



Published in final edited form as:

J Am Acad Dermatol. 2012 March ; 66(3): 376–386. doi:10.1016/j.jaad.2011.03.012.

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

Joy Wan, BA¹, Katrina Abuabara, MD¹, Andrea B. Troxel, ScD^{2,3}, Daniel B. Shin, BA^{1,3}, Abby S. Van Voorhees, MD^{1,4}, Bruce F. Bebo Jr, PhD⁴, Gerald G. Krueger, MD⁵, Kristina Callis Duffin, MD⁵, and Joel M. Gelfand, MD, MSCE^{1,2,3}

¹Department of Dermatology, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA

²Center for Clinical Epidemiology and Biostatistics, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA

³Department of Epidemiology and Biostatistics, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania, USA

⁴National Psoriasis Foundation, Portland, Oregon, USA

⁵Department of Dermatology, University of Utah School of Medicine, Salt Lake City, Utah, USA

Abstract

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 U.S. dermatologists (500 National Psoriasis Foundation and 500 American Academy of Dermatology members who treat psoriasis) about their preferences for

© 2011 American Academy of Dermatology, Inc. Published by Mosby, Inc. All rights reserved.

CORRESPONDENCE Joel M. Gelfand, 1471 Penn Tower, One Convention Avenue, Philadelphia, PA 19104, USA. Telephone: 215-614-0635, Fax: 215-746-6370, Joel.Gelfand@uphs.upenn.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

CONFLICTS OF INTEREST

Dr. Van Voorhees served on the advisory board of and was an investigator and speaker for Amgen and Genentech, receiving honoraria and grants; was a consultant for Incyte, Leo, VGX, and Xtrac, receiving honoraria; served on the advisory board and was a speaker for Abbott, Centocor, and Connetics, receiving honoraria; served on the advisory board and was an investigator for Bristol Myers Squibb and Warner Chilcott, receiving honoraria and grants; was an investigator for Astellas, IDEC, and Roche, receiving grants; served as a consultant for Amgen; and received honoraria from Synta. Dr. Bebo has had relationships with Abbott, Amgen, Astellas, Centocor, Galderma, Genentech, PhotoMedix, Stiefel/GSK, Warner Chilcott, and Wyeth, receiving other financial benefits. Dr. Callis Duffin was an investigator, consultant, and speaker for Abbott, Amgen, and Centocor, receiving honoraria and salary; served on the advisory board of Amgen; and received residency/fellowship program funding from Abbott and Amgen. Dr. Gelfand served as consultant and investigator with Abbott, Amgen, Centocor, Genentech, Novartis, and Pfizer, receiving grants and honoraria; was a consultant with Celgene, Covance, Galderma, Shire Pharmaceuticals, and Wyeth, receiving honoraria; and was an investigator with Shionogi, receiving grants. Drs. Abuabara, Krueger, and Troxel, Mr. Shin, and Ms. Wan have no conflicts of interest to declare.

STATEMENT ON PRIOR PRESENTATION

The data have not been presented previously.

REPRINT REQUESTS

Joel M. Gelfand, MD, MSCE, 1471 Penn Tower, One Convention Avenue, Philadelphia, PA 19104. Joel.Gelfand@uphs.upenn.edu

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: UVB (40% and 56%, respectively), etanercept (15%, 19%), methotrexate (16%, 4%), and adalimumab (12%, 10%). Sixty-six percent of respondents administered phototherapy in their practice. After adjusting for all physician characteristics, those preferring first-line UVB for males or females 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 males and females.

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 non-respondents.

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.

Keywords

psoriasis; treatment preference; first-line treatment; phototherapy; UVB; tumor necrosis factor inhibitor; methotrexate; comparative effectiveness; survey

INTRODUCTION

Psoriasis is a chronic, inflammatory disease of the skin and joints affecting 2–4% of the general population.^{1,2} An estimated 1.2 million psoriasis patients in the U.S. have moderate-to-severe disease, and up to 3 million adult Americans have psoriasis but remain undiagnosed 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 U.S. Institute of Medicine.¹⁹

The purpose of this study was therefore to describe U.S. 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 U.S.; five hundred were members of the National Psoriasis Foundation (NPF) randomly selected from the NPF's list

of 922 dermatologists and the other 500 were American Academy of Dermatology (AAD) members randomly selected from the AAD's list of 1417 dermatologists who had identified themselves as treating psoriasis.

