ONLINE FIRST

Trends in Pediatric Psoriasis Outpatient Health Care Delivery in the United States

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Objective: To characterize patterns of childhood psoriasis health care delivery from 1979-2007.

Design: Retrospective, cross-sectional investigation using National Ambulatory Medical Care Survey data.

Setting: US ambulatory physician offices from 1979 through 2007.

Patients: Children with psoriasis ages 0 (birth) to 18 years.

Main Outcome Measures: Demographics, physician specialty, and medications prescribed.

Results: There were an estimated 3.8 million visits for psoriasis over the study interval with a median of 123 420 visits per year. Dermatologists saw 63% of patients, pediatricians saw 17%, and internists, 14%. The numbers of visits were equal between sexes but ranged by age group: patients ages 13 to 18 years accounted for 47% of visits, those ages 8 to 12 years for 35%, and those ages 0 to 7 for 18%. Ninety-three percent of patients were white. Topical corticosteroids were the most commonly prescribed medications. Children 0 to 9 years old received equally potent corticosteroids as children 10 to 18 years old. Among all patients, the most prescribed medication was topical betamethasone; among those ages 0 to 9 years, tacrolimus; and among those ages 10 to 18 years, betamethasone. By physician specialty, the most prescribed medications were high-potency steroids for dermatologists and internists, and topical tacrolimus for pediatricians. Topical calcineurin inhibitors were not among the top 20 most prescribed medications by dermatologists, and systemic antipsoriatic agents were not among the top 20 most prescribed medications in any age group.

Conclusions: Over the 28-year interval, outpatient visits for pediatric psoriasis were attended primarily by white children older than 8 years in equal number by sex. Dermatologists and pediatricians saw the majority, and treatment approach differed by physician specialty and patient age. Treatment guidelines for childhood psoriasis may help reduce treatment variability.

Arch Dermatol. 2012;148(1):66-71.
Published online September 19, 2011.
doi:10.1001/archdermatol.2011.263

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PSORIASIS IS A CHRONIC DISEASE affecting approximately 2.5% of the US population.[1-3] The prevalence of psoriasis in children ages 0 (birth) to 18 years is 1%, with an incidence of 40.8 per 100 000.[4] One-third of patients present with the first signs and symptoms by the age of 20 years.[4-6] The diagnosis of psoriasis is often straightforward and based on well-characterized clinical features.[7-9] Treatment is determined by disease acuity, morphologic characteristics, distribution, patient age, and the presence of comorbidities, such as psoriatic arthropathy.[10,11] Most pediatric patients present with mild, localized psoriasis that is treated primarily with topical medications, including corticosteroids and topical noncorticosteroid agents. Phototherapy and systemic medications are typically reserved for more extensive or refractory disease. Management of psoriasis in children can be challenging owing to a paucity of data and lack of standardized guidelines specific to the pediatric

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population. We have observed in our own institutions that practice patterns vary by physician specialty and patient age; thus, we sought to characterize the patterns of health care delivery for children with psoriasis in the United States from 1979 through 2007.

METHODS

We used data from the National Ambulatory Medical Care Survey (NAMCS) to assess visits for psoriasis in children. The NAMCS is de-

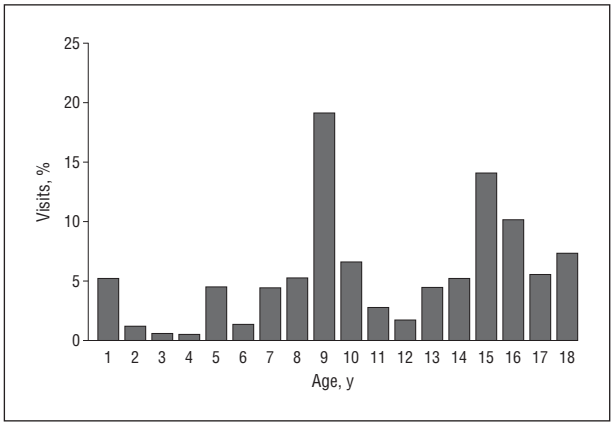

Figure 1. Distribution of visits by age. Patients 0 to 7 years of age accounted for a much smaller fraction of patients than preteens or teens.

