in three nonelderly Americans was uninsured for all or part of 2001 to 2002 (Robert Wood Johnson Foundation, 2003). Over the past three decades we have seen the advent of managed care, diagnostic-related groups, and the resource-based relative value scale. For many insured persons, changes in reimbursement have decreased patients' out-of-pocket costs for office visits, lowering the financial barrier to dermatologic care.

In the context of these dramatic changes in health care, this report details the characteristics of office-based care now provided by dermatologists and compares the practices of dermatologists and other office-based physicians. This report also compares the dermatologists' practices now to that described in our prior analyses of the National Ambulatory Medical Care Surveys, which we first completed more than 25 years ago (Stern *et al*, 1977; Stern and Gardocki, 1986; Stern and Nelson, 1993).

## Results

A total of 48,179 sampler visits are included in this analysis. In 1999 to 2000, the number of visits to office-based physicians averaged 790 million visits per year. There were 35 million visits each year to office-based dermatologists, 4.4% of all visits. Women account for about 60% of all ambulatory visits. The proportion of visits to dermatologists by women was comparable (57%). Patients cared for in dermatologists' offices were slightly older, more likely to be white, and more likely to be seen in nonrural areas (i.e., within metropolitan statistical areas) than patients consulting other office-based physicians. The geographic distribution of office visits to dermatologists was similar to that of other physicians (Table II).

The care of chronic problems accounted for the majority of care rendered by dermatologists (Table III). Care of

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Abbreviation: NAMCS, National Ambulatory Care Surveys

**Table I. Selected diagnosis groups and associated ICD9-CM codes**

Diagnosis group	ICD9-CM code(s) <sup>a</sup>
Acne	706.1
Roseacea	695.3
Eczema/dermatitis	692.9, 609.1, 691.8
Psoriasis	696.1
Warts	078.1
Skin malignancy	172, 173, 232
Benign skin growths	216.9, 702.1, 706.2, 709.0, 216.5
Actinic keratoses	702.0
V codes <sup>b</sup>	All V codes

<sup>a</sup>All analyses as specified were performed on basis of three- or four-digit ICD9-CM codes.

<sup>b</sup>Routine follow-up, general examination.

chronic disease was significantly more likely to be the reason for a visit (OR, 2.15; 95% CI, 1.75–2.64) to dermatologists than other office-based physicians. Visits to dermatologists' offices were on average 3 min shorter than those to other office-based practitioners ( $p < 0.01$ ). This difference is partially attributable to the *lower percentage* of visits to dermatologists (2.4%) lasting more than 30 min than was the case for other physicians (8%). When only visits of less than 30 min are considered, visits to dermatologists average 2.1 min less in duration. (95% CI, 1.2–3.0 min) than was the case for visits to other physicians. A higher proportion of other physicians' patients had been seen in that practice before than was the case for dermatologists (Table III). Patients referred by another physician were a significantly higher proportion of dermatologists' practices than that of other physicians (OR, 2.12; 95% CI, 1.49–3.02). One in six visits to dermatologists required prior insurance authorization, not significantly different from the proportion for all other office visits.

Dermatologists' patients were significantly more likely to have private insurance or be self-paid than patients seeing other physicians (Table III). Patients seeing other physicians were four times more likely to have Medicaid compared to patients seeing dermatologists (OR, 3.97; 95% CI, 2.24–7.04) (Table III). Patients seeing dermatologists were somewhat more likely to have private insurance than those cared for by other physicians (OR, 1.33; 95% CI, 1.01–1.73). Although Health Maintenance Organization members represented comparable numbers of dermatologists' and other physicians' practices, capitated visits were three times more frequent in other physicians' practices than was the case for dermatologists (Table III).

