JAMA Dermatology | Original Investigation

Analysis of Specialist and Patient Perspectives on Strategies to Improve Cardiovascular Disease Prevention Among Persons With Psoriatic Disease

John S. Barbieri, MD, MBA; Rinad S. Beidas, PhD; George C. Gondo, MA; Jessica Fishman, PhD; Nathaniel J. Williams, PhD; April W. Armstrong, MD, MPH; Alexis R. Ogdie, MD, MSCE; Nehal Mehta, MD, MSCE; Joel M. Gelfand, MD, MSCE

IMPORTANCE Patients with psoriatic disease are at increased risk of cardiovascular disease (CVD), which is a leading cause of mortality in this population. However, many of these patients do not have an active relationship with a primary care physician, and there may be a role for specialist-led care in prevention of CVD.

OBJECTIVE To explore clinician and patient perspectives regarding strategies to improve CVD prevention via specialist-led care.

DESIGN, SETTING, AND PARTICIPANTS Using electronically collected surveys, a best-worst scaling experimental survey study was conducted among dermatologists through the National Psoriasis Foundation as well as the American Academy of Dermatology from October 27, 2020, to April 1, 2021, to rank the strategies according to their potential to improve CVD prevention among patients with psoriatic disease. Participants were asked about the feasibility of specialist-led screening through an electronically delivered survey from the National Psoriasis Foundation conducted between February 1 and April 21, 2021. Patients with psoriatic disease were asked about whether they would like the specialist to screen for CVD risk factors. In addition, patients reported their likelihood to engage in CVD risk screening and management behaviors in scenarios in which either the primary care physician or specialist was making the recommendations.

MAIN OUTCOMES AND MEASURES For the clinician surveys, the primary outcome was the ratio scaled preference score (range, 0-100; higher is more preferred), as well as whether they think calculating a 10-year CVD risk score and prescribing statins seems feasible. For the patient surveys, the primary outcome was the likelihood to check cholesterol level, incorporate diet and exercise, or use statin therapy depending on whether recommended by the specialist or primary care physician, whether they would like their specialist to educate them about CVD risk, and whether they would find it convenient to have their cholesterol level checked by their specialist.

RESULTS Among 183 dermatologists (102 [55.7%] women; mean [SD] age not collected), clinical decision support (preference score, 22.3; 95% CI, 20.7-24.0), patient education (preference score, 14.1; 95% CI, 12.5-15.7), and clinician education (preference score, 15.8; 95% CI, 14.3-17.3) were ranked as strategies likely to improve CVD prevention in patients with psoriatic disease. In addition, 69.3% (95% CI, 62.2%-76.0%) of dermatologists agreed or strongly agreed that checking lipid levels was feasible. Among 160 patients with psoriasis and 162 patients with psoriatic arthritis (226 [70.2%] women; mean [SD] age, 54 [13.3] years), patients reported they were as likely to engage in cardiovascular risk screening and management behaviors whether recommended by their primary care physician or their specialist. In addition, 60.0% (95% CI, 52.0%-67.7%) of patients with psoriasis and 75.3% (95% CI, 67.9%-81.7%) of those with psoriatic arthritis agreed that it would be convenient for them to have their cholesterol checked by their dermatologist/rheumatologist.

CONCLUSIONS AND RELEVANCE In this survey study, dermatologists and patients with psoriatic disease expressed positive perspectives about engaging in a specialist-led model of care to improve CVD prevention. Dermatologists appear to view several strategies as having potential to improve cardiovascular risk prevention.

JAMA Dermatol. 2022;158(3):252-259. doi:10.1001/jamadermatol.2021.4467
Published online January 19, 2022.

Editorial page 239

Supplemental content

Author Affiliations: Author affiliations are listed at the end of this article.

Corresponding Authors: Joel M. Gelfand, MD, MSCE, University of Pennsylvania Perelman School of Medicine, Dermatology and Center for Clinical Epidemiology and Biostatistics, 730 South Tower, 3400 Civic Center Blvd, Philadelphia, PA 19104 (joel.gelfand@pennmedicine.upenn.edu); and John S. Barbieri, MD, MBA, Department of Dermatology, Brigham and Women's Hospital, 221 Longwood Ave, Boston, MA 02115 (jbarbieri@bwh.harvard.edu).

Psoriasis and psoriatic arthritis are chronic inflammatory diseases that are associated with increased risk of cardiovascular disease (CVD) and premature mortality.[1-6] Patients with psoriasis who require treatment with systemic medications or phototherapy have been reported to have reduced life expectancy by 5 years after adjusting for traditional risk factors.[7] Cardiovascular disease is a leading cause of this excess mortality and guidelines from the American Academy of Dermatology/National Psoriasis Foundation (NPF) and the American Heart Association/American College of Cardiology specifically identify patients with psoriatic disease as a population in need of enhanced CVD prevention efforts.[2,8]

Evidence-based CVD prevention for individuals with psoriatic disease includes screening for risk factors (eg, diabetes, hypertension, hyperlipidemia, and smoking), counseling about risk, and management (eg, lifestyle modification and medication management of risk factors).[2,8] Ten-year risk of major CVD events, such as myocardial infarction or stroke, can be estimated using the American Heart Association/American College of Cardiology Pooled Cohort Equations CV Risk Calculator available online.[9] This calculator estimates risk using basic demographic information and medical history, lipid levels, blood pressure, and diabetes status.