signed to obtain data regarding outpatient visits in the United States from non–federally employed physicians. The National Center for Health Statistics analyzes these data using a multistage probability sample design that produces unbiased national estimates from outpatient clinic information. Each physician who participates in the NAMCS records information regarding the reason for the visit, diagnoses, services provided, medications prescribed, referral practices, and the demographic distribution for a randomized sample of patient visits during a randomized 1-week time period.

We analyzed NAMCS data from both dermatologists and nondermatologists over the 28-year interval including the years 1979 to 2007. The 1982-1984 and 1987-1988 periods are omitted because no data were collected in those years. A patient was included in the data analysis if "psoriasis" (*International Classification of Diseases, Ninth Revision,* code 696.1) was listed as 1 of up to 3 diagnoses for that visit. We also analyzed the cohort of patients for whom "psoriasis" was the only diagnosis listed for that visit.

Medications documented in the NAMCS data included medications currently taken by the patient, dispensed in the physician's office, or prescribed by the physician at that visit. To analyze psoriasis treatment patterns, we excluded visits in which the treatment did not correspond with the known or suspected psoriatic treatments or the handwriting was illegible. Phototherapy treatments were not assessed in this study because NAMCS data on procedural therapy may not be comparable with data on medication therapy. The NAMCS does not give data on severity or site of disease and generally does not provide information on formulation or vehicle except occasionally in the case of shampoos.

We tabulated the frequency of each medication in the NAMCS database, combining entries for the same drug listed under different generic and brand names. For combination drugs, such as Taclonex, we accounted for the individual components in the calculations (betamethasone and calcipotriene). All medications were assigned to 1 of 3 categories: topical corticosteroid (C), topical noncorticosteroid (N), or systemic (S). Topical corticosteroids were defined as those medications included in the National Drug Code directory drug class "topical steroids" (National Drug Code class No. 1268). Acitretin, sulfasalazine, cyclosporine, hydroxyurea, methotrexate, oxsoralen, prednisone, etanercept, and infliximab were designated as "systemic." In addition, all corticosteroid drugs were assigned a relative potency value from 1 (super potent) to 7 (very weak), as ranked by the Stoughton-Cornell vasoconstriction classification.[12] Within an individual visit for psoriasis, if more than 1 potency of corticosteroid was prescribed, the patient's mean corticosteroid potency was calculated. Linear regression accounting for the variability in the survey method was calculated using Statistical Analysis Software (SAS Institute Inc, Cary, North Carolina).

RESULTS

GENERAL CHARACTERISTICS AND DEMOGRAPHICS

There were more than 3.8 million visits estimated for psoriasis attended by children during the 28-year study period, with a median of 123 420 visits per year. The number of pediatric psoriasis visits did not change significantly over time ($P = .75$). The numbers of visits were equal between males and females. Most patients (93%) were white, and of these, 85% were non-Hispanic.

Characteristic	%
Sex	
Female	50.0
Male	50.0
Race	
White	92.8
Black	2.9
Asian/Pacific Islander	3.3
American Indian/Eskimo/Aleut	0.5
Other or not stated	0.4
Ethnicity	
Non-Hispanic	85.1
Hispanic	8.1
Other or not stated	6.8
Age at visit, mean, y	11.3

Children ages 13 to 18 years accounted for 47% of visits, those ages 8 to 12 years for 35%, and those ages 0 to 7 years for 18% (**Figure 1**). Dermatologists were responsible for most visits (63%), followed by pediatricians (17%) and internists (14%). The remaining 4% of visits were divided among other primary and specialty physicians.