**Diagnoses** As classified in Table I and presented in Table IV, we identified eight disease-based diagnostic groups that together accounted for the majority of first (primary) diagnosis at visits to dermatologists. In dermatology practices, acne was the single most frequent diagnosis at visits to dermatologists and represented about a 100-fold greater proportion of visits to dermatologists than to other physicians (OR, 103; 95% CI, 67–156). Seven of the eight diagnostic groups (i.e., excluding visits for benign skin lesions) account for 60% of all visits to dermatologists, but together represent only 1% of all visits to other physicians. For only two of these eight diagnostic groups (benign growths and warts) were visits to all other physicians more frequent than visits to dermatologists. Dermatologists provided more than half the visits, which included skin cancer prevention services. Nevertheless, in only about one-fifth of visits to dermatologists were such preventative health counseling noted. Only 1% of office visits to other physicians included this service.

**Drug advice** For common acne products including isotretinoin, topical retinoids, and minocycline, dermatologists account for the majority of office visits where use of these medications was recommended (i.e., recommendation to use, or continue using, or the prescription of a drug).

**Table II. Characteristics of patient visits (1999–2000) to dermatologists and all other office-based physicians by patient and practice characteristics (number in millions, %, mean) with 95% CI**

	Dermatologists		All others <sup>a</sup>		p value <sup>a</sup>
	N	95% CI	N	95% CI	
All visits	34	29–39	756	705–810	
Percent female <sup>b</sup> (mean)	57	45–60	59	58–60	0.07
Percent white <sup>b</sup> (mean %)	92	91–94	86	84–88	<0.001
Mean age <sup>b</sup> (years)	46	45–48	44	43–45	0.007
Geographic region percent distribution					
Northeast	20	16–24	23	20–25	0.38
North central	20	13–27	23	19–27	
South	32	23–43	31	28–36	
West	27	19–35	23	20–26	
Percent in metropolitan statistical area	94	88–98	82	77–87	0.003

<sup>a</sup>All others = all other office-based physicians (see Materials and Methods).

<sup>b</sup>Dermatologist vs. all others.

Table III. Characteristics of visits (% distribution) to dermatologists and other physicians, 1999–2000

Type of complaint (% distribution)	Dermatologists		Other office-based physicians		p value
	N	95% CI	N	95% CI	
Acute	33	28–38	35	34–37	0.34 <sup>a</sup>
Chronic	55	50–59	36	34–37	<0.002 <sup>a</sup>
Postoperative	92	91–94	86	84–88	<0.001 <sup>a</sup>
Mean age <sup>a</sup> (years)	46	45–48	44	43–45	0.007
Routine care (V codes) <sup>b*</sup>	60	5–8	20	18–19	<0.002 <sup>a</sup>
Duration of visit (mean), min (excluding visits > 45 min) <sup>a</sup>	15	14–16	18	18–19	<0.002
Seen before in practice	79	76–82	88	89–89	<0.002
Referred by other MD	25	20–30	16	15–17	<0.002
Expected primary source of payment					
Private insurance	62	57–68	56	54–57	<0.14 <sup>a</sup>
Medicare	21	19–23	20	19–21	>0.41 <sup>a</sup>
Self-pay	10	6–15	5	4–6	<0.06 <sup>a</sup>
Medicaid	2	1–3	8	7–9	<0.002 <sup>a</sup>
HMO member	25	20–30	29	27–31	>0.15
Capitated visits	4	2–6	12	10–13	<0.002

<sup>a</sup>Corrected for multiple comparisons.<sup>b</sup>See Table I for definition (includes nonillness care).Table IV. Number of visits (millions per year) and percent of all visits by diagnostic group<sup>a</sup> and physician type, 1999–2000

Diagnostic group	Dermatologists		Other physicians	
	Number	Percent <sup>b</sup>	Number	Percent <sup>b</sup>
Acne	5.15	15.3	1.34	0.2
Rosecea	0.92	2.7	0.18	< 0.1
Eczema	2.76	8.2	4.38	0.6
Psoriasis	0.89	2.6	0.12	< 0.1
Warts	1.94	5.8	2.24	0.2
Skin malignancies	2.06	6.1	1.24	0.2
Benign growths	4.60	13.7	35.70	4.7
Actinic keratosis	5.15	15.3	1.3	0.2
V codes	1.86	5.5	142.1	18.8
Total of above	23.39	69.6	188.6	25
All visits	33.6	100	757	100

<sup>a</sup>See Table I for definitions.<sup>b</sup>Percent of all visits to specialty.