Study design

We conducted a survey of U.S. dermatologists as described above. The survey instrument (see online appendix) was developed by dermatologists expert in the care of psoriasis with input from steering committee members of the Dermatology Clinical Effectiveness Research Network (DCERN). First-line treatment preferences were assessed using two vignettes describing a "typical" healthy adult male or female 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 (FDA)-approved for the treatment of psoriasis (see appendix). The order in which treatment choices were listed was randomized in six 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 non-respondents and randomized survey packets to include one of three financial incentives.²⁵ The survey study was conducted from May 2010 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 approved by the University of Pennsylvania Institutional Review Board (protocol no. 810417; August 10, 2010) and reported in accordance with the STROBE 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 26 July 2010). We used the subjects' mailing addresses to determine their geographical region of practice as defined by the U.S. Census Bureau (<http://www.census.gov/popest/geographic/>, accessed 21 November 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 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 four first-choice therapies were directly compared. We used Fisher's exact tests for categorical variables and one-way analysis of variance (ANOVA) 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 non-significant 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 in order 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/IC10 (College Station, TX).

RESULTS

Of the 1000 physicians surveyed, six were unreachable and five were considered ineligible for study inclusion because they were non-dermatologists or not currently seeing patients. Of the remaining 989 dermatologists, 655 were males and 496 were NPF members. Three hundred eighty-seven 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 non-respondents with respect to sex, duration of practice, and geographic region. NPF members were more likely to respond than AAD members (odds ratio (OR) 2.37, 95% confidence interval (CI) 1.81–3.11). Response rates differed among the three 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 U.S. (Table I). Respondents had been in practice for a mean of 23.1 (standard deviation (SD) 10.6) years and had treated a median of 30 (interquartile range (IQR) 15–60) patients with moderate-to-severe psoriasis in the preceding 3 months. Sixty-six percent of dermatologists administered phototherapy in their practice. UVB, etanercept, methotrexate, and adalimumab were the treatments most heavily prescribed by responding dermatologists for their psoriasis patients (Table I). Safety and efficacy were considered “extremely” or “very” important by over 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 child-bearing potential were: UVB (39.5% and 56.3%, respectively), etanercept (15.0%, 18.6%), methotrexate (15.8%, 4.4%), and adalimumab (11.6%, 9.6%) (Figure 1). Thirty-one (8%) respondents chose acitretin as first-line treatment for males, and one respondent selected it for females. Few dermatologists preferred ustekinumab (3.1% and 1.3% for males and females, respectively), PUVA (2.1%, 2.6%), cyclosporine (0%, 1.3%), alefacept (0.3%, 0.8%) or infliximab (0%, 0.3%) as first-line therapy.

Variations in treatment preference by physician characteristics – univariate analyses

We compared the top four first-line treatment preferences by several physician factors (Table II). Compared to dermatologists in the South, those in the Northeast were significantly more likely to prefer UVB as first-line treatment for males and females (OR 2.19, 95% CI 1.19–4.05 and OR 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 males, in contrast to only 29% of dermatologists without phototherapy in their practice. We observed similar differences for female patients. Compared to less frequent prescribers, dermatologists who were heavy UVB prescribers were also more likely to select UVB as their first-line therapy for both males and females. Furthermore, less frequent prescribers of

etanercept, adalimumab, and methotrexate were significantly more likely to prefer UVB as first-line compared to 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 to the Northeast, heavy adalimumab use (for male patient 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 three 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 females 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 to 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 males were heavy methotrexate use and absence of phototherapy units in the practice.