TREATMENT

The most common medications prescribed overall were topical corticosteroids, which accounted for 7 of the top 10 most prescribed medications (**Tables 1**, **2**, **3**, and **4**). Betamethasone diproprionate, a high-potency topical corticosteroid, was the most listed medication for all children in the study, followed by fluocinonide (high potency) and fluocinolone acetonide (low to medium potency). The most common noncorticosteroid topical medications included a keratolytic (salicylic acid), vitamin D analog (calcipotriene), and coal tar (Table 2). Topical calcineurin inhibitors occupied the fifth position of most listed medication by class in the nonsteroidal group (Table 2), the second position by age in the 0- to 8-year-old group (Table 3), and the first (tacrolimus), and third (pimecrolimus) position by specialty among pediatricians (Table 4). Systemic antipsoriatic agents were not observed among the top 20 most listed medications by any physician group.

In the 0- to 8-year-old group, the most listed medication was topical betamethasone, followed by the topical calcineurin inhibitor tacrolimus, and the topical vi-

Table 1. Most Listed Medications Overall in 3.8 Million Visits for Psoriasis Treatment[a]

Frequency	Medication (Type)	Potency Class	%
1	Betamethasone (C)	2-4	10.2
2	Fluocinonide (C)	3	8.1
3	Fluocinolone (C)	6	4.0
4	Calcipotriene (N)	NA	3.8
5	Salicylic acid (N)	NA	3.6
6	Clobetasol (C)	1	3.0
7	Ketoconazole (N)	NA	3.0
8	Triamcinolone (C)	3-4	2.9
9	Hydrocortisone (C)	5-7	2.7
10	Mometasone (C)	3	2.2

Abbreviations: C, topical corticosteroid; N, topical noncorticosteroid; NA, not applicable; S, systemic.

[a] The most common medications used were high-potency corticosteroids. Steroids were 7 of the top 10 medications prescribed, and calcipotriene was the most common nonsteroidal treatment.

tamin D analog calcipotriene (Table 3). In the 9- to 18-year-old age group, the most listed medication was topical betamethasone, followed by the topical corticosteroids fluocinonide (high-potency) and fluocinolone (low-potency) (Table 3). Younger children (0-8 years) were prescribed topical corticosteroids equally potent as those prescribed to older children (9-18 years) with an average prescribed potency class of 4.0 and 3.5, respectively. This difference was not statistically significant. By specialty, the most listed medications were high-potency topical steroids for dermatologists and internists, and topical tacrolimus for pediatricians (Table 4).

Over the study period, topical corticosteroids consistently increased in usage, whereas over-the-counter medications sharply declined and then leveled off (**Figure 2**). From 1986 to 1995, noncorticosteroid topical agents were rarely prescribed; however, from 1995 onward an abrupt increase in prescriptions for nonsteroidal topical agents was noted. Prescriptions for biologic agents for pediatric psoriasis were rare and were not observed until after 2000.

COMMENT

This study confirms that pediatric psoriasis visits are frequent and represent a substantial burden of disease in the United States, validating the social, economic, and medical impact of this disease.[4] Our results demonstrated that dermatologists and pediatricians are the primary physicians for children with psoriasis and that treatment differs among physician groups and among children of different ages. When compared with data abstracted for adults from the same database,[13] our data also suggest that management differs between children and adults with psoriasis (Figure 2).

Over a 28-year period in the United States, 3.8 million office visits for pediatric psoriasis occurred, most of which were in children older than 8 years, with equal sex distribution. By age, adolescents (ages 13-18 years) accounted for most visits (47%). Although we do not have data on the clinical characteristics of these patients, this observation could be attributed to a number of factors, including increased disease severity, improved access, ease of diagnosis in older children who present classically (like adults), or visits prompted by the psychosocial ramifications of being a teenager with a potentially "public" and disfiguring skin affliction.[14] The relative decreased number of office visits by young children and preadolescents alternatively might be explained by the relative rarity of psoriasis in very young children, lack of recognition or confusion with other diagnoses, milder disease, or lack of significant impact on quality of life in this age group. In addition, the limited range of treatment options perceived as safe for young children may cause parents of young children to make just 1 visit and decline treatment, whereas older patients would get started on a course of therapy and make many follow-up visits. Many parents of young children sense danger as soon as they hear the word "steroid" and never return for another visit.[15]