Screening rates among patients with psoriasis are suboptimal: a UK study of primary care–based screening for CVD risk in those with psoriasis found that 48% had previously undetected risk factors for CVD and among those with known CVD risk factors, 46% had suboptimal blood pressure and cholesterol levels.[10,11] Furthermore, although a survey of dermatologists noted that 45% reported screening patients with psoriasis for dyslipidemia,[12] data from the National Ambulatory Care Survey found that fewer than 5% of psoriasis encounters included screening for dyslipidemia.[13]

Although statins are a useful CVD prevention tool given their efficacy, safety, low cost, and ease of use, statins are underused among persons with psoriatic disease, representing an important evidence-to-practice gap.[8,14] An international cross-sectional analysis of patients with psoriatic disease reported that 59% of individuals with hypertension and 66% of those with dyslipidemia were undertreated.[15] Data from a multicenter clinical trial of patients with moderate to severe psoriasis found that only 24% of patients for whom statins would be recommended according to guidelines were using these medications.[16] This rate of statin use is even lower than for the overall US population, in whom only 40% of those for whom statins are recommended are using them.[11]

Although CVD risk is typically managed by primary care physicians and cardiologists, fewer than half of commercially insured US adults aged 18 to 64 years visit a primary care physician each year.[17] In addition, 21.6% of men and 16.9% of women with psoriasis had no encounters with a primary care physician within a year of their first encounter with a dermatologist.[18] These results suggest that the current model in which the patient is referred back to their primary care physician for screening and management of CVD risk factors may not be useful for many patients with psoriatic disease.[18] Because these patients may be more likely to interact with a specialist, there could be an opportunity to improve outcomes by having dermatologists and rheumatologists take a larger role in the screening and management of CVD risk factors. The purpose of this study was to explore clinician and patient perspectives regarding strategies to improve CVD management through specialist-led care.

Key Points

Question What are clinician and patient perspectives regarding strategies to improve cardiovascular disease prevention via specialist-led care?

Findings In this survey study, 183 dermatologists and 322 patients with psoriatic disease expressed positive perspectives about engaging in a specialist-led model of care to improve cardiovascular risk management.

Meaning The findings of this study suggest the need for investigations evaluating whether implementing a specialist-led model of care can improve cardiovascular outcomes among patients with psoriatic disease.

Methods

Survey Design

To assess clinician perspectives on CVD management, a survey questionnaire was developed that included a series of items asking whether specialist-led screening and management of CVD risk factors was feasible (doable, according to survey item). These items were adapted from the validated Feasibility of Implementation Measure assessment.[19] In addition, to evaluate clinician preferences for strategies to improve statin use among patients with psoriasis, a best-worst scaling choice experiment was embedded within the survey to elicit preferences for 8 implementation strategies that have shown to be useful for increasing statin prescribing rates in primary prevention of CVD[20]: clinical decision support, patient educational materials, physician educational outreach, a telemedicine partnership to screen and manage dyslipidemia, peer coaching, a mobile app/texting service to remind patients to undergo CVD risk screening, a pay-for-performance option, and audit and feedback for comparison with peers (eTable 1 in the Supplement). The study was approved by the University of Pennsylvania Institutional Review Board, and participants provided informed consent prior to initiating the survey. The study followed the relevant portions of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline[21] and the American Association for Public Opinion Research (AAPOR) reporting guideline.[22]

To assess patient perspectives on specialist-led CVD management, a questionnaire was developed to measure patients' subjective likelihood of engaging in relevant prevention behaviors, such as having their cholesterol level checked, incorporating therapeutic lifestyle changes (ie, diet and exercise), or taking a statin. The measures used validated reliable methods that have been shown to predict future behavior in prior implementation science studies.[23,24] Participants were presented with scenarios in which either their primary care

physician or specialist (dermatologist or rheumatologist) was making these recommendations. The order in which the scenarios were presented was randomized. In addition, participants were asked whether they would like their specialist to educate them on the risk of CVD and whether they would find it convenient for their specialist to check their cholesterol level.

Surveys (eAppendix 1 in the Supplement) were developed and reviewed by an expert panel of clinicians (A.W.A., A.R.O., and J.M.G.), and those with expertise in survey methods (J.S.B., R.S.B., and J.F.), stated preference choice experiments (J.S.B. and N.J.W.), and implementation science (R.S.B., N.J.W., and J.F.).

Setting and Participants

The survey of dermatologists was distributed through the NPF and the American Academy of Dermatology. All dermatologists who reported that they care for patients with psoriasis were eligible. The survey of rheumatologists was distributed through the NPF and the Group for Research and Assessment of Psoriasis and Psoriatic Arthritis. All rheumatologists who reported that they care for patients with psoriatic arthritis were eligible. These surveys were conducted electronically between October 27, 2020, and April 1, 2021. Although multiple efforts were made to reach the sample size target of 160 rheumatologists, only 27 completed the survey; therefore, these results are provided only in eAppendix 2 and eTable 2 in the Supplement.

The patient survey was distributed electronically through the NPF between February 1 and April 21, 2021. Patients aged 18 years or older with psoriasis or psoriatic arthritis were eligible. Patients who were currently receiving statin therapy were excluded. Those who responded that the physician who they see most often for psoriasis or psoriatic arthritis treatment was a dermatologist were classified as patients with psoriasis. Those who responded that the physician they see most often was a rheumatologist were classified as patients with psoriatic arthritis. In addition to disease state and management information, demographic data were collected. Self-reported race and ethnicity data were documented to understand the diversity and representativeness of the survey population.

Until the study reached the target sample size of 160 participants for each survey, follow-up reminders were sent approximately weekly. Clinicians and patients were provided with a $5 gift card for completion of the survey, which they could choose to donate to the National Psoriasis Foundation.