DISCUSSION

The results of this descriptive study demonstrate several important findings. First, UVB is the most-preferred first-line treatment for both healthy males and females of childbearing potential by dermatologist respondents. The subcutaneously-administered TNF-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 (i.e. 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 utilization is declining significantly across the U.S.^{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 geographical region of practice.

Furthermore, just as regional variations exist in the treatment of other diseases such as breast cancer and myocardial infarction,^{29, 30} geographical variations in first-line treatment preferences for psoriasis also exist. The driving forces behind regional variation as well as 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 TNF-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 U.S. 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 nation-wide studies of U.S. dermatologists' preferences for treating moderate-to-severe psoriasis. While 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.

Acknowledgments

FUNDING SOURCES

This work was supported by grants from NIAMS RC1-AR058204 (JMG), the Doris Duke Clinical Research Fellowship (KA), and NIH Training Grant T32-AR07465 (JW).

ABBREVIATIONS

| | |
|--------------|---|
| AAD | American Academy of Dermatology |
| ANOVA | analysis of variance |
| CI | confidence interval |
| DCERN | Dermatology Clinical Effectiveness Research Network |
| FDA | Food and Drug Administration |
| HIV | human immunodeficiency virus |

| | |
|-------------|-------------------------------|
| IQR | interquartile range |
| NPF | National Psoriasis Foundation |
| OR | odds ratio |
| PUVA | psoralen plus ultraviolet A |
| SD | standard deviation |
| TNF | tumor necrosis factor |
| UVB | ultraviolet B |

REFERENCES

1. 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 Invest Dermatol Symp Proc*. 2004; 9:136–139.
2. Kurd SK, Gelfand JM. The prevalence of previously diagnosed and undiagnosed psoriasis in US adults: results from NHANES 2003–2004. *J Am Acad Dermatol*. 2009; 60:218–224. [PubMed: 19022533]
3. Griffiths CE, Barker JN. Pathogenesis and clinical features of psoriasis. *Lancet*. 2007; 370:263–271. [PubMed: 17658397]
4. Gelfand JM, Neimann AL, Shin DB, Wang X, Margolis DJ, Troxel AB. Risk of myocardial infarction in patients with psoriasis. *JAMA*. 2006; 296:1735–1741. [PubMed: 17032986]
5. Gelfand JM, Troxel AB, Lewis JD, Kurd SK, Shin DB, Wang X, et al. The risk of mortality in patients with psoriasis: results from a population-based study. *Arch Dermatol*. 2007; 143:1493–1499. [PubMed: 18086997]
6. Abuabara K, Azfar RS, Shin DB, Neimann AL, Troxel AB, Gelfand JM. Cause-specific mortality in patients with severe psoriasis: a population-based cohort study in the U.K. *Br J Dermatol*. 2010; 163:586–592. [PubMed: 20633008]
7. Chaudhari U, Romano P, Mulcahy LD, Dooley LT, Baker DG, Gottlieb AB. Efficacy and safety of infliximab monotherapy for plaque-type psoriasis: a randomised trial. *Lancet*. 2001; 357:1842–1847. [PubMed: 11410193]
8. Ellis CN, Krueger GG. Treatment of chronic plaque psoriasis by selective targeting of memory effector T lymphocytes. *N Engl J Med*. 2001; 345:248–255. [PubMed: 11474662]
9. Leonardi CL, Powers JL, Matheson RT, Goffe BS, Zitnik R, Wang A, et al. Etanercept as monotherapy in patients with psoriasis. *N Engl J Med*. 2003; 349:2014–2022. [PubMed: 14627786]
10. Leonardi CL, Kimball AB, Papp KA, Yeilding N, Guzzo C, Wang Y, et al. Efficacy and safety of ustekinumab, a human interleukin-12/23 monoclonal antibody, in patients with psoriasis: 76-week results from a randomised, double-blind, placebo-controlled trial (PHOENIX 1). *Lancet*. 2008; 371:1665–1674. [PubMed: 18486739]
11. Menter A, Tyring SK, Gordon K, Kimball AB, Leonardi CL, Langley RG, et al. Adalimumab therapy for moderate to severe psoriasis: A randomized, controlled phase III trial. *J Am Acad Dermatol*. 2008; 58:106–115. [PubMed: 17936411]
12. Menter A, Gottlieb A, Feldman SR, Van Voorhees AS, Leonardi CL, Gordon KB, et al. Guidelines of care for the management of psoriasis and psoriatic arthritis: Section 1. Overview of psoriasis and guidelines of care for the treatment of psoriasis with biologics. *J Am Acad Dermatol*. 2008; 58:826–850. [PubMed: 18423260]
13. Menter A, Korman NJ, Elmets CA, Feldman SR, Gelfand JM, Gordon KB, et al. Guidelines of care for the management of psoriasis and psoriatic arthritis: section 4. Guidelines of care for the management and treatment of psoriasis with traditional systemic agents. *J Am Acad Dermatol*. 2009; 61:451–485. [PubMed: 19493586]
14. Menter A, Korman NJ, Elmets CA, Feldman SR, Gelfand JM, Gordon KB, et al. Guidelines of care for the management of psoriasis and psoriatic arthritis: Section 5. Guidelines of care for the