Treatment modalities differed by patient age and physician specialty. Topical corticosteroids remain a first-line treatment for most presentations of psoriasis in children and adults, and, consistent with this, potent topical corticosteroids were the most commonly prescribed medications for children during the 28-year period of our study. Adult data reveal that the use of potent topical corticosteroids increased from 1986 to 2005 but has leveled off in recent years in lieu of newer topical and systemic therapies[13] (Figure 2). Our data showed that even younger children (ages 0-8 years) were most commonly treated with betamethasone, and there was no difference in steroid potency used in younger vs older children. These data may reflect that physicians are comfortable with the use of even potent topical corticosteroids for the treatment of psoriasis in children for areas that are typically resistant (like the scalp, knees, and elbows). However, we are concerned that frequent use of class I topical corticosteroids for psoriasis in children younger than 8 years may indicate that inappropriately strong topical corticosteroids may be prescribed to some patients. We found that children younger than 8 years were prescribed topical corticosteroids as potent as those prescribed to older children; in our experience, the highest potency topical corticosteroids are not commonly needed for psoriasis in young children. The use of inappropriately potent topical corticosteroids has been documented previously,[16] has the potential to cause adverse events, and may reflect the need for greater physician education in this area.

After topical corticosteroids, the next most commonly listed medications overall, as well as by class, included calcipotriene and salicylic acid. Calcipotriene represents an effective, evidence-based, nonsteroidal agent for the treatment of psoriasis, and its position as the second most prescribed medication in this study emphasizes its clinical utility and safety in children.[17] This is consistent with adult data, in which calcipotriene ranked in the top 2 most commonly prescribed medications from 1996 to 2005.[13] The approval of Dovonex (calcipotriene) by the US Food and Drug Administration (FDA)[16] in 1993 (Dovonex ointment), 1996 (Dovonex cream), and 1997 (Dovonex solution) likely played a substantial role in the sharp increase in prescriptions for nonsteroidal topical agents after 1995, as illustrated inFigure 2. Given its

Table 2. Most Listed Medications by Class in 3.8 Million Visits for Psoriasis Treatment

Frequency	Corticosteroids (Potency)	% Within Class	Noncorticosteroids	% Within Class	Systemic	% Within Class
1	Betamethasone (2-4)	10.5	Salicylic acid (N)	3.1	Hydroxyzine (S)	1.15
2	Fluocinonide (3)	7.0	Calcipotriene (N)	3.0	Methotrexate (S)	0.63
3	Fluocinolone (6)	4.1	Coal tar (N)	1.6	Diphenhydramine (S)	0.63
4	Hydrocortisone (5-7)	3.4	Ketoconazole (N)	1.4	Methoxsalen (S)	0.63
5	Triamcinolone (3-4)	3.4	Tacrolimus (N)	1.3	Methylprednisolone (S)	0.57
6	Mometasone (2-4)	1.7	Propylene glycol (N)	1.3	Acetaminophen (S)	0.57
7	Desonide (6)	1.7	Phenol mineral oil (N)	1.2	Interferon (S)	0.57
8	Diflorasone (2)	1.4	Anthralin (N)	1.0	Penicillin V (S)	0.56
9	Halcinonide (3)	0.9	Eucerin (N)	0.8	Alefacept (S)	0.56
10	Fluticasone (3-5)	0.8	Lactic acid (N)	0.8	Etanercept (S)	0.23

Abbreviations: C, topical corticosteroid; N, topical noncorticosteroid; S, systemic.