Statistical Analysis

For the best-worst scaling choice experiment, assuming an α level of .05 and that the clinicians would be rating 8 sets of 4 options per set, we estimated that we would need approximately 160 participants to achieve 80% power.[25] The best-worst scaling experimental design was generated using the Sawtooth Discover, version 9.10.1 (Sawtooth Software) algorithm. Within the experiment, each participant was shown 8 sets of 4 implementation strategies that were randomly selected and ordered within each set. Participants were asked to choose which strategy in each set was the best (ie, most useful for helping dermatologists/rheumatologists improve the use of statins among patients with psoriasis) and which was the worst (ie, least useful).[26,27]

The best-worst scaling choice experiment was analyzed using ratio-scaled preference scores that were generated using hierarchical bayesian analysis in Lighthouse Studio, version 9.10.1 (Sawtooth Software). Ratio-scaled preference scores range from 0 to 100 with 0 being least preferred (always ranked worst) and 100 being most preferred (always ranked best). These scores follow ratio scaling, such that an item with a score of 20 is twice as preferred as an item with a score of 10, an item with a score of 10 is twice as preferred as one with a score of 5, and so forth. When 95% CIs for 2 strategies did not overlap, the strategy with the higher score, determined with 2-sided, unpaired testing, was significantly more preferred at $P < .05$.

For the patient surveys, responses were reported on a 7-point scale from extremely unlikely to extremely likely, which were collapsed to a 3-point scale of unlikely, neither, and likely for the analyses. In addition, χ^2 tests were used to compare differences in the proportion of respondents who agreed they would be likely to engage in each behavior when it was recommended by their specialist vs primary care physician. Statistical analysis was performed with Stata, version 15 (StataCorp LLC).

Results

Clinician Survey

The clinician survey was completed by 183 dermatologists (response rate, 5.2%), of whom 102 were women (55.7%) and 81 were men (44.3%); 106 dermatologists (58.0%) practiced in a single specialty group or solo practice setting (**Table 1**). Compared with the American Academy of Dermatology membership, the characteristics of survey participants were similar with respect to sex, years in practice, and practice setting (eTable 3 in the Supplement). In response to the prompt, "I think checking lipids and calculating a 10-year cardiovascular risk score to determine if a statin is recommended seems doable," 69.3% (95% CI, 62.2%-76.0%) of dermatologists agreed or strongly agreed with the statement. In response to the prompt, "I think prescribing statins when they are indicated based on guidelines for primary prevention of cardiovascular disease seems doable," 36.1% (95% CI, 29.1%-43.5%) of dermatologists agreed or strongly agreed with the statement. In addition, 67.8% (95% CI, 60.5%-74.5%) of dermatologists agreed or strongly agreed that they would change their practice to screen and manage CVD risk if a clinical trial demonstrated that patients achieved better CVD risk prevention when the specialist screened for cholesterol levels and prescribed statins.

In the best-worst scaling choice experiment, the 3 highest ranked strategies among dermatologists were clinical decision support (preference score, 22.3; 95% CI, 20.7-24.0), physician educational outreach (preference score, 15.8; 95% CI, 14.3-17.3), and patient educational materials (preference score, 14.1; 95% CI, 12.5-15.7). The lowest ranked strategies among dermatologists were comparison with peers (preference score, 5.1; 95% CI, 3.9-6.2), pay-for-performance (preference score, 9.0; 95% CI, 7.2-10.9), and the mobile

Table 1. Dermatologist Survey Respondent Characteristics

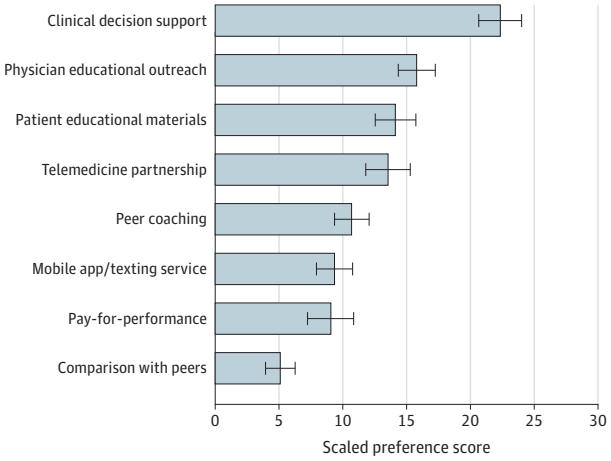
Characteristic	No. (%)
No.	183
Sex	
Female	102 (55.7)
Male	81 (44.3)
Years in practice	
≤5	37 (20.2)
6-10	32 (17.5)
11-15	31 (16.9)
16-20	18 (9.8)
>20	65 (35.5)
Practice setting	
Academic	52 (28.4)
Multispecialty group	21 (11.5)
Single specialty group	83 (45.4)
Solo	23 (12.6)
Other/declined to answer	4 (2.2)
Survey item	
I think checking lipids and calculating a 10-y cardiovascular risk score to determine if a statin is recommended seems doable.	
Completely disagree	9 (4.9)
Disagree	17 (9.3)
Neither agree nor disagree	30 (16.4)
Agree	86 (47.0)
Completely agree	41 (22.4)
I think prescribing statins when they are indicated based on guidelines for primary prevention of cardiovascular disease seems doable.	
Completely disagree	14 (7.7)
Disagree	61 (33.3)
Neither agree nor disagree	42 (23.0)
Agree	44 (24.0)
Completely agree	22 (12.0)
If a clinical trial demonstrated that patients achieved better cardiovascular prevention when their dermatologist/rheumatologist screened for cholesterol and prescribed statins, I would change my practice to screen my patients and to prescribe statins.	
Completely disagree	7 (3.8)
Disagree	26 (14.2)
Neither agree nor disagree	26 (14.2)
Agree	80 (43.7)
Completely agree	44 (24.0)

app/texting service (preference score, 9.4; 95% CI, 7.9-10.8) (**Figure 1**). Results of the best-worst scaling choice experiment including rheumatologists are shown in the eFigure in the Supplement.