- treatment of psoriasis with phototherapy and photochemotherapy. *J Am Acad Dermatol.* 2010; 62:114–135. [PubMed: 19811850]
15. Pathirana D, Ormerod AD, Saiag P, Smith C, Spuls PI, Nast A, et al. European S3-guidelines on the systemic treatment of psoriasis vulgaris. *J Eur Acad Dermatol Venereol.* 2009; 23 Suppl 2:1–70. [PubMed: 19712190]
 16. Van Voorhees, AS.; Feldman, SR.; Koo, JY.; Lebwohl, MG.; Menter, A. The psoriasis and psoriatic arthritis pocket guide: treatment algorithms and management options. Portland, OR: National Psoriasis Foundation; 2009.
 17. Smith CH, Anstey AV, Barker JN, Burden AD, Chalmers RJ, Chandler D, et al. British Association of Dermatologists guidelines for use of biological interventions in psoriasis 2005. *Br J Dermatol.* 2005; 153:486–497. [PubMed: 16120132]
 18. Nast A, Kopp IB, Augustin M, Banditt KB, Boehncke WH, Follmann M, et al. Evidence-based (S3) guidelines for the treatment of psoriasis vulgaris. *J Dtsch Dermatol Ges.* 2007; 5 Suppl 3:1–119. [PubMed: 17615051]
 19. Institute of Medicine. Initial national priorities for comparative effectiveness research. Washington, DC: The National Academies Press; 2009.
 20. Peabody JW, Luck J, Glassman P, Dresselhaus TR, Lee M. Comparison of vignettes, standardized patients, and chart abstraction: a prospective validation study of 3 methods for measuring quality. *JAMA.* 2000; 283:1715–1722. [PubMed: 10755498]
 21. Peabody JW, Luck J, Glassman P, Jain S, Hansen J, Spell M, et al. Measuring the quality of physician practice by using clinical vignettes: a prospective validation study. *Ann Intern Med.* 2004; 141:771–780. [PubMed: 15545677]
 22. Veloski J, Tai S, Evans AS, Nash DB. Clinical vignette-based surveys: a tool for assessing physician practice variation. *Am J Med Qual.* 2005; 20:151–157. [PubMed: 15951521]
 23. Dillman, DA. Mail and telephone surveys: the total design method. New York: Wiley; 1978.
 24. Dillman, DA. Mail and Internet surveys: the tailored design method. New York: J. Wiley; 2000.
 25. Wan J, Abuabara K, Shin DB, Troxel AB, Bebo BF Jr, Gelfand JM. Dermatologist response rates to a mailed questionnaire: a randomized trial of monetary incentives. Submitted for review.
 26. von Elm E, Altman DG, Egger M, Pocock SJ, Gotszche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *J Clin Epidemiol.* 2008; 61:344–349. [PubMed: 18313558]
 27. Housman TS, Rohrbach JM, Fleischer AB Jr, Feldman SR. Phototherapy utilization for psoriasis is declining in the United States. *J Am Acad Dermatol.* 2002; 46:557–559. [PubMed: 11907508]
 28. Simpson GL, Yelverton CB, Rittenberg S, Feldman SR. Do utilization management controls for phototherapy increase the prescription of biologics? *J Dermatolog Treat.* 2006; 17:359–361. [PubMed: 17853310]
 29. Sariago J. Regional variation in breast cancer treatment throughout the United States. *Am J Surg.* 2008; 196:572–574. [PubMed: 18809065]
 30. Krumholz HM, Chen J, Rathore SS, Wang Y, Radford MJ. Regional variation in the treatment and outcomes of myocardial infarction: investigating New England's advantage. *Am Heart J.* 2003; 146:242–249. [PubMed: 12891191]
 31. Dommasch ED, Abuabara K, Shin DB, Nguyen J, Troxel AB, Gelfand JM. The risk of infection and malignancy with tumor necrosis factor antagonists in adult patients with psoriatic disease: a systematic review and meta-analysis of randomized controlled trials. *Journal of the American Academy of Dermatology.* In press.
 32. Schmitt J, Zhang Z, Wozel G, Meurer M, Kirch W. Efficacy and tolerability of biologic and nonbiologic systemic treatments for moderate-to-severe psoriasis: meta-analysis of randomized controlled trials. *Br J Dermatol.* 2008; 159:513–526. [PubMed: 18627372]
 33. Perneger TV. What's wrong with Bonferroni adjustments. *BMJ.* 1998; 316:1236–1238. [PubMed: 9553006]
 34. Savitz DA, Olshan AF. Describing data requires no adjustment for multiple comparisons: a reply from Savitz and Olshan. *Am J Epidemiol.* 1998; 147:813–814. [PubMed: 9583710]