Table 3. Most Listed Medications by Age Group in 3.8 Million Visits for Psoriasis Treatment[a]

Frequency	Ages 0-8 y	% Within Group	Ages 9-18 y	% Within Group
1	Betamethasone (C)	10.9	Betamethasone (C)	9.6
2	Tacrolimus (N)	6.4	Fluocinonide (C)	8.1
3	Calcipotriene (N)	6.3	Salicylic acid (N)	5.9
4	Triamcinolone (C)	5.9	Fluocinolone (C)	4.8
5	Clobetasol (C)	5.8	Clobetasol (C)	3.6
6	Phenol mineral oil (N)	5.5	Triamcinolone (C)	3.2
7	Mometasone (C)	5.3	Calcipotriene (N)	3.2
8	Desonide (C)	4.5	Ketoconazole (N)	3.0
9	Ketoconazole (N)	4.1	Hydrocortisone (C)	2.7
10	Selenium sulfide (N)	3.15	Coal tar (N)	1.8

Abbreviations: C, topical corticosteroid; N, topical noncorticosteroid; S, systemic.
[a] High-potency corticosteroids were equally often prescribed for younger and older children.

Table 4. Most Listed Medications by Medical Specialty in 3.8 Million Visits for Psoriasis Treatment[a]

Frequency	Dermatologists	% Within Specialty	Pediatricians	% Within Specialty
1	Fluocinonide (C)	9.5	Tacrolimus (N)	23.6
2	Betamethasone (C)	7.1	Selenium sulfide (N)	11.7
3	Clobetasol (C)	7.0	Pimecrolimus (N)	9.4
4	Fluocinolone (C)	5.9	Diphenhydramine (S)	6.3
5	Salicylic acid (N)	5.3	Hydrocortisone (C)	6.3
6	Calcipotriene (N)	4.9	Mometasone (C)	3.8
7	Triamcinolone (C)	3.9	Amoxicillin (S)	1.8
8	Ketoconazole (N)	3.4	Ibuprofen (N)	0.1
9	Mometasone (C)	2.9		
10	Anthralin (N)	2.6		

Abbreviations: C, topical corticosteroid; N, topical noncorticosteroid; S, systemic.
[a] Most listed medications by medical specialty. Dermatologists frequently treated with high-potency corticosteroids, whereas pediatricians preferred topical calcineurin inhibitors and other nonsteroidal treatments.

documented widespread use among dermatologists and nondermatologists, education and guidance in regard to calcipotriene are important.[5,18-22]

Salicylic acid is a useful keratolytic agent for thick psoriatic plaques, and it was observed to be used more commonly in older children (> 9 years). This usage pattern may reflect an understanding of the risk of salicylism when used in infants or very young children whose high surface area–to-volume ratio increases the risk of percutaneous absorption.

Topical calcineurin inhibitors deserve special mention. Tacrolimus and pimecrolimus were approved by the FDA in 2000 and 2001, respectively,[16] and are currently indicated for second-line intermittent treatment of atopic dermatitis in patients 2 years or older (pimecrolimus and tacrolimus, 0.03%) and 15 years or older (tacrolimus, 0.1%). Neither is approved for psoriasis. The common use of these agents by pediatricians in this study represents a major change in practice since these agents became available on the US market in 2000 and likely ac-

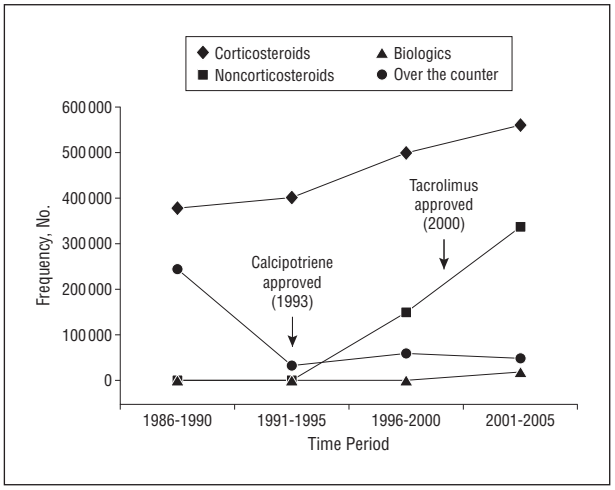

Figure 2. Trends in pediatric psoriasis medical treatment. Topical steroids were most commonly used for adults and children. Other topical treatments increased greatly over the past 10 years, especially in children. Systemic and biologic therapies were rarely used in children. The approval dates of calcipotriene and tacrolimus by the US Food and Drug Administration are noted on the timeline.

