

# Improving Rosacea Outcomes in Skin of Color Patients: A Review on the Nuances in the Treatment and the Use of Cleansers and Moisturizers

Andrew F. Alexis MD MPH,<sup>a,\*</sup> Heather Woolery-Lloyd MD FAAD,<sup>b,\*</sup> Anneke Andriessen PhD,<sup>c</sup> Seemal Desai MD FAAD,<sup>d</sup> George Han MD FAAD,<sup>e</sup> David Rodriguez MD<sup>f</sup>

<sup>a</sup>Clinical Dermatology, Weill Cornell Medical College, New York, NY

<sup>b</sup>Skin of Color Division, Dr Phillip Frost Department of Dermatology and Cutaneous Surgery, University of Miami, Miller School of Medicine, FL

<sup>c</sup>Radboud UMC Nijmegen, Andriessen Consultants, Malden, The Netherlands

<sup>d</sup>Department of Dermatology, The University of Texas Southwestern Medical Center, Innovative Dermatology, PA, Dallas, TX

<sup>e</sup>Department of Dermatology, Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, New York, NY

<sup>f</sup>Research Dadeland Dermatology Group, Department of Dermatology & Cutaneous Surgery, University of Miami, FL

\*Dr Alexis and Dr Woolery-Lloyd are both first authors

## ABSTRACT

**Background:** While rosacea is a common inflammatory condition that affects diverse populations, published data in skin of color (SOC) are limited. This review explored nuances in clinical presentation and treatment considerations in SOC patients with rosacea and the role of cleansers and moisturizers in the management of rosacea in these populations.

**Methods:** A panel reviewed and discussed aspects of rosacea in SOC and possible implications for treatment and maintenance. The outcome of these discussions, coupled with the panel's expert opinion and experience was used to define draft statements. After group discussions and an online review process, the panel agreed on the inclusion and wording of five statements.

**Results:** Studies and anecdotal clinical experience suggest that rosacea is more common in SOC populations than previously reported. The clinical presentation of rosacea across diverse skin types includes the spectrum of clinical subtypes observed in other populations; however, clinical features may be less conspicuous in individuals with higher skin phototypes and the index of suspicion may be lower in SOC populations. To avoid underdiagnosis, dermatologists should consider rosacea in the differential diagnosis of any patient presenting with a history of skin sensitivity, central facial erythema, papules, and pustules. The compromised barrier in rosacea contributes to skin sensitivity. Studies including Chinese rosacea patients showed that using a moisturizer and sunscreen negatively correlated with rosacea development.

**Conclusions:** The use of skincare could improve rosacea symptomatology. These products are recommended before and during prescription therapy and as part of a maintenance regimen as adjuncts.

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## INTRODUCTION

Rosacea is an inflammatory dermatosis with at least a ten percent prevalence reported among White adults and limited data in nonwhite populations.<sup>1-5</sup> Although rosacea is less frequently described in patients with darker skin types, there is increasing awareness that the condition occurs in all racial/ethnic groups, including people of African descent, Asian, and Latino populations.<sup>5-16</sup> The clinical presentation of rosacea across diverse skin types varies widely, and clinical features may be less conspicuous in individuals with richly

pigmented skin<sup>5-8</sup> rosacea deserves more attention from clinicians, especially in darker skin tones where erythema may be more challenging to detect.<sup>5-8</sup> Frequently, this population is misdiagnosed, leading to advanced disease, suboptimal treatment, and greater morbidity.<sup>5-8,18-21</sup>

This review explores rosacea in skin of color (SOC) patients and the potential role of over-the-counter (OTC) skincare in improving treatment outcomes.

## MATERIALS AND METHODS

A panel of five dermatologists from the US (the authors) convened a meeting on August 7, 2021, during the American Academy of Dermatology (AAD) Summer Meeting. The objectives of the meeting were to gain a better understanding of the unique aspects of rosacea in SOC patients and nuances in the treatment approaches of this population.