Patient Survey

The patient survey was completed by 160 patients with psoriasis (response rate, 9.6%) and 162 patients with psoriatic arthritis (response rate, 7.9%); 226 patients (70.2%) were women and 96 were men (29.8%) (**Table 2**). Mean (SD) age was 54 (13.3) years. A total of 20.6% (95% CI, 14.6%-27.7%) of patients with psoriasis and 13.6% (95% CI, 8.7%-19.8%) of patients with psoriatic arthritis had not seen a primary care physician in the past 12 months. Compared with the membership of the NPF, the characteristics of survey participants were similar with respect to sex and race and ethnicity (eTable 4 in the Supplement). Patients with psoriatic arthritis who responded to the survey were more likely to be female (80.2%) compared with the membership of the NPF (55.1%). A total of 75.6% (95% CI, 68.2%-82.1%) of patients with psoriasis and 89.5% (95% CI, 83.7%-93.8%) of patients with psoriatic arthritis agreed that "I would like it if my dermatologist/rheumatologist educated me about my risk of heart disease," and 60.0% (95% CI, 52.0%-67.7%) of patients with psoriasis and 75.3% (95% CI, 67.9%-81.7%) of patients with psoriatic arthritis agreed that it would be "convenient for me to have my cholesterol checked by my dermatologist/rheumatologist."

Figure 1. Results of Best-Worst Scaling Choice Experiment



Scaled preference scores range from 0 to 100, with 0 being least preferred (always ranked worst) and 100 being most preferred (always ranked best). These scores follow ratio scaling, such that an item with a score of 20 is twice as preferred as an item with a score of 10, an item with a score of 10 is twice as preferred as one with a score of 5, and so forth. Error bars indicate 95% CIs.

Table 2. Patient Survey Respondent Characteristics

Characteristic	No. (%)	
	Psoriasis	Psoriatic arthritis
No.	160	162
Age, mean (SD), y[a]	54.0 (15.2)	54.0 (11.4)
Sex		
Female	96 (60.0)	130 (80.2)
Male	64 (40.0)	32 (19.8)
Race		
Asian	3 (1.9)	6 (3.7)
Black or African American	7 (4.4)	2 (1.2)
White	129 (80.6)	138 (85.2)
Other[b]	21 (13.1)	16 (9.9)
Ethnicity		
Hispanic or Latinx	21 (13.1)	9 (5.6)
Survey item		
How often have you seen primary care provider in past 12 mo?		
I don't have a primary care provider	12 (7.5)	5 (3.1)
I have one, but have not seen	21 (13.1)	17 (10.5)
Once	52 (32.5)	51 (31.5)
Twice	44 (27.5)	47 (29.0)
More than twice	31 (19.4)	42 (25.9)
How often have you seen dermatologist/rheumatologist in past 12 mo?		
I don't have a dermatologist/rheumatologist	7 (4.4)	1 (0.6)
I have one, but have not seen	22 (13.8)	9 (5.6)
Once	53 (33.1)	25 (15.4)
Twice	47 (29.4)	37 (22.8)
More than twice	31 (19.4)	90 (55.6)
Comorbidities		
Coronary artery disease	6 (3.8)	5 (3.1)
Stroke	3 (1.9)	3 (1.9)
Diabetes	5 (3.1)	12 (7.4)
Hyperlipidemia	17 (10.6)	26 (16.0)
Hypertension	43 (26.9)	49 (30.2)
Current smoker	10 (6.3)	9 (5.6)
Prior treatment		
Phototherapy	77 (48.1)	36 (22.2)
Biologic	72 (45.0)	41 (25.3)
Nonbiologic systemic medication	61 (38.1)	34 (21.0)

[a] Age data were not available for 11 participants with psoriasis and for 3 participants with psoriatic arthritis.

