
Dermatologist preferences for first-line therapy of moderate to severe psoriasis in healthy adult patients

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Background: Despite increasing therapies for moderate to severe psoriasis, dermatologists' treatment preferences are unknown.

Objective: We sought to assess dermatologists' preferences for first-line treatments and their selection determinants.

Methods: We surveyed 1000 US dermatologists (500 National Psoriasis Foundation and 500 American Academy of Dermatology members who treat psoriasis) about their preferences for first-line treatment of moderate to severe psoriasis in healthy adults of childbearing age using standardized patient vignettes.

Results: The response rate was 39% (N = 387). Preferred therapies for male and female patients were: ultraviolet (UV) B (40% and 56%, respectively), etanercept (15% and 19%), methotrexate (16% and 4%), and adalimumab (12% and 10%). Of respondents, 66% administered phototherapy in their practice. After adjusting for all physician characteristics, those preferring first-line UVB for male or female patients were significantly more likely to have phototherapy in their practice (odds ratio [OR] 3.4, 95% confidence interval [CI] 1.8-6.6 and OR 2.8, 95% CI 1.5-5.3, respectively) and to have used UVB in more than 10 patients in the last 3 months (OR 8.0, 95% CI 3.9-16.4; OR 9.6, 95% CI 4.3-21.6). Dermatologists in the Midwest were more likely than those in the Northeast to prefer adalimumab first line for male and female patients.

Limitations: We surveyed only dermatologists with interest in treating psoriasis and elicited their treatment preferences for a single base case scenario. Treatment preferences may differ between survey respondents and nonrespondents.

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Conclusion: UVB is most commonly preferred as a first-line treatment for moderate to severe psoriasis in healthy adults, and preferences vary based on region, phototherapy availability, and prior treatment use. (J Am Acad Dermatol 2012;66:376-86.)

Key words: biologic; comparative effectiveness; methotrexate; phototherapy; psoriasis; treatment preference; tumor necrosis factor inhibitor.

Psoriasis is a chronic, inflammatory disease of the skin and joints affecting 2% to 4% of the general population.^{1,2} An estimated 1.2 million patients with psoriasis in the United States have moderate to severe disease, and up to 3 million adult Americans have psoriasis but remain without a diagnosis by a physician.² Psoriasis, especially if more severe, may be a risk factor for systemic disorders including diabetes, myocardial infarction, stroke, and premature death.³⁻⁶

The treatment options for moderate to severe psoriasis have expanded dramatically in the last decade.⁷⁻¹¹ Despite the growing repertoire of treatments, insufficient data exist to determine which therapies are first, second, and third line. Numerous psoriasis treatment guidelines now exist and they variably differentiate (or do not differentiate at all) between first- and second-line treatment options based on cost, risk-benefit considerations, and expert opinion.¹²⁻¹⁸ Moreover, little is known about dermatologists' preferences for treating this disease. Such information is critical to further investigating the determinants of treatment selection and informing future comparative effectiveness studies, which have been identified as a priority by the US Institute of Medicine.¹⁹

The purpose of this study was therefore to describe US dermatologists' preferences for first-line treatment in healthy adults with moderate to severe psoriasis using patient vignettes, a well-accepted method for measuring variation and quality in clinical practice.²⁰⁻²²

METHODS

Study population and setting

We conducted a survey of 1000 practicing dermatologists across the United States; 500 were members of the National Psoriasis Foundation (NPF) randomly selected from the NPF list of 922 dermatologists

and the other 500 were American Academy of Dermatology (AAD) members randomly selected from the AAD list of 1417 dermatologists who had identified themselves as treating psoriasis.

Study design

We conducted a survey of US dermatologists as described above. The survey instrument (see online Appendix at <http://www.eblue.org>*) was developed by dermatologists expert in the care of psoriasis with

input from steering committee members of the Dermatology Clinical Effectiveness Research Network. First-line treatment preferences were assessed using two vignettes describing a typical healthy adult man or woman of childbearing age with moderate to severe psoriasis adapted from previously published vignettes.¹⁶ For each hypothetical patient, dermatologists were asked to select their first, second, and third choices for treatment from a list of 10 biologic, oral systemic, or phototherapies currently Food and Drug Administration approved for the treatment of psoriasis

(see Appendix). The order in which treatment choices were listed was randomized in 6 different ways to reduce bias.

We conducted the survey using a modified Dillman Tailored Design method^{23,24} of sending postcard reminders and duplicate surveys to nonrespondents and randomized survey packets to include one of 3 financial incentives.²⁵ The survey study was conducted from May to August 2010; all responses received within 15 weeks after the initial questionnaire mailing were included in the results.