Additionally, the panel discussed the role of skincare comprising gentle cleansers and moisturizers as adjuncts in treating and maintaining rosacea in SOC patients. Finally, the ingredients of these skincare products were explored, offering insights into the specific role of common key ingredients in cleanser and moisturizer formulations for SOC rosacea patients that may be beneficial or should be avoided.

### Literature Review

In preparation for the meeting, a literature review was conducted on treating and maintaining rosacea and skincare as adjuncts to treatment in different racial/ethnic populations. Searches for English-language literature [2015–2021] took place on June 24, 2021, on PubMed, with Google Scholar as a secondary source. The literature review gave priority to clinical studies published on SOC patients with rosacea and articles describing the current best practices in caring for cutaneous features of rosacea and skin barrier dysfunction. The rosacea literature was reviewed for inclusion of SOC, looking at demographics to include nonwhite populations, Fitzpatrick skin types IV–VI, various ethnic populations, and publications from regions with these populations. Further recent clinical guidelines, consensus papers, and algorithms on rosacea and skincare that specifically addressed nonwhite populations, Fitzpatrick skin types IV–VI, various ethnic populations, and regions with these populations were included in the searches.

Excluded were duplications, articles of insufficient quality [small sample size, flawed methodology], and the most recent publication was used in the case of review articles.

The search terms used focused on SOC rosacea patients nonwhite populations, Fitzpatrick skin types IV–VI, various ethnic populations, and regions with these populations: *Rosacea, pathophysiology, skin barrier dysfunction in rosacea in SOC patients, lipid abnormalities in rosacea-prone skin, prescription treatment, and maintenance for SOC rosacea patients, rosacea guidelines for various ethnic groups, algorithm, consensus recommendations.*

Further searches culled articles from the literature: *OTC rosacea skincare and sunscreen use, cleansers, and moisturizers for rosacea SOC patients nonwhite populations, Fitzpatrick skin types IV–VI, various ethnic populations, and regions with these populations treatment, maintenance, adjunctive treatment,*

*efficacy, safety, tolerability, and skin irritation from OTC skincare use, quality of life aspects, handling, and comfort, adherence to treatment in SOC populations, nonwhite populations, Fitzpatrick skin types IV–VI, various ethnic populations and regions with these populations.*

Of the 168 papers, 104 lacked data contributing to SOC rosacea patients and adjunctive skincare use, leaving 64 articles for further review. After removing 14 duplicate articles, 50 remained; however, the small number of clinical studies on skincare using cleansers and moisturizers as an adjunct to treatment and maintenance for SOC patients with rosacea did not allow for a systematic literature review and grading of the evidence.

### Development of Statements

During the meetings workshop, the panel members discussed the recommendations on rosacea treatment in SOC patients and skincare given in clinical studies, clinical guidelines, consensus papers, and algorithms available per region with different racial/ethnic populations. Drawing from fourteen draft statements, the advisors agreed on five statements for insights and recommendations on treating cutaneous features of rosacea in SOC populations.

### Rosacea Occurrence in Various Ethnic Populations

*Statement 1: Although data are limited, studies and anecdotal clinical experience suggest that rosacea is more common in individuals with darker skin than previously reported.*

Currently, data on nonwhite rosacea patients are limited.

Earlier data from 1935 and the 1980s comprises small-size case studies and are therefore not included in the discussion. Recent studies and anecdotal clinical experience suggest that rosacea is more common in individuals of African ancestry with richly pigmented skin than previously reported. A 1993–2010 US National ambulatory medical care survey on the racial/ethnic distribution of patients with rosacea showed that 2% of rosacea patients were Black, and 2.3% of clinicians believed that rosacea does not occur in people with SOC.<sup>8,19–21</sup>

A 5-year longitudinal cohort study of 705 rosacea patients included 421 (16.27%) African-American and 284 (10.98%) other SOC rosacea patients on North Carolina Medicaid. In this study, physicians prescribed at least one topical rosacea treatment (metronidazole, adapalene, azelaic acid, permethrin, or sulfacetamide).<sup>9</sup>