Dermatologists were three times more likely to advise minocycline or doxycycline at visits for acne than other physicians (Table V). Dermatologists accounted for 38% of the 2,840,000 visits per year with advice to use very high potency topical corticosteroids, but less than one-fourth of visits with advice to use a representative group of less potent topical corticosteroids (data not shown). Dermatologists accounted for more than 85% of the 360,000 yearly visits with advice to use azelaic acid and the 345,000 visits with advice to use topical 5-fluorouracil. Visits to dermatol-

Table V. Visits with advice to use (thousands per year ± SEM) selected medications by primary diagnosis for dermatologists and other physicians

Drug diagnosis <sup>a</sup>	Dermatologists	Other physicians	Total
Isotretinoin			
All	948 ± 101	178 ± 76	1125 ± 141
Acne	780 ± 82	> <sup>b</sup>	863 ± 94
Topical retinoids			
All	2772 ± 344	457 ± 201	3228 ± 382
Acne	1817 ± 219	<sup>b</sup>	2115 ± 263
Minocycline			
All	1348 ± 202	350 ± 106	1699 ± 268
Acne	1043 ± 175	<sup>b</sup>	1159 ± 201
Doxycycline			
All	482 ± 131	2286 ± 437	2768 ± 471
Acne	342 ± 117	<sup>b</sup>	377 ± 124

<sup>a</sup>Primary diagnosis for visit.<sup>b</sup>Estimates, less than 300,000 not presented owing to imprecision (see Materials and Methods and Discussion).

ogists accounted for over half (60%) of 240,000 visits with topical calcipotrol use recommended, but less than one-fifth of the 1,640,000 visits with topical mupirocin use recommended.

**Other aspects of dermatologic care** Annually, nearly 12 million visits (34%) to dermatologists include a procedure.

More than 75% of the 3 million office visits, which include a skin biopsy, occur in dermatologists' offices.

Dermatologists were significantly more likely than other office-based physicians to be in solo practice (60% vs. 35%) (OR, 2.82; 95% CI, 2.02–3.93). Nearly 90% of dermatologists in office-based practice own their practice, a significantly higher percentage than the other office-based physicians (OR, 2.78; 95% CI, 1.52–5.02). Dermatologists were significantly less likely to maintain a laboratory in their office compared to other physicians (32% vs. 52%) (OR, 0.43; 95% CI, 0.29–0.63). Nurse practitioners provide less than 1% of care in a dermatologist's office, a significantly lower proportion than observed in other types of offices (OR, 0.10; 95% CI, 0.03–0.33).

Follow-up planning for patients visiting dermatologists and other physicians did not differ significantly. In dermatology practices, 65% of patients were asked to return at a specific time and an additional 25% were asked to return as needed.

## Discussion

**Utilization of health services** The NAMCS is a federal survey of office-based practice (Cherry and Woodwell, 2002). Since its initiation in 1973, this survey provides data that permits quantification of the nature of visits to office-based physicians (Delozier and Gagnon, 1975). Since our initial 1974 analysis of dermatologic data from this survey, we have periodically reanalyzed these surveys, which were conducted periodically from 1973 to 1989 and annually since that year (Stern, 1977, 1993; Stern and Gardocki, 1986). Taken together with prior results, the analysis of the most recent available surveys provides more than 25 years perspective on the quantity and content of office-based dermatologic care.