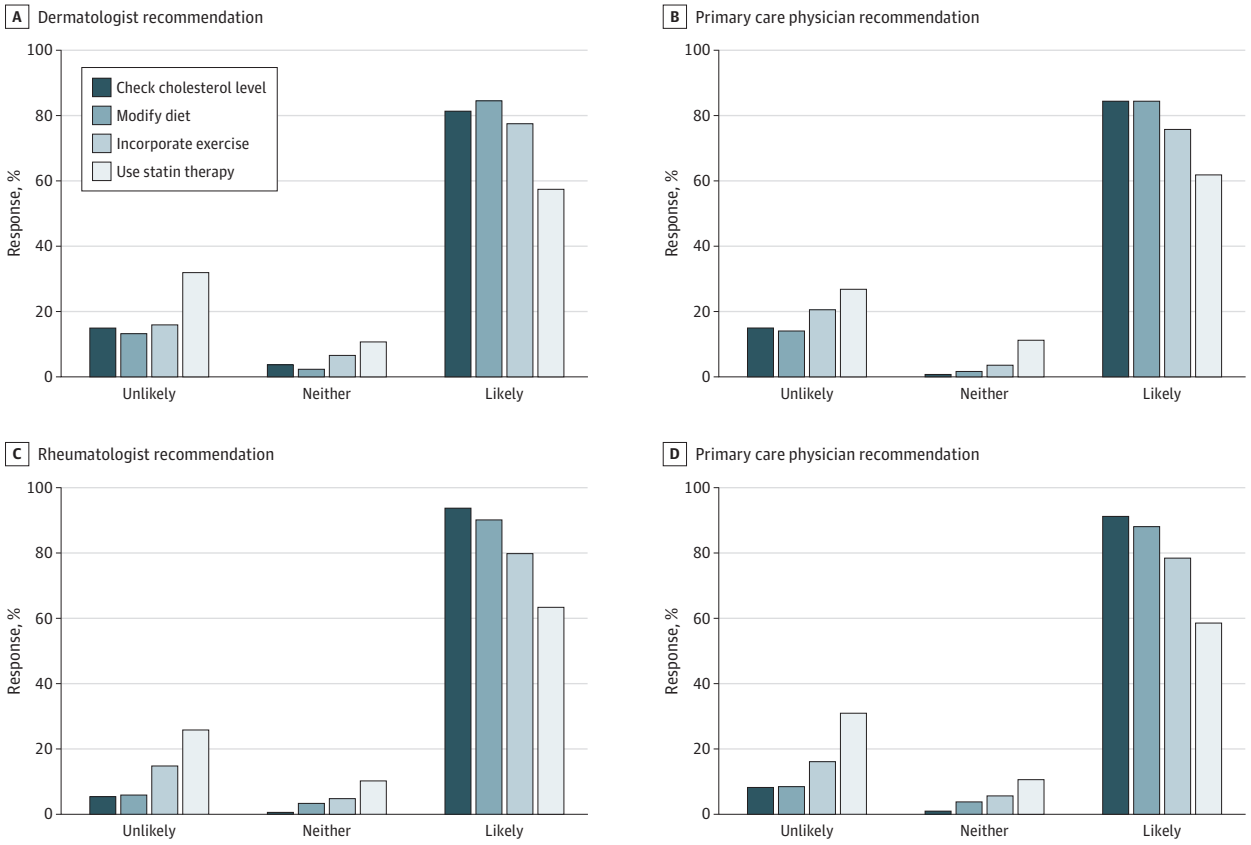
[b] No specification given.

Patients with psoriasis agreed that they would follow recommendations from their dermatologist or primary care physician with respect to checking their cholesterol level (81.3% vs 84.4%; χ^2 P = .46), incorporating diet (84.6% vs 84.4%; χ^2 P = .98) and exercise (77.6% vs 75.7%; χ^2 P = .75), and using statin therapy (57.5% vs 61.9%; χ^2 P = .43). Similarly, patients with psoriatic arthritis agreed that they would follow recommendations from their rheumatologist or their primary care physician with respect to monitoring their cholesterol level (93.8% vs 91.4%; χ^2 P = .40), incorporating diet (90.5% vs 88.2%; χ^2 P = .56) and exercise (80.0% vs 78.6%; χ^2 P = .78) and using statin therapy (63.6% vs 58.6%; χ^2 P = .36) (**Figure 2**). A small group of patients with psoriasis (5.0%; 95% CI, 2.2%-9.6%) and psoriatic arthritis (1.9%; 95% CI, 0.4%-5.3%) responded that they would be likely to check their cholesterol level if their primary care physician recommended it but not if their dermatologist or rheumatologist recommended it. Few patients with psoriasis (7.5%; 95% CI, 3.9%-12.7%) and no patients with psoriatic arthritis responded that they would be likely to use statin therapy if their primary care physician recommended it but not if their dermatologist or rheumatologist recommended it. The overall likelihood of patients to have their cholesterol level checked or to use statin therapy when recommended by a primary care physician or specialist is presented in **Table 3**.

Discussion

In this survey study, dermatologists and patients with psoriatic disease expressed positive perspectives about engaging in a specialist-led model for CVD risk screening and management. More than two-thirds of dermatologists agreed that it was doable to screen for cardiovascular risk factors and nearly half of dermatologists reported that prescribing statins was doable. In addition, most patients with psoriatic disease thought it would be convenient for their specialist to play a larger role in screening and managing CVD risk. Patients also reported that they would be similarly likely to follow recommendations regarding CVD risk screening and management whether they were made by their primary care physician or by their dermatologist or rheumatologist.

Figure 2. Patient Likelihood to Engage in Cardiovascular Risk Screening and Management Behaviors



Patients with psoriasis were asked whether they would be likely to have the cholesterol level checked, to incorporate diet and exercise lifestyle changes, or to use statin therapy in scenarios when the recommendation was made by either their dermatologist (A) or primary care physician (B). Patients with psoriatic arthritis were asked the same questions in scenarios when the recommendation was made by either their rheumatologist (C) or primary care physician (D).

Table 3. Patient Likelihood to Check Cholesterol Level or Use Statin Therapy if Recommended by Primary Care Physician vs Specialist[a]

	Dermatologist			Rheumatologist		
PCP	Unlikely	Neither	Likely	Unlikely	Neither	Likely
Check cholesterol level						
Unlikely	10	0	5	4	0	4
Neither	0	1	0	0	0	1
Likely	5	3	76	2	1	89
Use statin therapy						
Unlikely	23	0	4	25	2	4
Neither	2	8	1	1	6	3
Likely	8	3	52	0	2	56

Abbreviation: PCP, primary care physician.

[a] Results compare patients' subjective likelihood of accepting recommendations by their dermatologist/rheumatologist vs their PCP. For example, only 5% of patients with psoriasis reported they would be likely to have their cholesterol level checked if recommended by their PCP but unlikely to do so when recommended by their dermatologist. Similarly, only 2% of patients with psoriatic arthritis reported they would be likely to have their cholesterol level checked if recommended by their PCP but unlikely to do so when recommended by their rheumatologist.