Various publications, including the treatment and maintenance of rosacea SOC patients, showed that rosacea might be less common in deeply pigmented patients than in White populations but is not rare.<sup>8,10–14,19–22</sup>

A retrospective study in a Tunis teaching hospital from 1990-2003 included 244 rosacea cases with predominantly Fitzpatrick phototype IV-V and found a prevalence of 0.2%.<sup>4,10</sup>

Sun exposure (64%) was the most frequent trigger, followed by thermal stimuli (25%). The diagnosis of rosacea was made using symptoms and clinical features in 185 patients and histological findings in 59 patients. Erythematotelangiectatic type occurred in 12%, papulopustular rosacea in 69%, and rhinophyma in 3.7% of patients. The mean duration between the onset of rosacea symptoms and the first consultation was about 20 months.<sup>10</sup>

A study of rosacea in Korea included one hundred sixty-eight patients diagnosed with rosacea from March 2002 through February 2007.<sup>11</sup> The global assessment with physician rating subtypes revealed 47(92.2%) males and 115(98.3%) females presented erythematotelangiectatic rosacea, and 23 (45.1%) males and 62 (53.0%) females showed papulopustular subtype.<sup>11</sup> The study showed that sun exposure in this population correlated with erythematotelangiectatic type rosacea.<sup>11</sup>

Finally, a Colombian study showed a prevalence of rosacea of 2.85%, which was the highest reported in Latin America.<sup>17</sup>

#### Skin Barrier Dysfunction and SOC Rosacea Patients

Genetic and exogenous factors may trigger rosacea in predisposed patients. Upregulation and dysregulation of the innate immune system and neurovascular dysregulation are essential mechanisms involved in rosacea.<sup>2,23-26</sup> These mechanisms start activating inflammatory cascades leading to acute and chronic inflammation and acute and chronic changes in the facial vasculature.<sup>23-26</sup> Patients with rosacea present with an impaired skin barrier function which could be at the root of the condition or a consequence of activated and chronic inflammation.<sup>24,27</sup>

The intact skin barrier prevents excess water loss and thwarts toxins and dysbiosis. However, harsh chemicals, surfactants, exfoliants, and aggressive cleansers – especially those with a high pH - can damage the skin barrier.<sup>24,27</sup>

Rosacea mainly affects sebaceous gland-rich facial skin. Molecular analysis of permeability barrier alterations in papulopustular rosacea compared to healthy sebaceous gland-rich skin showed significant alterations in the cornified envelope and intercellular lipid lamellae formation, desmosome, and tight junction organizations, barrier alarmins, and antimicrobial peptides.<sup>28</sup> The researchers concluded that these permeability barrier alterations in papulopustular rosacea at the molecular level highlight the importance of barrier repair therapies for rosacea.<sup>28</sup>

The lesional skin of patients is characterized by significantly

increased pH and transepidermal water loss and significantly decreased skin hydration levels, indicating skin barrier dysfunction.<sup>29</sup> Inflammatory skin disease processes such as atopic dermatitis, psoriasis, and acne are associated with barrier deficiency.<sup>28,29</sup> Conversely, exogenously initiated barrier dysfunction and dysbiosis of the cutaneous microbiota may cause or exacerbate the disease state.<sup>24-29</sup> To which extent this applies to rosacea is unclear for various ethnic skin types and requires further research.

#### Rosacea Diagnosis in SOC Patients

*Statement 2: A history of "skin sensitivity" (e.g., burning, stinging from many OTC skincare products) should raise suspicion for diagnosing rosacea in SOC patients.*

The clinical diagnosis of rosacea is based on visual assessment and patient history, excluding other conditions, such as contact dermatitis, seborrheic dermatitis, photodamage, acne vulgaris, and cutaneous lupus, and carcinoid syndrome.<sup>2</sup> Classification of rosacea comprises a patient-focused phenotype approach reflecting the myriad clinical presentations of rosacea patients.<sup>1,2</sup> Rosacea commonly affects the central face with erythema and lesions prominent on the cheeks, forehead, chin, and nose.<sup>1,2</sup> Symptoms of rosacea include facial flushing, stinging, burning, and itching.<sup>1,2</sup> To avoid misdiagnosis of rosacea in SOC, dermatologists should consider rosacea in the differential diagnosis of any patient presenting with a history of skin sensitivity, central facial erythema, papules, and pustules.<sup>30</sup>