From 1974 to 2000, the number of visits to dermatologists in office-based practice nearly doubled from 18 million to 35 million per year, a far greater increase than for total visits for office-based care, which increased from 635 million to 752 million annually during this time period (20%). During this interval, the number of dermatologists in office-based practice approximately doubled (Ramsay *et al*, 1984). Each office-based dermatologist sees an average about 5000 patients per year. In the past 20 years, the average duration of a visit to a dermatologist has, however, increased more than 25% (Stern and Gardocki, 1986).

**Demographic characteristics** More detailed information on the demographic characteristics of patients, physician diagnoses and therapeutic services have been available for dermatology than was the case for our first analysis of 1974 data. Both over time and compared to visits to other physicians, the female predominance among those visiting dermatologists has been remarkably consistent. Women represent approximately 60% of all visits to dermatologists and other office practitioners. Since 1980, the absolute increase in the percent of visits by nonwhite persons, from 10 to 14% for other physicians and from 5 to 8% for dermatologists, has been comparable. Nevertheless, the proportion of nonwhite persons seen in dermatologists' offices continues to be only about half the proportion of visits by nonwhite persons to other office-based physicians.

Over time, the age distribution of patients' visits to dermatologists has changed significantly. Twenty years ago, patients under age 30 accounted for about half of visits to dermatologists. Now this group accounts for only about one-fourth of visits to dermatologists. Over these two decades the proportion of visits to dermatologists by patients age 45 to 64 y has increased 50%, and the proportion of visits by patients age 65 or older has doubled. Visits by older Americans have risen far more than can be accounted for by the aging of the US population.

**Dermatologists' practices** Dermatologists' practices substantially differ from that of other office-based physicians in organizational and financial aspects as well as content. Dermatologists provide only about one-third the proportion of their services outside metropolitan statistical areas (i.e., nonrural areas) as do other physicians. Dermatologists see a higher proportion of self-pay and privately insured patients than other physicians. The proportions of Medicaid and capitated visits in dermatologists' practices is one-third or less the proportion in other physicians' practices. Patients referred by another physician and new patients are now about twice as frequent in dermatologists than other physicians' practices, a finding similar to that of more than 25 y ago (Stern, 1977).

**Reasons for visits** The eight diagnostic groups detailed in Table I compose the principle reason for nearly two-thirds of all visits to dermatologists. Acne is still the most frequent diagnosis at visits to dermatologists. Nevertheless, compared to 1980, acne now accounts for only about half the fraction of all visits to dermatologists as it did then. Since 1980 the number of visits to nondermatologists for acne has increased more than fourfold, but dermatologist still provide nearly 80% of visits for acne.

Over this 20-y period, visits to dermatologists for skin malignancies have increased by about two-thirds (Stern, 1986). Dermatologists provide skin cancer prevention counseling to nearly one-fourth of their patients, but other physicians do so very infrequently (about 1%).

Although common in the general population, psoriasis continues to account for only about 1 million visits per year (Lebwohl, 2003). Dermatologists no longer account for the majority of visits for warts, but the proportions of visits to dermatologists for many other skin diagnoses including eczema and acne is relatively unchanged over the past two decades. After acne and benign growths, actinic keratoses is the third most frequent primary diagnosis for visits to dermatologists. Dermatologists' office practices are procedurally oriented. One in three visits to a dermatologist includes a procedure, and dermatologists provide 60% of all office-based skin procedures.

**Recommendations of drug therapy** The distribution of drugs recommended at visits for acne to dermatologists illustrates the importance of a relatively few agents in the treatment of this disease. Topical retinoids are dispensed at one-third of acne visits and isotretinoin is prescribed nearly half as often as are tetracyclines at visits for acne. Very high potency steroids are recommended twice as often now compared to 10 y ago. In marked contrast to a decade ago

when dermatologists accounted for more than three-fourths of all very high potency recommendations, now other physicians account for the majority of visits with a very high potency topical corticosteroid recommended (Stern, 1996).