Informed consent was obtained using the cover letter enclosed with the questionnaire. The study was

CAPSULE SUMMARY

- Despite increasing numbers of therapies for moderate to severe psoriasis, little is known about dermatologists' treatment preferences.
- Ultraviolet B is the most preferred first-line treatment in healthy adults of childbearing age. Preferences vary based on geographic region, phototherapy availability, and prior treatment use.
- Although we describe variations in preferences for treatment, additional studies are necessary to determine the cause of these variations and comparative effectiveness trials are necessary to discern how treatments should be used.

*DCERN survey instrument. Copyright © 2010 DCERN™. For commercial usage, please contact Joel M. Gelfand, MD, MSCE.

Abbreviations used:

AAD:	American Academy of Dermatology
CI:	confidence interval
NPF:	National Psoriasis Foundation
OR:	odds ratio
UV:	ultraviolet

approved by the University of Pennsylvania Institutional Review Board (protocol No. 810417; August 10, 2010) and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology statement.²⁶

Outcomes and covariates of interest

The primary outcome of interest was dermatologists' preferences for first-line treatment in patients with moderate to severe psoriasis, as indicated by the first-choice therapies selected in response to two vignettes. Information on sex and years in practice were obtained for all dermatologists surveyed using Vitals (<http://www.vitals.com/>, accessed July 26, 2010). We used the subjects' mailing addresses to determine their geographic region of practice as defined by the US Census Bureau (<http://www.census.gov/popest/geographic/>, accessed November 21, 2010). Additional respondent characteristics of interest were assessed directly via the questionnaire.

Study size

With a sample size of 1000, if 60% of respondents labeled an element as a key preference, then the width of the 95% confidence interval (CI) about that estimate would be 0.10, assuming a response rate of 40%.

Statistical analysis

Data were first summarized descriptively. Analyses of treatment preference were performed separately for the hypothetical male and female patients. Only the top 4 first-choice therapies were directly compared. We used Fisher exact tests for categorical variables and one-way analysis of variance or nonparametric Kruskal-Wallis tests for continuous variables. We also performed a series of logistic regressions to evaluate interactions among covariates determined a priori to be possible predictors of treatment preference. After including all a priori variables in the initial model, we used backward elimination to remove nonsignificant covariates one at a time if they did not alter the other main effects by more than 10% when excluded. The final models were assessed using the Hosmer-Lemeshow goodness-of-fit test, and data points with excessive residuals were excluded to improve goodness of fit.

We used two-sided tests of statistical significance ($\alpha = 0.05$) for all analyses. Statistical analyses were conducted using Stata (Version 10, StataCorp, College Station, TX).

RESULTS

Of the 1000 physicians surveyed, 6 were unreachable and 5 were considered ineligible for study inclusion because they were nondermatologists or not currently seeing patients. Of the remaining 989 dermatologists, 655 were male and 496 were NPF members. A total of 387 dermatologists returned the questionnaire, yielding a 39.1% response rate.

Data on sex, NPF or AAD membership status, number of years in practice, and region of practice were available for the sample population. After adjusting for all measured characteristics, survey respondents were similar to nonrespondents with respect to sex, duration of practice, and geographic region. NPF members were more likely to respond than AAD members (odds ratio 2.37, 95% CI 1.81-3.11). Response rates differed among the 3 incentive groups (results reported elsewhere),²⁵ but we observed no meaningful variations in the respondents' treatment preferences by incentive amount.

Physician characteristics

Survey respondents were mostly male (72%), NPF members (64%), and in private practice (70%) and represented all regions of the United States (Table D). Respondents had been in practice for a mean of 23.1 (SD 10.6) years and had treated a median of 30 (interquartile range 15-60) patients with moderate to severe psoriasis in the preceding 3 months. Of dermatologists, 66% administered phototherapy in their practice. Ultraviolet (UV) B, etanercept, methotrexate, and adalimumab were the treatments most heavily prescribed by responding dermatologists for their patients with psoriasis (Table I). Safety and efficacy were considered "extremely" or "very" important by more than 95% of respondents.

First-line treatment preferences

The most preferred treatments for moderate to severe psoriasis for the hypothetical healthy male and female patient of childbearing potential were: UVB (39.5% and 56.3%, respectively), etanercept (15.0% and 18.6%), methotrexate (15.8% and 4.4%), and adalimumab (11.6% and 9.6%) (Fig 1). In all, 31 (8%) respondents chose acitretin as first-line treatment for men, and one respondent selected it for women. Few dermatologists preferred ustekinumab (3.1% and

Table I. Baseline characteristics of survey respondents (N = 387)