Patients with rosacea often complain of low tolerance to skincare. A Chinese retrospective case-control survey of 997 rosacea cases and 1012 skin-healthy controls showed a low tolerance to skincare in the past five years before the onset of rosacea.<sup>31</sup> The chi-square test and the logistic regression analysis revealed a low tolerance of the facial skin to skincare in the rosacea group compared to the controls.<sup>31</sup> The history of facial skin allergic reaction was related to the severity of self-reported symptoms of rosacea, including dryness, burning, stinging, and itching.<sup>31</sup>

*Statement 3: To avoid underdiagnosis of rosacea in SOC, dermatologists should also have a high index of suspicion of rosacea in SOC patients presenting with facial erythema, papules, and pustules.*

Challenges in diagnosis have been described in populations with SOC, which may contribute to disparities in treatment.<sup>5,8,15</sup> The clinical presentation of rosacea across diverse ethnic skin types includes the spectrum of clinical subtypes.<sup>6,9,16</sup> Particularly, erythema and telangiectasia may be challenging to recognize in richly pigmented skin types.<sup>15-19,22,30</sup>

Moreover, the lower index of suspicion and difficulties in

detecting rosacea characteristics in darker skin may lead to misdiagnosis or a delayed diagnosis.<sup>5-8,10,18,19,30</sup> Delayed or inaccurate diagnosis may cause advanced disease, more significant morbidity, and disfigurement due to inadequate or late treatment.<sup>6,15,18,19</sup>

**FIGURE 1.** Diagnosis of rosacea in SOC patients.



Diascopy revealed telangiectasia associated with rosacea on the central face of a woman with Fitzpatrick skin type IV. Photograph courtesy of Jennifer David, DO (Philadelphia, Pennsylvania)<sup>30</sup>

**TABLE 1.**

Management of Cutaneous Features of Rosacea Using Medical Treatment		
Rosacea cutaneous features	Treatment	When lack of response at 8-12 weeks, consider the following
Persistent erythema <sup>1</sup> 	Topical brimonidine or topical oxymetazoline	Laser: PDL In Fitzpatrick phototypes I-III only Nd:YAG - microsecond 1064 nm may be used for all Fitzpatrick phototypes, including IV-VI Intense pulsed light (IPL) on average up to 2-3 treatments. When inflammation is suspected: topical azelaic acid, topical ] metronidazole, topical ivermectin
Both erythema and telangiectasia <sup>2</sup> 	laser and intense pulsed light therapy	--
Papulopustular rosacea <sup>3</sup> 	FDA-approved therapy: Oral doxycycline 40 mg modified-release, topical azelaic acid, topical metronidazole, topical ivermectin, and most recently, topical minocycline foam  Not FDA approved for this indication: Isotretinoin is effective for most aspects of recalcitrant disease and phymas  Doxycycline and minocycline, although antibiotic resistance concerns preclude long-term use.	Continue treatment and consider maintenance with topical azelaic acid, topical metronidazole, topical ivermectin or consider a combination with systemic therapy.  --  --

Modified from van Zuuren 2020.<sup>33</sup> Photo 1: Persistent erythema (phototype type IV)- Photo courtesy of: <https://cdn.mdedge.com/files/s3fs-public/Document/September-2017/086020060.pdf>  
 Photo 2: Erythema and telangiectasia (African American female phototype V). Photo 3: Papulopustular rosacea (Phototype VI). Photo 2 and 3 courtesy of Susan C. Taylor.