35. Flytstrom I, Stenberg B, Svensson A, Bergbrant IM. Methotrexate vs. ciclosporin in psoriasis: effectiveness, quality of life and safety. A randomized controlled trial. *Br J Dermatol.* 2008; 158:116–121. [PubMed: 17986302]
36. Griffiths CE, Strober BE, van de Kerkhof P, Ho V, Fidelus-Gort R, Yeilding N, et al. Comparison of ustekinumab and etanercept for moderate-to-severe psoriasis. *N Engl J Med.* 2010; 362:118–128. [PubMed: 20071701]
37. Heydendael VM, Spuls PI, Opmeer BC, de Borgie CA, Reitsma JB, Goldschmidt WF, et al. Methotrexate versus cyclosporine in moderate-to-severe chronic plaque psoriasis. *N Engl J Med.* 2003; 349:658–665. [PubMed: 12917302]
38. Saurat JH, Stingl G, Dubertret L, Papp K, Langley RG, Ortonne JP, et al. Efficacy and safety results from the randomized controlled comparative study of adalimumab vs. methotrexate vs. placebo in patients with psoriasis (CHAMPION). *Br J Dermatol.* 2008; 158:558–566. [PubMed: 18047523]

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 three choices by filling in one circle in each column below:

| Treatment | 1 st Choice (choose one) | 2 nd Choice (choose one) | 3 rd 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"/> |

A healthy adult *female* of child-bearing 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 three choices by filling in one circle in each column below:

| Treatment | 1 st Choice (choose one) | 2 nd Choice (choose one) | 3 rd 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"/> |