counts for the continued upward climb in prescriptions for nonsteroidal topical agents after 2000 as illustrated inFigure 2. The minimal use of topical calcineurin inhibitors by dermatologists for children with psoriasis is consistent with adult data through 2005. This use by nondermatologists and striking lack of use by dermatologists suggests emphasis on perceived safety over efficacy by nondermatologists and underlines another area in need of education and guidelines for children. For a brief list of potential adverse consequences in children resulting from inappropriate use of topical medications identified in this study, see **Figure 3**.

After topical steroids, ketoconazole shampoo was the third most commonly listed medication overall and occupied a top 10 position among dermatologists and in both age groups (0-8 and 9-18 years). Another antifungal shampoo, selenium sulfide, occupied the second most prescribed topical position by pediatricians. These data suggest, in agreement with the literature, that scalp involvement is very common in childhood psoriasis. It is possible that scalp involvement was mistaken for seborrheic dermatitis or that some patients had comorbid seborrhea. It is unlikely that scalp psoriasis was misdiagnosed as tinea capitis because systemic antifungal agents were not found in the top 10 most prescribed medications in any group by any physician.

Systemic antipsoriatic medications were used infrequently. Over the study period, oral antihistamines were the first (hydroxyzine) and third (diphenhydramine) most commonly prescribed systemic agents. One possible explanation for this finding is treatment of pruritus, a frequent feature of pediatric psoriasis.[5] Methotrexate and oxsoralen (presumably accompanied by UV-A treatment) represent 2 standard systemic treatments for psoriasis and were prescribed in less than 1% of patients overall. The use of oral oxsoralen is typically limited to patients older than 12 years, and even when data were analyzed according to age, oxsoralen still was not observed among the top 10 agents prescribed in the 9- to 18-year-old cohort throughout the study period. Conversely, in adults, systemic therapies were observed to increase by 110% from 1996 to 2005[13] (Figure 2). The disparity between the treatment of children and adults with psoriasis is clear, and several possible explanations exist. The most likely is undertreatment due to short- and long-term safety concerns in addition to lack of FDA labeling indications for pediatric psoriasis. The need for frequent clinical surveillance and blood monitoring while patients are taking systemic agents also creates challenges when treating children. These observations further highlight the need for additional collaborative research efforts and treatment guidelines for pediatric patients.

Potential Adverse Consequences

- Systemic absorption of topical corticosteroids in young children.
- In small children, calcipotriene use of greater than 45 g per week per square meter may influence serum ionized calcium levels.
- Salicylism when salicylic acid is used in infants or very young children whose high surface area to volume ratio increases the risk of percutaneous absorption.

Figure 3. Potential adverse consequences in children resulting from inappropriate use of topical medications identified in this study.

Although the NAMCS affords the possibility of examining large-scale data over a period of many years, the survey methodology does provide some limitations to our study. This study is based on the completion of uncompensated surveys conducted with busy professionals and relies on systematic extrapolation of visits.[23] We are unable to comment on the appropriateness of treatment because we do not know the clinical characteristics of psoriasis, sites of involvement, nor the vehicles used in the surveyed population. Based on NAMCS methodology, only office visits to non–federally employed physicians were included, which may result in ascertainment bias. However, given these limitations, to our knowledge this study remains the largest survey of health care delivery to the pediatric psoriasis population to date.