When assessing which implementation strategies would be most likely to improve CVD risk screening and management among patients with psoriatic disease, the highest ranked strategies among dermatologists involved clinical decision support and education. Although strategies using audit and feedback as well as pay-for-performance have been found to be beneficial in prior studies focused on increasing use of statins, they were the lowest-ranked strategies among dermatologists.[20,28] A meta-analysis[28] of strategies to improve statin use found that no single implemen-

tation strategy appeared to be associated with improved outcomes compared with others, but that trials that combined multiple implementation strategies were more likely to be successful than were those that used only a single strategy.

One potential strategy for addressing lipid management in specialty care clinics is use of a care coordinator, which has been successfully implemented to improve disease management in other settings.[29,30] In this model, the specialist educates the patient regarding psoriasis and cardiovascular risk, measures blood pressure, checks a lipid panel, and refers the patient to the care coordinator. Diabetes status could be assessed by history or by checking the hemoglobin A_{1c} level. Information on sex, age, race and ethnicity, smoking status, and use of antihypertensives, statins, and aspirin would also be collected. The care coordinator would review the results of these tests and calculate a 10-year CVD risk score.[8,9] Using a protocolized clinical decision support approach, the care coordinator could then educate the patient about their risk, and provide counseling about diet and exercise, as well as whether statin therapy or blood pressure management is indicated. The care coordinator would also communicate the findings and recommendations to the patient's care team. This model would provide flexibility and a patient-centered approach to addressing CVD risk.[18]

Limitations

The study has limitations that should be considered in the context of its design. In any survey there is the possibility of sampling and response bias. Although national listservs were used to maximize the generalizability of the results, given the low response rates, these findings may not generalize to nonresponders. In addition, the NPF membership may be more informed about treatments than those in the general population of patients with psoriasis.[31] However, comparison of survey respondents with the overall demographic characteristics of the American Academy of Dermatology membership for the dermatologist survey and NPF membership for the patient surveys support that the survey respondents in this study were relatively similar to the underlying populations from which they were sampled (eTables 3 and 4 in the Supplement). Although the survey participants had a lower incidence of chronic conditions, such as hyperlipidemia, this difference may be related to our exclusion criteria of prior statin use. In addition, differences in sex among patients with psoriatic arthritis may reflect differences in the definitions used in this study compared with the NPF membership survey. To ensure adequate power, we were able to evaluate only 8 potential implementation strategies. However, these strategies are each evidence-based and were carefully pilot tested among dermatologists, rheumatologists, and patients with psoriasis or psoriatic arthritis to ensure each strategy was clearly defined, consistent with what physicians and patients might encounter in typical practice, and reflected the range of potential strategies that physicians' viewed as relevant.[20] Although survey responses describing intended behavior may not accurately reflect actual behavior, validated survey approaches were used to maximize the likelihood that these survey results would translate into real-world settings.[23,24]

Conclusions

Patients with psoriatic disease are at higher risk of CVD; however, care to address their risk factors is not adequately managed. Because many patients are not actively seeing a primary care physician and welcome management of their traditional cardiovascular risk factors in the context of their psoriatic disease evaluation,[32] a specialist-led model of care has the potential to improve CVD risk management in this population. In this survey study, both clinicians and patients expressed interest in such a model, particularly if it includes clinical decision support, patient education, and clinician educational outreach. Future studies are needed to evaluate whether these implementation strategies can successfully be adopted and whether they can improve outcomes associated with CVD risk management among patients with psoriasis and psoriatic arthritis.

ARTICLE INFORMATION

Accepted for Publication: September 9, 2021.

Published Online: January 19, 2022. doi:10.1001/jamadermatol.2021.4467

Author Affiliations: Department of Dermatology, Brigham and Women's Hospital, Boston, Massachusetts (Barbieri); Department of Psychiatry, University of Pennsylvania Perelman School of Medicine, Philadelphia (Beidas, Fishman); Penn Implementation Science Center at the Leonard Davis Institute of Health Economics, University of Pennsylvania, Philadelphia (Beidas); Department of Medical Ethics and Health Policy, University of Pennsylvania Perelman School of Medicine, Philadelphia (Beidas); Department of Medicine, University of Pennsylvania Perelman School of Medicine, Philadelphia (Beidas); Center for Health Incentives and Behavioral Economics, University of Pennsylvania, Philadelphia (Beidas, Fishman); Penn Medicine Nudge Unit, University of Pennsylvania Health System, Philadelphia (Beidas); National Psoriasis Foundation, Alexandria, Virginia (Gondo); Message Effects Lab at the Annenberg School for Communication, University of Pennsylvania Perelman School of Medicine, Philadelphia (Fishman); School of Social Work, Boise State University, Boise, Idaho (Williams); Department of Dermatology, Keck School of Medicine, University of Southern California, Los Angeles (Armstrong); Department of Rheumatology, University of Pennsylvania Perelman School of Medicine, Philadelphia (Ogdie); Section of Inflammation and Cardiometabolic Diseases, National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, Maryland (Mehta); Department of Dermatology, University of Pennsylvania Perelman School of Medicine, Philadelphia (Gelfand); Review Editor, *JAMA Dermatology* (Barbieri); Editorial Board Member, *JAMA Dermatology* (Armstrong).

Author Contributions: Dr Barbieri had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
Concept and design: Barbieri, Beidas, Fishman, Ogdie, Mehta, Gelfand.
Acquisition, analysis, or interpretation of data: Barbieri, Beidas, Gondo, Fishman, Williams, Armstrong, Ogdie, Gelfand.
Drafting of the manuscript: Barbieri, Fishman.
Critical revision of the manuscript for important intellectual content: All authors.
Statistical analysis: Barbieri, Gondo, Williams, Ogdie.
Obtained funding: Mehta, Gelfand.
Administrative, technical, or material support: Beidas, Gondo, Armstrong, Ogdie, Mehta, Gelfand.
Supervision: Fishman, Gelfand.