Characteristic	n (%)
Sex	
Female	110 (28.42)
Male	277 (71.58)
NPF member	
Yes	246 (63.57)
No	141 (36.43)
Region of practice in United States	
Northeast	90 (23.26)
Midwest	90 (23.26)
South	135 (34.88)
West	72 (18.60)
Years in practice	
Overall mean (SD)	23.1 (10.6)
0-9	48 (12.40)
10-19	92 (23.77)
20-29	119 (30.75)
≥ 30	113 (29.20)
Missing	15 (3.88)
Practice type	
Academic	40 (10.34)
Multispecialty group practice	40 (10.34)
Private dermatology practice (size below)	272 (70.28)
Solo practice	133 (48.90)
<5 Dermatologists	97 (35.66)
≥ 5 Dermatologists	37 (13.60)
Missing	5 (1.84)
Department of Veterans Affairs	1 (0.26)
Staff model HMO (ie, Kaiser)	2 (0.52)
Other	8 (2.07)
Missing	24 (6.20)
Physician extender (ie, nurse practitioner, physician assistant) employed	
Yes	150 (38.76)
Treats patients on orals or biologics?	
Yes	106 (70.67)
No	35 (23.33)
Missing	9 (6.00)
No	229 (59.17)
Missing	8 (2.07)
Phototherapy administered by practice	
Yes	255 (65.89)
No	123 (31.78)
Missing	9 (2.33)
Infusion center affiliated with practice	
Yes	83 (21.45)
No	295 (76.23)
Missing	9 (2.33)
No. of patients with moderate to severe psoriasis treated in last 3 mo	
Median (IQR)	30 (15-60)
First quartile (0-15)	105 (27.13)

Continued

Table I. Cont'd

Characteristic	n (%)
Second quartile (16-30)	105 (27.13)
Third quartile (31-60)	78 (20.16)
Fourth quartile (60-999)	89 (23.00)
Missing	10 (2.58)
No. of patients treated with UVB in last 3 mo*	
≤ 10	267 (68.99)
>10	105 (27.13)
Missing	15 (3.88)
No. of patients treated with etanercept in last 3 mo*	
≤ 10	280 (72.35)
>10	90 (23.26)
Missing	17 (4.39)
No. of patients treated with adalimumab in last 3 mo*	
≤ 10	312 (80.62)
>10	62 (16.02)
Missing	13 (3.36)
No. of patients treated with methotrexate in last 3 mo*	
≤ 10	302 (78.04)
>10	67 (17.31)
Missing	18 (4.65)
Importance of treatment factors (1 = not at all, 5 = extremely)	
Safety	
Median (IQR) rating	5 (4-5)
Extremely important	254 (65.63)
Very important	119 (30.75)
Moderately important	8 (2.07)
Somewhat important	1 (0.26)
Not at all important	0 (0)
Missing	5 (1.29)
Efficacy	
Median (IQR) rating	5 (4-5)
Extremely important	224 (57.88)
Very important	155 (40.05)
Moderately important	3 (0.78)
Somewhat important	0 (0)
Not at all important	0 (0)
Missing	5 (1.29)
Cost to patient	
Median (IQR) rating	4 (3-4)
Extremely important	77 (19.90)
Very important	194 (50.13)
Moderately important	86 (22.22)
Somewhat important	21 (5.43)
Not at all important	1 (0.26)
Missing	8 (2.07)
Personal experience	
Median (IQR) rating	4 (3-4)
Extremely important	40 (10.34)
Very important	171 (44.19)
Moderately important	136 (35.14)

Continued

Table I. Cont'd

Characteristic	n (%)
Somewhat important	27 (6.98)
Not at all important	2 (0.52)
Missing	11 (2.84)
Ease of insurance approval	
Median (IQR) rating	4 (3-4)
Extremely important	66 (17.05)
Very important	142 (36.69)
Moderately important	120 (31.01)
Somewhat important	46 (11.89)
Not at all important	7 (1.81)
Missing	6 (1.55)
Ease of administration	
Median (IQR) rating	3 (3-4)
Extremely important	38 (9.82)
Very important	144 (37.21)
Moderately important	141 (36.43)
Somewhat important	50 (12.92)
Not at all important	6 (1.55)
Missing	8 (2.07)

HMO, Health maintenance organization; IQR, interquartile range; NPF, National Psoriasis Foundation; UV, ultraviolet.

*Use in >10 patients in last 3 mo is defined as "heavy" use.

1.3% for male and female patients, respectively), psoralen plus UVA (2.1% and 2.6%), cyclosporine (0% and 1.3%), alefacept (0.3% and 0.8%), or infliximab (0% and 0.3%) as first-line therapy.

Variations in treatment preference by physician characteristics—univariate analyses

We compared the top 4 first-line treatment preferences by several physician factors (Table II).

Compared with dermatologists in the South, those in the Northeast were significantly more likely to prefer UVB as first-line treatment for male and female patients (odds ratio 2.19, 95% CI 1.19-4.05 and odds ratio 2.13, 95% CI 1.12-4.03, respectively). Nearly 56% of dermatologists with phototherapy units in their practice selected UVB for first-line use in male patients, in contrast to only 29% of dermatologists without phototherapy in their practice. We observed similar differences for female patients. Compared with less frequent prescribers, dermatologists who were heavy UVB prescribers were also more likely to select UVB as their first-line therapy for both male and female patients. Furthermore, less frequent prescribers of etanercept, adalimumab, and methotrexate were significantly more likely to prefer UVB as first line compared with heavy users of etanercept, adalimumab, and methotrexate, respectively.