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The use of suitable lighting, blanching of the skin, photography of the area against a dark blue background, and dermatoscopy may support accurate diagnosis (Fig 1).<sup>6,7,30</sup>

**The Role of Moisturizers and Cleansers in Treating SOC Patients With Rosacea**

*Statement 4: Quality moisturizers may repair/maintain stratum corneum/barrier function, enhance skin hydration, reduce the likelihood of skin irritation, and can be used as adjuvants to other rosacea therapies. The use of some cleansers (e.g., those with harsh surfactants or those that raise skin pH) may not be suitable for rosacea patients. Combining appropriate skincare (gentle cleansers, moisturizers, and sunscreen) with prescription medications may improve rosacea management; however, skincare's role and beneficial ingredients for rosacea are not well defined and require more studies.*

Although rosacea presentation in SOC may differ,<sup>38</sup> the overall approach to medical therapy is similar to those with lighter skin phototypes and comprises anti-demodex, anti-inflammatory, and anti-angiogenesis treatment modalities (Table 1).<sup>6,7,22,23,32-37</sup>

For safety reasons, the use of energy-based devices for rosacea varies according to skin phototype, with vascular lasers and intense pulse light generally being limited to Fitzpatrick skin phototypes I-IV. Clinical data involving rosacea patients with SOC and their treatment and maintenance are limited.<sup>6</sup> The assumption that treating SOC rosacea populations is similar to White patients is based on clinical experience, rosacea guidelines, and consensus papers from various regions.<sup>6,7,22,23,32-37</sup>

Patient education about the chronic nature of the disease, its long-term control, and management is essential for successful outcomes and helps patients set goals and manage expectations (Box 1).<sup>6,7,22,23,32-37</sup> Prompt, and persistent erythema and inflammation reduction are important in the clearance or reduction of papules and pustules and the mitigation or avoidance of post-inflammatory hyperpigmentation.<sup>6,7,22,23,32-37</sup>

#### Box 1: Rosacea Education and Skincare

Educate SOC rosacea patients on the importance of:

- Avoidance of triggers
- Using gentle cleansers
- Avoiding skincare products with elevated pH
- Avoiding excessive cleansing and exfoliating
- Frequent use of quality moisturizers
- Choosing skincare that promotes a healthy barrier
- Using sun protection with SPF  $\geq$  30

General measures must include preventing exposure to triggering factors avoiding compromising the skin barrier and vasodilatation.<sup>6,7,22,23,32-37</sup> Lifestyle choices include sun avoidance and the use of sunblock.<sup>32-37</sup> General measures further comprise promoting a healthy skin barrier reducing cutaneous symptoms and sensitive skin reactions.<sup>6,7,22,23,32-37</sup>

The skin barrier function includes physical, chemical, and immunological aspects to protect against harmful environmental

factors to prevent their ingress.<sup>38</sup> The skin pH plays an important role in the barrier function. A healthy barrier function depends on stratum corneum pH complex interplay, and exogenous and endogenous processes<sup>38</sup> Lipid processing and the formation of lamellar structures require an acidic skin pH.<sup>38</sup> Elevated skin pH may delay barrier recovery and facilitate skin barrier breakdown.<sup>38</sup> This process is particularly well documented in AD, but also rosacea.<sup>25-29</sup>

A retrospective case-control survey of 997 Chinese rosacea patients and 1012 skin-healthy controls showed that low facial skin tolerance to skin care such as facial masks and harsh cleansers might cause facial allergic reactions in rosacea patients.<sup>31</sup>

Another Chinese retrospective case-controlled survey of 1,245 rosacea cases and 1,538 healthy controls found a close correlation to the development of rosacea and excessive use of a facial cleanser (twice or more a day) and a facial mask (more than four times a week).<sup>39</sup> The study noted that frequent makeup use (more than six times a week), regular beauty salon treatments (more than once a week) and using beauty salon products were associated with rosacea development. The researchers further found a negative correlation with rosacea in subjects using moisturizing products (OR = 0.602, 95%CI 0.386–0.983,  $P=.035$ ) and sunscreen (OR = 0.303–0.507,  $P<.001$  or  $P=.0167$ ).<sup>39</sup>