Conflict of Interest Disclosures: Dr Beidas reported grants from National Psoriasis Foundation during the conduct of the study and grants from the National Institutes of Health, Centers for Disease Control and Prevention, and the Patient-Centered Outcomes Research Institute; personal fees from Oxford University Press, Optum Behavioral Health, and United Behavioral Health outside the submitted work. Dr Gondo reported being an employee of the National Psoriasis Foundation

during the conduct of the study. Dr Armstrong reported grants from Bristol Myers Squibb, Dermavant, Dermira, Eli Lilly, Leo Pharma, Novartis, UCB Pharma, Kyowa Kirin, Galderma, AbbVie, and Regeneron during the conduct of the study; consulting fees from AbbVie, Bristol Myers Squibb, Dermavant, Dermira, Eli Lilly, Janssen, Leo Pharma, Modernizing Medicine, Novartis, Ortho Dermatologics, Regeneron, Sanofi Genzyme, Sun Pharma, UCB Pharma, Boehringer Ingelheim, Pfizer, and Parexel outside the submitted work. Dr Ogdie reported consulting fees from AbbVie, Amgen, BMS, Corrona, Celgene, Gilead, Janssen, Lilly, Novartis, Pfizer, and UCB Consulting; grants from AbbVie, Novartis, and Pfizer to the University of Pennsylvania, and royalties from Novartis to a family member outside the submitted work. Dr Mehta is a full-time US government employee and has served as a paid consultant for Amgen, Eli Lilly, and Leo Pharma, reported receiving grants/other payments as a principal investigator and/or investigator for AbbVie, Celgene, Janssen Pharmaceuticals Inc, and Novartis; and grants and/or research funding and as a principal investigator from the National Institutes of Health. Dr Gelfand reported grants from the National Psoriasis Foundation during the conduct of the study; consulting fees from Bristol-Myers Squibb, Boehringer Ingelheim, GlaxoSmithKline, Janssen Biologics, Novartis Corp, Regeneron, UCB (Data Safety and Monitoring Board), Sanofi, and Pfizer Inc; grants from AbbVie, Janssen, Novartis Corp, Sanofi, Celgene, OrthoDermatologics, and Pfizer Inc outside the submitted work; and board of directors, International Psoriasis Council (not paid). No other disclosures were reported.

Funding/Support: This study was supported by a grant from the National Psoriasis Foundation Psoriasis Prevention Initiative.

Role of the Funder/Sponsor: The National Psoriasis Foundation participated in the design and distribution of the surveys but had no role in the interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Disclaimer: Dr Barbieri is Review and CME Editor for *JAMA Dermatology*, and Dr Armstrong is on the *JAMA Dermatology* Editorial Board, but they were not involved in any of the decisions regarding review of the manuscript or its acceptance.

Meeting Presentation: This work was presented as an oral presentation at the virtual Prevention of Cardiovascular Disease in Patients with Psoriasis and Psoriatic Arthritis: Bridging the Evidence to Practice Gap for Statins meeting (April 9, 2021) and the Society for Investigative Dermatology (May 5, 2021).

REFERENCES

1. Neimann AL, Shin DB, Wang X, Margolis DJ, Troxel AB, Gelfand JM. Prevalence of cardiovascular risk factors in patients with psoriasis. *J Am Acad Dermatol*. 2006;55(5):829-835. doi:10.1016/j.jaad.2006.08.040

2. Elmets CA, Leonardi CL, Davis DMR, et al. Joint AAD-NPF guidelines of care for the management and treatment of psoriasis with awareness and attention to comorbidities. *J Am Acad Dermatol*. 2019;80(4):1073-1113. doi:10.1016/j.jaad.2018.11.058

3. 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(3):586-592. doi:10.1111/j.1365-2133.2010.09941.x

4. Ogdie A, Yu Y, Haynes K, et al. Risk of major cardiovascular events in patients with psoriatic arthritis, psoriasis and rheumatoid arthritis: a population-based cohort study. *Ann Rheum Dis*. 2015;74(2):326-332. doi:10.1136/annrheumdis-2014-205675

5. Gelfand JM, Neimann AL, Shin DB, Wang X, Margolis DJ, Troxel AB. Risk of myocardial infarction in patients with psoriasis. *JAMA*. 2006;296(14):1735-1741. doi:10.1001/jama.296.14.1735

6. Polachek A, Touma Z, Anderson M, Eder L. Risk of cardiovascular morbidity in patients with psoriatic arthritis: a meta-analysis of observational studies. *Arthritis Care Res (Hoboken)*. 2017;69(1):67-74. doi:10.1002/acr.22926

7. Gelfand JM, Troxel AB, Lewis JD, et al. The risk of mortality in patients with psoriasis: results from a population-based study. *Arch Dermatol*. 2007;143(12):1493-1499. doi:10.1001/archderm.143.12.1493

8. Grundy SM, Stone NJ, Bailey AL, et al. 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the management of blood cholesterol: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *J Am Coll Cardiol*. 2019;73(24):e285-e350. doi:10.1016/j.jacc.2018.11.003

9. American Heart Association. 2018 Prevention guidelines tool CV risk calculator. Accessed August 23, 2021. http://static.heart.org/riskcalc/app/index.html#!/baseline-risk