With respect to etanercept (Table II), factors associated with a significantly greater likelihood of

preferring etanercept as first-line treatment included absence of phototherapy in the practice, heavy etanercept use in recent months, and less frequent UVB use. Factors significantly associated with a greater likelihood of selecting adalimumab for first-line use included location in the Midwest as compared with the Northeast, heavy adalimumab use (for male patients only), and less frequent UVB use (Table II). Similarly, factors significantly associated with a greater likelihood of first-line preference for methotrexate included location in the West relative to the Northeast, heavy methotrexate use, and absence of phototherapy in practice (male patient only) (Table II).

Variations in treatment preference by physician characteristics—multivariate analyses

We performed a series of logistic regressions to generate descriptive models for UVB, etanercept, adalimumab, and methotrexate preference if at least 20 respondents selected the therapy as first line for male or female patients (Table III). The most significant physician characteristics independently associated with first-line preference for UVB were heavy use of UVB in the preceding 3 months and availability of phototherapy units in practices (Table III). Heavy use of etanercept or methotrexate was negatively associated with UVB preference. Male dermatologists were significantly more likely than female providers to select UVB for first-line use. As the importance of treatment cost increased, the likelihood of preferring UVB as first line for female patients also increased.

In the case of etanercept (Table III), factors significantly associated with a greater likelihood of preferring etanercept as first line included heavy etanercept use, less frequent UVB use, female dermatologist, lesser importance of cost (female patient only), and lesser importance of treatment safety (male patient only). Factors significantly associated with a greater likelihood of preferring first-line adalimumab included location in the Midwest as compared with the Northeast, less frequent UVB use, female dermatologist, lesser importance of cost (female patient only), and greater importance of efficacy (male patient only) (Table III). Lesser importance of treatment safety was also associated with greater (but not statistically significant) adalimumab preference (data not shown). With respect to methotrexate (Table III), the only factors significantly associated with a greater likelihood of preferring methotrexate as first line for male patients were heavy methotrexate use and absence of phototherapy units in the practice.

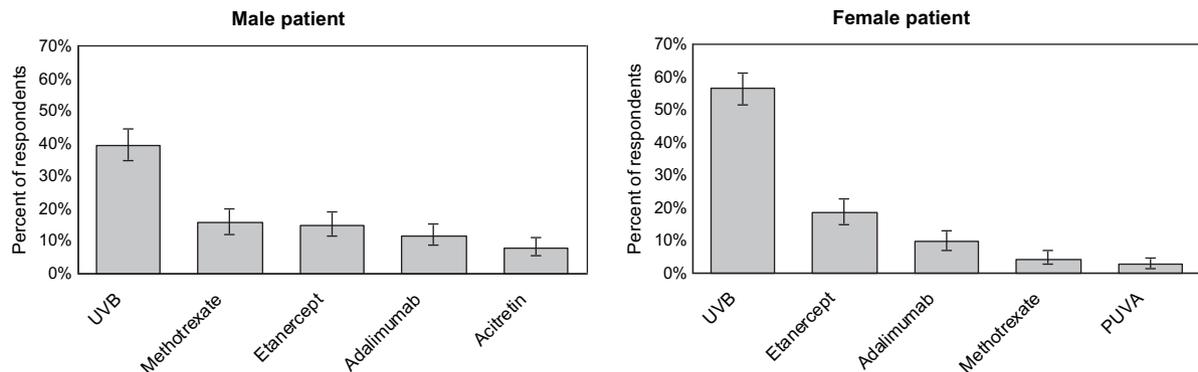


Fig 1. First-line treatment preferences for healthy adult with moderate to severe psoriasis. Error bars indicate 95% confidence interval. PUVA, Psoralen plus ultraviolet (UV) A.

DISCUSSION

The results of this descriptive study demonstrate several important findings. First, UVB is the most-preferred first-line treatment for both healthy male and female patients of childbearing potential by dermatologist respondents. The subcutaneously administered tumor necrosis factor inhibitors are the most preferred type of biologic, and methotrexate still remains highly preferred especially for male patients. Several, but not all, guidelines specifically recommend UVB as first-line treatment (ie, ahead of other options) for moderate to severe psoriasis.¹²⁻¹⁶ Nevertheless, the availability of phototherapy appears to be low relative to its preference as a first-line treatment, and phototherapy use is declining significantly across the United States.^{27,28}

Second, treatment preference is strongly associated with factors beyond the individual patient scenario such as several physician and practice characteristics, namely recent treatment use, availability of phototherapy, and geographic region of practice. Furthermore, just as regional variations exist in the treatment of other diseases such as breast cancer and myocardial infarction,^{29,30} geographic variations in first-line treatment preferences for psoriasis also exist. The driving forces behind regional variation and their implications for quality of care remain unknown and require future investigation.