CONCLUSION

There is a discrepancy in treatment of children with psoriasis between specialties, children of different ages, and adults. Although these data may be biased toward milder or localized disease, the results suggest that pediatric patients with psoriasis, compared with adults, may be undertreated. The documented impairment of quality of life in children with psoriasis, together with recent data suggesting a potential increased risk of comorbid conditions, creates a compelling argument for adequately addressing all aspects of psoriasis management in children.[5,24] Although treatment guidelines specific to pediatric psoriasis would be useful, formal evidence on which to base such guidelines is not yet available. The current state-of-the-art care for pediatric psoriasis is based primarily on experience and expert consensus. Some differences in approach to management between dermatologists and nondermatologists seem due in part to the "art" of dermatology (choice of vehicle, potency, combination, and rotational therapy) and thus may not be reasonably an-

ticipated to change, even with standardized treatment guidelines. As such, education of our dermatology and nondermatology colleagues about unique clinical and treatment aspects of pediatric psoriasis, rather than guidelines alone, may decrease the treatment gap by creating more comfortable, safe, and effective use of topical and systemic regimens for children with psoriasis.

Accepted for Publication: July 1, 2011.
Published Online: September 19, 2011. doi:10.1001/archdermatol.2011.263
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Author Contributions: Ms Vogel and Drs Yentzer, Feldman, and Cordoro had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Vogel, Feldman, and Cordoro. *Acquisition of data:* Yentzer and Feldman. *Analysis and interpretation of data:* Vogel, Davis, Feldman, and Cordoro. *Drafting of the manuscript:* Vogel, Yentzer, Davis, and Cordoro. *Critical revision of the manuscript for important intellectual content:* Vogel, Davis, Feldman, and Cordoro. *Statistical analysis:* Vogel, Yentzer, Feldman, and Cordoro. *Study supervision:* Cordoro.
Financial Disclosure: None reported.