*Complete questionnaire is available by request from the corresponding author

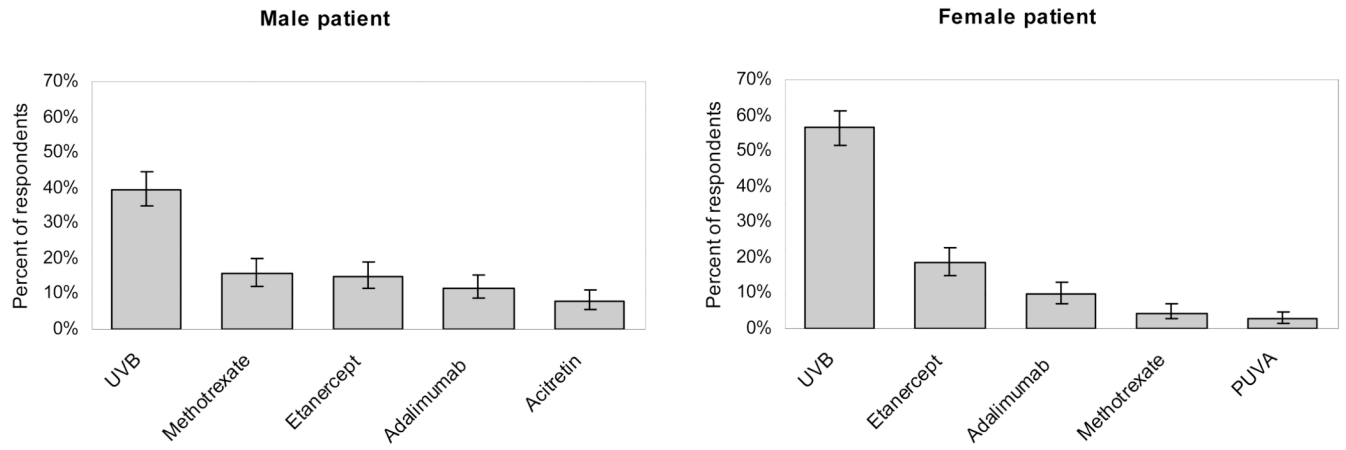


FIGURE 1. First-line treatment preferences for healthy adult with moderate-to-severe psoriasis
Error bars indicate 95% confidence interval.

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 the 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) |
| Multi-specialty 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) |
| Veterans Administration | 1 (0.26) |
| Staff model HMO (i.e. Kaiser) | 2 (0.52) |
| Other | 8 (2.07) |
| Missing | 24 (6.20) |
| Physician extender (i.e. nurse practitioner, physician assistant) employed | |
| Yes | 150 (38.76) |
| Manages 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 | |

| Characteristic | n (%) |
|--|-------------|
| 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) |
| Number of moderate-to-severe psoriasis patients treated in last 3 months | |
| Median (IQR) | 30 (15–60) |
| 1 st quartile (0–15 patients) | 105 (27.13) |
| 2 nd quartile (16–30) | 105 (27.13) |
| 3 rd quartile (31–60) | 78 (20.16) |
| 4 th quartile (60–999) | 89 (23.00) |
| Missing | 10 (2.58) |
| Number of patients treated with UVB in last 3 months [†] | |
| ≤ 10 patients | 267 (68.99) |
| > 10 patients | 105 (27.13) |
| Missing | 15 (3.88) |
| Number of patients treated with etanercept in last 3 months [†] | |
| ≤ 10 patients | 280 (72.35) |
| > 10 patients | 90 (23.26) |
| Missing | 17 (4.39) |
| Number of patients treated with adalimumab in last 3 months [†] | |
| ≤ 10 patients | 312 (80.62) |
| > 10 patients | 62 (16.02) |
| Missing | 13 (3.36) |
| Number of patients treated with methotrexate in last 3 months [†] | |
| ≤ 10 patients | 302 (78.04) |
| > 10 patients | 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) |

| Characteristic | n (%) |
|----------------------------|-------------|
| 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) |
| 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) |

¹Use in >10 patients in last 3 months is defined as “heavy” use.