Third, although treatment factors such as efficacy, safety, and cost were highly important to dermatologists, their effects on treatment preference were less uniform. Dermatologists who were increasingly concerned with safety were less likely to prefer etanercept first line (similar findings were also seen for adalimumab), perhaps reflecting concerns about the potential side effects of biologics.³¹ Greater importance of treatment efficacy was associated with a stronger preference for adalimumab, suggesting that adalimumab may be perceived as more efficacious.³²

It is possible that differences in importance of safety or efficacy were too small to be detected in our analyses as almost all survey respondents rated them extremely or very important. Interestingly, cost to the patient was a significant factor only for female patients; dermatologists were more likely to prefer UVB and less likely to prefer tumor necrosis factor inhibitors as first line if cost was more important.

As with all studies, there are limitations. First, the study design uses survey methods and is intended to be descriptive. Second, we used scripted case scenarios to elicit dermatologists' preferences; however, this is a well-accepted approach.^{21,22} Third, the generalizability of our results to dermatologists who are not members of NPF or self-identified as treating psoriasis as well those who did not respond to our survey is unknown. Nevertheless, our findings are still inherently important, as they represent the stated treatment preferences of hundreds of dermatologists from across the United States who actively treat patients with psoriasis. Finally, we did not adjust our analyses for multiple comparisons as this was a descriptive study.^{33,34}

To our knowledge, this report is one of the first nationwide studies of US dermatologists' preferences for treating moderate to severe psoriasis. Although we describe *preferences* for treatment use in this study, we cannot speak to how treatments *should* be used. To address this latter issue, large-scale, long-term head-to-head trials directly comparing phototherapy, biologics, and traditional oral treatments are necessary.³⁵⁻³⁸ Nevertheless, we do find that despite UVB being generally preferred as first-line treatment for moderate to severe psoriasis in healthy adults, treatment preferences still vary based on region of practice, phototherapy availability within practices, and prior treatment experience, suggesting that there is wide variation in preference unrelated to the patient's indication for treatment.

Table II. First-line treatment preferences by physician characteristic

Respondent characteristic	Male patient				<i>P</i> ^a	Female patient				<i>P</i> ^b
	UVB (N = 153) n (%)	Etanercept (N = 58) n (%)	Adalimumab (N = 45) n (%)	Methotrexate (N = 61) n (%)		UVB (N = 218) n (%)	Etanercept (N = 72) n (%)	Adalimumab (N = 37) n (%)	Methotrexate (N = 17) n (%)	
Sex										
Male	118 (50.86)	37 (15.95)	28 (12.07)	49 (21.12)	.045	162 (65.06)	45 (18.07)	26 (10.44)	16 (6.43)	.04
Female	35 (41.18)	21 (24.71)	17 (20.00)	12 (14.12)		56 (58.95)	27 (28.42)	11 (11.58)	1 (1.05)	
NPF member										
No	52 (45.22)	29 (25.22)	17 (14.78)	17 (14.78)	.08	70 (57.38)	31 (25.41)	14 (11.48)	7 (5.74)	.34
Yes	101 (50.00)	29 (14.36)	28 (13.86)	44 (21.78)		148 (66.67)	41 (18.47)	23 (10.36)	10 (4.50)	
Region of practice										
Northeast	45 (60.81)	18 (24.32)	1 (1.35)	10 (13.51)	.001	61 (76.25)	15 (18.75)	3 (3.75)	1 (1.25)	.01
Midwest	35 (46.05)	14 (18.42)	15 (19.74)	12 (15.79)		46 (56.10)	15 (18.29)	15 (18.29)	6 (7.32)	
South	46 (41.44)	18 (16.22)	24 (21.62)	23 (20.72)		74 (60.16)	32 (26.02)	14 (11.38)	3 (2.44)	
West	27 (48.21)	8 (14.29)	5 (8.93)	16 (28.57)		37 (62.71)	10 (16.95)	5 (8.47)	7 (11.86)	
Years in practice										
Mean (SD)	23.5 (11.3)	20.3 (8.8)	18.9 (9.7)	25.4 (11.4)	.01 [†]	23.8 (10.8)	20.7 (10.2)	20.8 (10.2)	21.6 (9.7)	.10 [†]
Practice type										
Academic	20 (54.05)	4 (10.81)	2 (5.41)	11 (29.73)	.03	26 (70.27)	4 (10.81)	3 (8.11)	4 (10.81)	.20
Private	105 (48.17)	43 (19.72)	37 (16.97)	33 (15.14)		151 (63.18)	51 (21.34)	28 (11.72)	9 (3.77)	
Multispecialty, VA, HMO, other	18 (40.91)	7 (15.91)	4 (9.09)	15 (34.09)		26 (55.32)	14 (29.79)	4 (8.51)	3 (6.38)	
Practice size (private practice only)										
Solo	44 (42.31)	21 (20.19)	18 (17.31)	21 (20.19)	.56	64 (57.14)	25 (22.32)	16 (14.29)	7 (6.25)	.36
<5 Dermatologists	40 (49.38)	17 (20.99)	15 (18.52)	9 (11.11)		58 (65.17)	20 (22.47)	10 (11.24)	1 (1.12)	
≥ 5 Dermatologists	18 (60.00)	5 (16.67)	4 (13.33)	3 (10.00)		26 (74.29)	6 (17.14)	2 (5.71)	1 (2.86)	
Physician extender										
No	91 (50.00)	32 (17.58)	21 (11.54)	38 (20.88)	.49	133 (67.17)	42 (21.21)	13 (6.57)	10 (5.05)	.04
Yes	59 (45.74)	25 (19.38)	22 (17.05)	23 (17.83)		81 (57.86)	30 (21.43)	23 (16.43)	6 (4.29)	
No psoriasis management	15 (50.00)	6 (20.00)	5 (16.67)	4 (13.33)	.90	24 (72.73)	7 (21.21)	2 (6.06)	0 (0)	.09
Psoriasis management	39 (42.86)	17 (18.68)	17 (18.68)	18 (19.78)		52 (52.53)	21 (21.21)	20 (20.20)	6 (6.06)	
Phototherapy										
No	26 (28.89)	25 (27.78)	14 (15.56)	25 (27.78)	<.001	49 (48.04)	32 (31.37)	16 (15.69)	5 (4.90)	.002
Yes	123 (55.66)	32 (14.48)	30 (13.57)	36 (16.29)		164 (69.49)	40 (16.95)	21 (8.90)	11 (4.66)	
Infusion										
No	114 (48.93)	46 (19.74)	32 (13.73)	41 (17.60)	.36	168 (65.12)	54 (20.93)	26 (10.08)	10 (3.88)	.34
Yes	34 (44.74)	11 (14.47)	11 (14.47)	20 (26.32)		44 (56.41)	18 (23.08)	10 (12.82)	6 (7.69)	
No. of patients with psoriasis treated in last 3 mo										
Median (IQR)	30 (15-50)	30 (15-71)	42.5 (20-100)	33 (18-80)	.21 [‡]	30 (10-50)	30 (20-90)	40 (20-100)	40 (20-75)	.03 [‡]