REFERENCES

1. Gelfand JM, Weinstein R, Porter SB, Neimann AL, Berlin JA, Margolis DJ. Prevalence and treatment of psoriasis in the United Kingdom: a population-based study. *Arch Dermatol*. 2005;141(12):1537-1541.
2. Christophers E. Psoriasis: epidemiology and clinical spectrum. *Clin Exp Dermatol*. 2001;26(4):314-320.
3. Stern RS, Nijsten T, Feldman SR, Margolis DJ, Rolstad T. Psoriasis is common, carries a substantial burden even when not extensive, and is associated with widespread treatment dissatisfaction. *J Investig Dermatol Symp Proc*. 2004;9(2):136-139.
4. Tollefson MM, Crowson CS, McEvoy MT, Maradit Kremers H. Incidence of psoriasis in children: a population-based study. *J Am Acad Dermatol*. 2010;62(6):979-987.
5. Benoit S, Hamm H. Childhood psoriasis. *Clin Dermatol*. 2007;25(6):555-562.
6. Raychaudhuri SP, Farber EM. The prevalence of psoriasis in the world. *J Eur Acad Dermatol Venereol*. 2001;15(1):16-17.
7. Griffiths CE, Christophers E, Barker JN, et al. A classification of psoriasis vulgaris according to phenotype. *Br J Dermatol*. 2007;156(2):258-262.
8. Mallbris L, Larsson P, Bergqvist S, Vingård E, Granath F, Ståhle M. Psoriasis phenotype at disease onset: clinical characterization of 400 adult cases. *J Invest Dermatol*. 2005;124(3):499-504.
9. Farber EM, Nall L. Childhood psoriasis. *Cutis*. 1999;64(5):309-314.
10. Cordoro KM. Systemic and light therapies for the management of childhood psoriasis: part II. *Skin Therapy Lett*. 2008;13(4):1-3.
11. Cordoro KM. Topical therapy for the management of childhood psoriasis: part I. *Skin Therapy Lett*. 2008;13(3):1-3.
12. Cornell RC, Stoughton RB. Correlation of the vasoconstriction assay and clinical activity in psoriasis. *Arch Dermatol*. 1985;121(1):63-67.
13. Strowd LC, Yentzer BA, Fleischer AB Jr, Feldman SR. Increasing use of more potent treatments for psoriasis. *J Am Acad Dermatol*. 2009;60(3):478-481.
14. Beattie PE, Lewis-Jones MS. A comparative study of impairment of quality of life in children with skin disease and children with other chronic childhood diseases. *Br J Dermatol*. 2006;155(1):145-151.
15. Feldman SR. *Practical Ways to Improve Patients' Treatment Outcomes*. Winston-Salem, NC: Medical Quality Enhancement Corp; 2009:45.
16. Railan D, Wilson JK, Feldman SR, Fleischer AB. Pediatricians who prescribe clotrimazole-betamethasone diproprionate (Lotrisone) often utilize it in inappropriate settings regardless of their knowledge of the drug's potency. *Dermatol Online J*. 2002;8(2):3.
17. Saggese G, Federico G, Battini R. Topical application of 1,25-dihydroxyvitamin D3 (calcitriol) is an effective and reliable therapy to cure skin lesions in psoriatic children. *Eur J Pediatr*. 1993;152(5):389-392.
18. Bourke JF, Mumford R, Whittaker P, et al. The effects of topical calcipotriol on systemic calcium homeostasis in patients with chronic plaque psoriasis. *J Am Acad Dermatol*. 1997;37(6):929-934.
19. Choi YJ, Hann SK, Chang SN, Park WH. Infantile psoriasis: successful treatment with topical calcipotriol. *Pediatr Dermatol*. 2000;17(3):242-244.
20. Darley CR, Cunliffe WJ, Green CM, Hutchinson PE, Klaber MR, Downes N. Safety and efficacy of calcipotriol ointment (Dovonex) in treating children with psoriasis vulgaris. *Br J Dermatol*. 1996;135(3):390-393.
21. Oranje AP, Marcoux D, Svensson A, et al. Topical calcipotriol in childhood psoriasis. *J Am Acad Dermatol*. 1997;36(2, pt 1):203-208.
22. Travis LB, Silverberg NB. Psoriasis in infancy: therapy with calcipotriene ointment. *Cutis*. 2001;68(5):341-344.
23. The 2000 NAMCS Micro-data file documentation. National Center for Health Statistics Web site. http://ftp.cdc.gov/pub/health_statistics/nchs/Dataset_Documentation/NAMCS/doc00.pdf. Accessed February 2010.
24. Augustin M, Glaeske G, Radtke MA, Christophers E, Reich K, Schäfer I. Epidemiology and comorbidity of psoriasis in children. *Br J Dermatol*. 2010;162(3):633-636.

PRACTICE GAPS

Prescribing Patterns by Dermatologists and Primary Care Providers for Pediatric Psoriasis

Psoriasis remains one of the most common chronic skin conditions encountered in childhood. Yet, clear treatment guidelines for this patient population are lacking. Based on the National Ambulatory Medical Care Survey (NAMCS), Vogel et al[1] identify 2 gaps in health care provider prescribing patterns: (1) pediatricians frequently prescribe nonsteroidal anti-inflammatory agents, particularly topical tacrolimus, rather than corticosteroid, for psoriasis; and (2) dermatologists treat children, regardless of age, with high-potency topical corticosteroids.

Ongoing steroid phobia among patients and health care providers likely contributes to the frequent prescription of topical noncorticosteroid agents by pediatricians from 1979 through 2007. The high utilization may be further fueled by the occurrence of facial involvement in 38% to 46% of affected pediatric patients and, at least later in the survey period, by the demonstration of efficacy of topical calcineurin inhibitors for facial psoriasis.[2,3] Unfortunately, the NAMCS data do not specific the site of topical application to test the contribution of facial vs nonfacial use. It would be interesting to assess pediatric utiliza-