TABLE II

First-line treatment preferences by physician characteristic

| Respondent Characteristic | Male patient | | | | | Female patient | | | | | p ¹ |
|---------------------------------------|-------------------------|-------------------------------|-------------------------------|---------------------------------|-------------------|-------------------------|-------------------------------|-------------------------------|---------------------------------|-------------------|----------------|
| | UVB (N=153) n (%) | Etanercept (N=58) n (%) | Adalimumab (N=45) n (%) | Methotrexate (N=61) n (%) | p ¹ | UVB (N=218) n (%) | Etanercept (N=72) n (%) | Adalimumab (N=37) n (%) | Methotrexate (N=17) n (%) | p ¹ | |
| Sex | | | | | | | | | | | |
| Male | 118 (50.86) | 37 (15.95) | 28 (12.07) | 49 (21.12) | 0.045 | 162 (65.06) | 45 (18.07) | 26 (10.44) | 16 (6.43) | 0.04 | |
| 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) | 0.08 | 70 (57.38) | 31 (25.41) | 14 (11.48) | 7 (5.74) | 0.34 | |
| 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) | | 61 (76.25) | 15 (18.75) | 3 (3.75) | 1 (1.25) | | |
| Midwest | 35 (46.05) | 14 (18.42) | 15 (19.74) | 12 (15.79) | 0.001 | 46 (56.10) | 15 (18.29) | 15 (18.29) | 6 (7.32) | 0.01 | |
| 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) | 0.01 ² | 23.8 (10.8) | 20.7 (10.2) | 20.8 (10.2) | 21.6 (9.7) | 0.10 ² | |
| Practice type | | | | | | | | | | | |
| Academic | 20 (54.05) | 4 (10.81) | 2 (5.41) | 11 (29.73) | | 26 (70.27) | 4 (10.81) | 3 (8.11) | 4 (10.81) | | |
| Private | 105 (48.17) | 43 (19.72) | 37 (16.97) | 33 (15.14) | 0.03 | 151 (63.18) | 51 (21.34) | 28 (11.72) | 9 (3.77) | 0.20 | |
| Multi-specialty, 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) | | 64 (57.14) | 25 (22.32) | 16 (14.29) | 7 (6.25) | | |
| <5 dermatologists | 40 (49.38) | 17 (20.99) | 15 (18.52) | 9 (11.11) | 0.56 | 58 (65.17) | 20 (22.47) | 10 (11.24) | 1 (1.12) | 0.36 | |
| ≥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) | 0.49 | 133 (67.17) | 42 (21.21) | 13 (6.57) | 10 (5.05) | 0.04 | |
| 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 pso mgmt | 15 (50.00) | 6 (20.00) | 5 (16.67) | 4 (13.33) | 0.90 | 24 (72.73) | 7 (21.21) | 2 (6.06) | 0 (0) | 0.09 | |
| +pso mgmt | 39 (42.86) | 17 (18.68) | 17 (18.68) | 18 (19.78) | | 52 (52.53) | 21 (21.21) | 20 (20.20) | 6 (6.06) | | |