Heavy user of UVB [§]										
No	79 (37.80)	47 (22.49)	38 (18.18)	45 (21.53)	<.001	128 (54.94)	59 (25.32)	33 (14.16)	13 (5.58)	<.001
Yes	70 (72.92)	8 (8.33)	6 (6.25)	12 (12.50)		83 (83.84)	9 (9.09)	4 (4.04)	3 (3.03)	
Heavy user of etanercept [§]										
No	117 (52.47)	33 (14.80)	32 (14.35)	41 (18.39)	.02	169 (68.42)	40 (16.19)	28 (11.34)	10 (4.05)	.001
Yes	29 (35.80)	23 (28.40)	12 (14.81)	17 (20.99)		40 (47.62)	30 (35.71)	9 (10.71)	5 (5.95)	
Heavy user of adalimumab [§]										
No	131 (51.37)	50 (19.61)	29 (11.37)	45 (17.65)	.003	184 (65.95)	59 (21.15)	27 (9.68)	9 (3.23)	.01
Yes	18 (33.96)	6 (11.32)	15 (28.30)	14 (26.42)		28 (50.00)	11 (19.64)	10 (17.86)	7 (12.50)	
Heavy user of methotrexate [§]										
No	130 (53.50)	46 (18.93)	34 (13.99)	33 (13.58)	<.001	184 (67.65)	57 (20.96)	25 (9.19)	6 (2.21)	<.001
Yes	17 (28.33)	7 (11.67)	10 (16.67)	26 (43.33)		24 (41.38)	12 (20.69)	12 (20.69)	10 (17.24)	
Importance of treatment factors, ^{//} median (IQR)										
Safety	5 (4-5)	5 (4-5)	5 (4-5)	5 (4-5)	.73 [‡]	5 (4-5)	5 (4-5)	5 (4-5)	4 (4-5)	.41 [‡]
Efficacy	5 (4-5)	5 (4-5)	5 (4-5)	5 (4-5)	.62 [‡]	5 (4-5)	5 (4-5)	5 (4-5)	5 (4-5)	.62 [‡]
Cost to patient	4 (3-4)	4 (3-5)	4 (4-4)	4 (4-5)	.22 [‡]	4 (3-4)	4 (3-4)	4 (3-4)	4 (4-5)	.21 [‡]
Personal experience	4 (3-4)	4 (3-4)	4 (3-4)	4 (3-4)	.61 [‡]	4 (3-4)	4 (3-4)	4 (3-4)	4 (3-4)	.92 [‡]
Ease of insurance approval	3 (3-4)	4 (3-4)	4 (3-4)	4 (3-4)	.12 [‡]	4 (3-4)	4 (3-4)	4 (3-4)	4 (3-4)	.31 [‡]
Ease of administration	3 (3-4)	4 (3-4)	3 (2-4)	3 (3-4)	.02 [‡]	4 (3-4)	3 (3-4)	3 (3-4)	3 (3-4)	.59 [‡]

HMO, Health maintenance organization; IQR, interquartile range; NPF, National Psoriasis Foundation; UV, ultraviolet; VA, Department of Veterans Affairs.