**Strengths and limitations** The strengths of this study include the design of the NAMCS, which scientifically samples a large number of office-based practitioners; the high rate of participation among these sampled; and its established methodology and trained staff. As in the case for estimates derived from any sample, estimates from the survey are subject to error. Nevertheless, the design of the survey and the specialized statistical methods available for analysis permitted us to calculate standard errors and confidence intervals for the estimates. Although our analysis included data from nearly 50,000 sampled visits, estimates of less than 300,000 visits to dermatologists are subject to substantial error (i.e., relative standard error > 30%) and are not provided. This limits our analysis to common diagnoses and draws relatively broad categorizations of patient characteristics.

The doubling of visits to dermatologists' in the past 25 years is testimony to the substantial burden of skin disease in the United States. This parallel rate of growth in the number of dermatologists and utilization of their services suggests that, so far, supply rather than need or demand is the primary determinant of the expert resources devoted to the care of skin disease in the United States (Stern, 1986).

### Materials and Methods

We analyzed data from the 1999 and 2000 National Ambulatory Care Surveys (NAMCS). This federal survey samples physicians in office-based practices and patient visits within these practices (U.S. Dept. of Health and Human Services, 2001, 2002a, b). It utilizes a multistage probability sample to select the physicians' practices to be studied. These practices are selected for participation based on master files maintained by the American Medical Association and the American Medical Osteopathic Association, which includes all US physicians. The sample for the NAMCS is restricted to physicians who primarily provide patient care in office-based practices and were not federally employed. They number more than 430,000. The survey excludes radiologists, pathologists, and anesthesiologists. In 1999 to 2000, 3777 physicians were asked to participate and 2475 (66%) participated. A total of 134 of 209 (64%) sampled dermatologists participated, who comprise 2% of dermatologists in office-based care. Each sampled physician was randomly assigned 1 of 52 wk of the year to record the characteristics of a sample (of 20%–100%) of all patients seen during that week (U.S. Dept. of Health and Human Services 2001, 2002a, b). Among the data collected are physicians' specialty, location, and for each visit during the sample period demographic and disease characteristics of the patient including the principle diagnosis associated with the visit and medications prescribed and disposition for the visit.

**Statistical methods** Because of its use of a multistage sampling, the survey is able to utilize four statistical techniques: (1) inflation by reciprocals, (2) adjustment for nonresponse, (3) a ratio adjustment to fixed totals, and (4) weights. As a result survey data can be used to calculate unbiased national estimates of the number of visits with given characteristics (U.S. Dept. of Health and Human Services, 2002a, b). These attributes of the design of the NAMCS permit the calculation of sample weights for each observation and define the cluster (population sample unit) and stratum for each sampled visit. Sample weights permit calculation of point estimates. In the case of the NAMCS, sample weights, cluster (population sample unit) stratum, are provided for each

observation. The design permits use of specialized statistical programs for surveys. We used these programs to calculate the standard error (SE) of point estimates, odds ratios (OR), and 95% confidence intervals (95% CI) (Stata Press, 2003). We used the Bonferroni method to correct for multiple comparisons.

**Diagnostic and drug categories** We tabulated the most frequently cited diagnoses seen in dermatologists' practices and we grouped these ICD9-CM diagnosis codes according to the classification schema presented in Table I. This classification closely parallels the one we utilized in analyses of data from earlier survey years (U.S. Dept. of Health and Human Services, 2002a, b; Stern, 1986). We also quantified visits with a recommendation to use prescriptions for specific medications, which have been the focus of our prior analyses. These include topical retinoids, isotretinoin, and tetracyclines as well as selected other prescription agents which are widely promoted for dermatologic use (Stern, 1994, 1996).

DOI: 10.1046/j.1087-0024.2003.09108.x

Manuscript received May 15, 2003; revised August 14, 2003; accepted for publication August 26, 2003

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