10. Rutter MK, Kane K, Lunt M, et al. Primary care–based screening for cardiovascular risk factors in patients with psoriasis. *Br J Dermatol*. 2016;175(2):348-356. doi:10.1111/bjd.14557

11. Ngo-Metzger Q, Zuvekas SH, Bierman AS. Estimated impact of US Preventive Services Task Force recommendations on use and cost of statins for cardiovascular disease prevention. *J Gen Intern Med*. 2018;33(8):1317-1323. doi:10.1007/s11606-018-4497-4

12. Manalo IF, Gilbert KE, Wu JJ. Survey of trends and gaps in dermatologists' cardiovascular screening practices in psoriasis patients: areas still in need of improvement. *J Am Acad Dermatol*. 2015;73(5):872-4.e4. doi:10.1016/j.jaad.2015.07.029

13. Alamdari HS, Gustafson CJ, Davis SA, Huang W, Feldman SR. Psoriasis and cardiovascular screening rates in the United States. *J Drugs Dermatol*. 2013;12(1):e14-e19.

14. Brugts JJ, Yetgin T, Hoeks SE, et al. The benefits of statins in people without established cardiovascular disease but with cardiovascular risk factors: meta-analysis of randomised controlled trials. *BMJ*. 2009;338:b2376. doi:10.1136/bmj.b2376

15. Eder L, Harvey P, Chandran V, et al. Gaps in diagnosis and treatment of cardiovascular risk factors in patients with psoriatic disease: an international multicenter study. *J Rheumatol*. 2018;45(3):378-384. doi:10.3899/jrheum.170379

16. Kimball AB, Szapary P, Mrowietz U, et al. Underdiagnosis and undertreatment of cardiovascular risk factors in patients with moderate to severe psoriasis. *J Am Acad Dermatol*. 2012;67(1):76-85. doi:10.1016/j.jaad.2011.06.035

17. Ganguli I, Shi Z, Orav EJ, Rao A, Ray KN, Mehrotra A. Declining use of primary care among commercially insured adults in the United States, 2008-2016. *Ann Intern Med*. 2020;172(4):240-247. doi:10.7326/M19-1834

18. Barbieri JS, Mostaghimi A, Noe MH, Margolis DJ, Gelfand JM. Use of primary care services among patients with chronic skin disease seen by dermatologists. *JAAD Int*. 2020;2:31-36. doi:10.1016/j.jdin.2020.10.010

19. Weiner BJ, Lewis CC, Stanick C, et al. Psychometric assessment of three newly developed implementation outcome measures. *Implement Sci*. 2017;12(1):108. doi:10.1186/s13012-017-0635-3

20. Sparrow RT, Khan AM, Ferreira-Legere LE, et al. Effectiveness of interventions aimed at increasing statin-prescribing rates in primary cardiovascular disease prevention: a systematic review of randomized clinical trials. *JAMA Cardiol*. 2019;4(11):1160-1169. doi:10.1001/jamacardio.2019.3066

21. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Lancet*. 2007;370(9596):1453-1457. doi:10.1016/S0140-6736(07)61602-X

22. American Association for Public Opinion Research. Survey disclosure checklist. May 13, 2019. Accessed December 13, 2021. https://www.aapor.org/Standards-Ethics/AAPOR-Code-of-Ethics/Survey-Disclosure-Checklist.aspx

23. Fishman J, Lushin V, Mandell DS. Predicting implementation: comparing validated measures of intention and assessing the role of motivation when designing behavioral interventions. *Implement Sci Commun*. 2020;1(1):81. doi:10.1186/s43058-020-00050-4

24. Fishman J, Beidas R, Reisinger E, Mandell DS. The utility of measuring intentions to use best practices: a longitudinal study among teachers supporting students with autism. *J Sch Health*. 2018;88(5):388-395. doi:10.1111/josh.12618

25. Sample size issues for conjoint analysis studies. 2019. Accessed April 15, 2021. https://sawtoothsoftware.com/resources/technical-papers/sample-size-issues-for-conjoint-analysis-studies

26. Van Houtven G, Johnson FR, Kilambi V, Hauber AB. Eliciting benefit-risk preferences and probability-weighted utility using choice-format conjoint analysis. *Med Decis Making*. 2011;31(3):469-480. doi:10.1177/0272989X10386116

27. Cheung KL, Wijnen BFM, Hollin IL, et al. Using best-worst scaling to investigate preferences in health care. *Pharmacoeconomics*. 2016;34(12):1195-1209. doi:10.1007/s40273-016-0429-5

28. Jones LK, Tilberry S, Gregor C, et al. Implementation strategies to improve statin utilization in individuals with hypercholesterolemia: a systematic review and meta-analysis. *Implement Sci*. 2021;16(1):40. doi:10.1186/s13012-021-01108-0

29. Atlantis E, Fahey P, Foster J. Collaborative care for comorbid depression and diabetes: a systematic review and meta-analysis. *BMJ Open*. 2014;4(4):e004706. doi:10.1136/bmjopen-2013-004706

30. Reiter-Brennan C, Dzaye O, Davis D, Blaha M, Eckel RH. Comprehensive care models for cardiometabolic disease. *Curr Cardiol Rep*. 2021;23(3):22.

31. Nijsten T, Rolstad T, Feldman SR, Stern RS. Members of the National Psoriasis Foundation: more extensive disease and better informed about treatment options. *Arch Dermatol*. 2005;141(1):19-26. doi:10.1001/archderm.141.1.19

32. Gustafson A, Lieberman A, Mason J, et al. Dermatologist and patient perspectives on implementing cardiovascular risk prevention in the management of psoriasis: a qualitative study [abstract]. *J Invest Dermatol*. 2021;5(1).