*Fisher exact test.

†Analysis of variance test.

‡Kruskal-Wallis test.

§Use in >10 patients in last 3 mo.

//1 = not at all important, 5 = extremely important.

Table III. Series of logistic regression models predicting first-line treatment preference

Respondent characteristic	OR (95% CI)						
	Male patient				Female patient		
	UVB (N = 324)	Etanercept (N = 315)	Adalimumab (N = 317)	Methotrexate (N = 313)	UVB (N = 321)	Etanercept (N = 317)	Adalimumab (N = 310)
Male sex	1.94* (1.04-3.62)	0.39* (0.17-0.92)	0.31* (0.12-0.79)	1.51 (0.58-3.94)	1.94* (1.08-3.50)	0.44* (0.20-0.98)	0.30* (0.09-0.95)
NPF member	0.56 (0.31-1.01)	0.49 (0.22-1.10)	1.62 (0.69-3.81)	2.34 (0.99-5.54)	n/a	n/a	n/a
Region of practice (base: Northeast)							
Midwest	n/a	0.85 (0.27-2.62)	26.36 [†] (2.88-241.10)	0.53 (0.15-1.94)	0.55 (0.24-1.26)	1.38 (0.47-4.07)	19.54 [†] (2.86-133.57)
South		0.47 (0.18-1.27)	16.14* (1.89-138.14)	0.74 (0.24-2.32)	0.63 (0.30-1.36)	1.63 (0.63-4.23)	3.94 (0.61-25.32)
West		0.51 (0.15-1.79)	6.57 (0.64-67.69)	1.15 (0.34-3.83)	0.58 (0.24-1.40)	0.67 (0.20-2.20)	4.01 (0.53-30.22)
Years in practice (base: 0-9)							
10-19	0.44 (0.18-1.06)	0.95 (0.27-3.28)	1.19 (0.37-3.88)	2.04 (0.57-7.26)	n/a	0.96 (0.32-2.85)	0.86 (0.20-3.72)
20-29	0.71 (0.31-1.64)	1.18 (0.36-3.88)	1.33 (0.40-4.37)	0.35 (0.08-1.50)		1.02 (0.35-2.96)	1.37 (0.31-6.13)
≥ 30	0.70 (0.29-1.65)	0.41 (0.10-1.73)	0.61 (0.14-2.61)	2.26 (0.63-8.07)		0.81 (0.24-2.71)	0.71 (0.13-3.95)
Practice type (base: academic)							
Private practice	0.63 (0.27-1.49)	0.93 (0.21-4.15)	7.24* (1.08-48.43)	0.37 (0.10-1.36)	0.46 (0.16-1.35)	2.31 (0.57-9.36)	4.26 (0.56-32.45)
Multispecialty, VA, HMO, other	0.44 (0.15-1.29)	1.37 (0.26-7.12)	2.03 (0.26-16.02)	1.57 (0.41-5.97)	0.25* (0.08-0.78)	10.17 [†] (1.96-52.70)	1.27 (0.15-10.61)
Physician extender hired	n/a	0.78 (0.33-1.83)	1.34 (0.56-3.21)	n/a	n/a	n/a	5.89 [†] (1.95-17.80)
Phototherapy in practice	3.40 [‡] (1.75-6.62)	0.65 (0.27-1.58)	n/a	0.34* (0.14-0.81)	2.83 [†] (1.51-5.29)	0.48 (0.22-1.04)	0.50 (0.17-1.47)
Infusion center affiliation	n/a	1.30 (0.40-4.21)	3.68* (1.04-13.02)	0.73 (0.26-2.04)	0.79 (0.35-1.78)	n/a	4.92* (1.16-20.81)
No. of patients with psoriasis in last 3 mo (base: first quartile [0-15])							
Second quartile (16-30)	n/a	1.01 (0.36-2.82)	2.20 (0.71-6.84)	0.80 (0.25-2.51)	0.35 [†] (0.16-0.75)	2.43 (0.94-6.27)	3.80 (0.92-15.66)
Third quartile (31-60)		0.44 (0.13-1.52)	1.38 (0.38-4.99)	0.90 (0.27-3.02)	0.59 (0.26-1.36)	0.64 (0.20-2.02)	2.76 (0.61-12.53)
Fourth quartile (61-999)		0.39 (0.10-1.55)	2.07 (0.52-8.18)	0.62 (0.17-2.30)	0.29 [†] (0.12-0.72)	1.29 (0.40-4.20)	2.38 (0.47-11.95)
Heavy user of UVB [§]	7.97 [‡] (3.87-16.42)	0.22* (0.07-0.71)	0.22 [†] (0.07-0.68)	0.42 (0.15-1.20)	9.59 [‡] (4.25-21.63)	0.12 [‡] (0.04-0.35)	0.14* (0.03-0.65)
Heavy user of etanercept [§]	0.39* (0.17-0.89)	58.56 [‡] (13.35-256.88)	0.52 (0.13-2.12)	1.50 (0.48-4.69)	0.26 [†] (0.11-0.59)	31.75 [‡] (9.68-104.14)	0.27 (0.06-1.27)
Heavy user of adalimumab [§]	0.54 (0.21-1.36)	0.21* (0.05-0.89)	3.89 (0.86-17.65)	2.05 (0.54-7.76)	n/a	0.35 (0.11-1.17)	n/a
Heavy user of methotrexate [§]	0.38* (0.16-0.86)	0.37 (0.10-1.40)	n/a	5.78 [‡] (2.18-15.36)	0.27 [†] (0.12-0.61)	0.34* (0.12-0.98)	9.55 [†] (2.42-37.73)
Importance of safety	n/a	0.46* (0.23-0.91)	n/a	n/a	n/a	0.58 (0.31-1.06)	n/a
Importance of efficacy	n/a	n/a	2.43* (1.03-5.71)	0.58 (0.29-1.18)	n/a	n/a	2.56 (0.96-6.83)
Importance of cost to patient	n/a	0.70 (0.37-1.31)	0.99 (0.53-1.83)	1.61 (0.90-2.89)	2.12 [‡] (1.39-3.24)	0.39 [†] (0.23-0.67)	0.32 [†] (0.15-0.68)
Importance of personal experience	n/a	n/a	1.04 (0.57-1.87)	1.05 (0.62-1.77)	0.86 (0.60-1.23)	n/a	1.34 (0.70-2.59)
Importance of insurance approval	0.73 (0.53-1.01)	1.54 (0.90-2.63)	1.44 (0.87-2.41)	0.72 (0.46-1.12)	0.73 (0.52-1.01)	1.91 [†] (1.23-2.96)	1.29 (0.74-2.26)
Importance of ease of administration	1.30 (0.90-1.87)	1.72 (0.99-2.98)	0.49* (0.27-0.88)	n/a	n/a	n/a	n/a