| Respondent Characteristic | Male patient | | | | | Female patient | | | | | p ¹ |
|---|-------------------------|-------------------------------|-------------------------------|---------------------------------|-------------------|-------------------------|-------------------------------|-------------------------------|---------------------------------|-------------------|----------------|
| | UVB (N=153) n (%) | Etanercept (N=58) n (%) | Adalimumab (N=45) n (%) | Methotrexate (N=61) n (%) | p ¹ | UVB (N=218) n (%) | Etanercept (N=72) n (%) | Adalimumab (N=37) n (%) | Methotrexate (N=17) n (%) | p ¹ | |
| Phototherapy | | | | | | | | | | | |
| No | 26 (28.89) | 25 (27.78) | 14 (15.56) | 25 (27.78) | <0.001 | 49 (48.04) | 32 (31.37) | 16 (15.69) | 5 (4.90) | 0.002 | |
| 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) | 0.36 | 168 (65.12) | 54 (20.93) | 26 (10.08) | 10 (3.88) | 0.34 | |
| 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) | | |
| Number of psoriasis patients treated in last 3 mon | | | | | | | | | | | |
| Median (IQR) | 30 (15–50) | 30 (15–71) | 42.5 (20–100) | 33 (18–80) | 0.21 ² | 30 (10–50) | 30 (20–90) | 40 (20–100) | 40 (20–75) | 0.03 ³ | |
| Heavy user of UVB ⁴ | | | | | | | | | | | |
| No | 79 (37.80) | 47 (22.49) | 38 (18.18) | 45 (21.53) | <0.001 | 128 (54.94) | 59 (25.32) | 33 (14.16) | 13 (5.58) | <0.001 | |
| 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 ⁴ | | | | | | | | | | | |
| No | 117 (52.47) | 33 (14.80) | 32 (14.35) | 41 (18.39) | 0.02 | 169 (68.42) | 40 (16.19) | 28 (11.34) | 10 (4.05) | 0.001 | |
| 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 ⁴ | | | | | | | | | | | |
| No | 131 (51.37) | 50 (19.61) | 29 (11.37) | 45 (17.65) | 0.003 | 184 (65.95) | 59 (21.15) | 27 (9.68) | 9 (3.23) | 0.01 | |
| 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 ⁴ | | | | | | | | | | | |
| No | 130 (53.50) | 46 (18.93) | 34 (13.99) | 33 (13.58) | <0.001 | 184 (67.65) | 57 (20.96) | 25 (9.19) | 6 (2.21) | <0.001 | |
| 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 ⁵ , median (IQR) | | | | | | | | | | | |
| Safety | 5 (4–5) | 5 (4–5) | 5 (4–5) | 5 (4–5) | 0.73 ³ | 5 (4–5) | 5 (4–5) | 5 (4–5) | 4 (4–5) | 0.41 ³ | |
| Efficacy | 5 (4–5) | 5 (4–5) | 5 (4–5) | 5 (4–5) | 0.62 ³ | 5 (4–5) | 5 (4–5) | 5 (4–5) | 5 (4–5) | 0.62 ³ | |
| Cost to patient | 4 (3–4) | 4 (3–5) | 4 (4–4) | 4 (4–5) | 0.22 ³ | 4 (3–4) | 4 (3–4) | 4 (3–4) | 4 (4–5) | 0.21 ³ | |
| Personal experience | 4 (3–4) | 4 (3–4) | 4 (3–4) | 4 (3–4) | 0.61 ³ | 4 (3–4) | 4 (3–4) | 4 (3–4) | 4 (3–4) | 0.92 ³ | |
| Ease of insurance approval | 3 (3–4) | 4 (3–4) | 4 (3–4) | 4 (3–4) | 0.12 ³ | 4 (3–4) | 4 (3–4) | 4 (3–4) | 4 (3–4) | 0.31 ³ | |
| Ease of administration | 3 (3–4) | 4 (3–4) | 3 (2–4) | 3 (3–4) | 0.02 ³ | 4 (3–4) | 3 (3–4) | 3 (3–4) | 3 (3–4) | 0.59 ³ | |

- * $p < 0.05$;
- ** $p < 0.01$;
- *** $p < 0.001$

- 1 Fisher's exact test
- 2 ANOVA test
- 3 Kruskal-Wallis test

- 4 Use in >10 patients in last 3 months
- 5 1-not at all important, 5-extremely important

TABLE III

Series of logistic regression models predicting first-line treatment preference

| Respondent characteristic | Odds Ratio (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) |
| Sex (male) | 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 | | 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 | n/a | 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 years) | | | | | | | |
| 10-19 years | 0.44 (0.18, 1.06) | 0.95 (0.27, 3.28) | 1.19 (0.37, 3.88) | 2.04 (0.57, 7.26) | | 0.96 (0.32, 2.85) | 0.86 (0.20, 3.72) |
| 20-29 years | 0.71 (0.31, 1.64) | 1.18 (0.36, 3.88) | 1.33 (0.40, 4.37) | 0.35 (0.08, 1.50) | n/a | 1.02 (0.35, 2.96) | 1.37 (0.31, 6.13) |
| ≥30 years | 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) |
| Multi-specialty, 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) |
| Number of psoriasis pts in last 3 | | | | | | | |

| Respondent characteristic | Odds Ratio (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) |
| months (base: 1 st quartile (0-15)) | | | | | | | |
| 2 nd quartile (16-30) | | 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) |
| 3 rd quartile (31-60) | n/a | 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) |
| 4 th 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 |

* p<0.05;

** p<0.01;

*** p<0.001

[†] Use of the particular therapy in >10 patients in last 3 months