CI, Confidence interval; HMO, Health maintenance organization; n/a, not applicable; NPF, National Psoriasis Foundation; OR, odds ratio; UV, ultraviolet; VA, Department of Veterans Affairs.

* $P < .05$.

[†] $P < .01$.

[‡] $P < .001$.

[§]Use of particular therapy in >10 patients in last 3 mo.

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**APPENDIX. QUESTIONNAIRE ITEM
ASSESSING TREATMENT PREFERENCES
FOR MODERATE TO SEVERE PSORIASIS***

For each of the following patients, please choose the treatment you would be most likely to prescribe, assuming that all of the options are readily available and cost to the patient and insurance approval are not major issues. We understand that many factors affect prescription practices, but given the general scenario and information presented here please rank the first, second, and third treatments you would prescribe if you were required to choose.

A healthy adult **male** presents to you with chronic stable plaque-type psoriasis vulgaris covering >10% of his body surface area. He has not responded adequately to prior topical treatments and his psoriasis affects his quality of life.

What would you prescribe? Please rank your top 3 choices by filling in one circle in each column below*:

Treatment	First choice (choose one)	Second choice (choose one)	Third choice (choose one)
Phototherapy (PUVA)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Phototherapy (UVB)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Acitretin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cyclosporine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Methotrexate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adalimumab	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alefacept	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Etanercept	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infliximab	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ustekinumab	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PUVA, Psoralen plus ultraviolet A; UV, ultraviolet. Treatment order was randomized in 6 different ways to reduce bias.

A healthy adult **female** of childbearing age presents to you with chronic stable plaque-type psoriasis vulgaris covering >10% of her body surface area. She has not responded adequately to prior topical treatments and her psoriasis affects her quality of life.

What would you prescribe? Please rank your top 3 choices by filling in one circle in each column below*:

Treatment	First choice (choose one)	Second choice (choose one)	Third choice (choose one)
Phototherapy (PUVA)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Phototherapy (UVB)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Acitretin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cyclosporine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Methotrexate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adalimumab	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alefacept	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Etanercept	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infliximab	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ustekinumab	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (Please specify):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PUVA, Psoralen plus ultraviolet A; UV, ultraviolet. Treatment order was randomized in 6 different ways to reduce bias.

*Complete questionnaire is available by request from corresponding author.