*Statement 5: Educate SOC rosacea patients on the importance of:*

- Avoidance of triggers
- Using gentle cleansers
- Avoiding skincare products with elevated pH
- Avoiding excessive cleansing and exfoliating
- Frequent use of quality moisturizers
- Choosing skincare that promotes a healthy barrier
- Using mineral sun protection with SPF  $\geq$  30

Education of rosacea patients on avoiding triggers is an essential measure addressed in various guidelines, pathways, and consensus papers.<sup>23,32-34</sup>

**TABLE 2.**

Types of Cleansers	
Type	Details
Soap	<ul style="list-style-type: none"> <li>• True soap, pH 9-10<sup>34,38</sup></li> <li>• Great cleanser, but increases TEWL and penetration of topically applied substances<sup>38</sup></li> <li>• Dissolves intracellular lipids<sup>38</sup></li> </ul>
Syndet (synthetic detergent)	<ul style="list-style-type: none"> <li>• Bars and liquids, pH 4-6 (close to physiological pH)<sup>34,38</sup></li> <li>• Cleans without stripping<sup>38</sup></li> </ul>
Combars	<ul style="list-style-type: none"> <li>• True soap + syndet + antibacterial agent, pH 10-12<sup>38</sup></li> <li>• Kills normal flora as well as problematic, increases irritation<sup>34,38</sup></li> </ul>
Liquid synthetic cleansers	<ul style="list-style-type: none"> <li>• No soap, very mild, pH 5-7</li> <li>• Leave behind moisturizing film<sup>38</sup></li> <li>• Same technology as two in one shampoo</li> </ul>

A Chinese study on 999 rosacea cases compared to 1010 skin-healthy controls showed a positive correlation with rosacea for a high frequency of cleansing (more than once daily) (OR= 1.450) and the use of a large number of cleansers (>5 pieces/year) (OR= 1.612).<sup>40</sup>

Significant risk factors also included the deep cleansing habits, overuse of a cleansing tool (more than four times/week) (OR 2.179), oil control and exfoliating behaviors via daily used products (OR 2.435), facial mask (OR 1.459), and projects in beauty salons (OR 2.688).<sup>40</sup>

Daily use of exfoliating products presented a positive correlation with the progression of the symptoms from flushing to erythema (OR=2.01), papules and pustules (OR=2.28), and telangiectasis (OR=2.14).<sup>40</sup> The researchers concluded that excessive cleansing habits were substantial risk factors for the incidence and progression of rosacea in the Chinese population studied.<sup>40</sup>

Appropriate skincare includes gentle facial cleansing once or twice a day with a near physiologic pH (4–7) synthetic cleanser (Table 2) and application of moisturizers, similar in composition to the skin's lipids.<sup>23,34-37</sup> The use of gentle skincare products with a near-physiological skin pH may improve skin barrier repair and reduce inflammation.<sup>34-37</sup> Rosacea patients often have dry facial skin that can exacerbate symptoms. Using gentle cleansers and frequent application of quality moisturizers can promote or maintain stratum corneal barrier function, enhance skin hydration, and reduce the likelihood of skin irritation.<sup>23</sup> Skincare should also be used as adjuvants to other rosacea therapies.<sup>23,32-34</sup>

Moisturizers used for rosacea-affected skin are preferably rich in ceramides, hyaluronic acid, glycerin, niacinamide, free fatty acids, and without alpha-hydroxy acids.<sup>41-45</sup>

A split-face design study on 102 patients with mild to moderate papulopustular rosacea evaluated skin condition after cleansing with a gentle facial cleanser.<sup>44</sup> The study participants applied azelaic gel 15% to both sides of the face. They then used the provided ceramide containing moisturizer (CeraVe) or a moisturizing cream (Cetaphil) to the right side of the face only. Self-reported scores for stinging, burning, tingling, and itching on each side of the face twice daily for seven days were recorded in a diary. On day seven, the self-reported cumulative symptom score showed a significant reduction for the cleansing regimen with moisturizer ( $P=0.008$ ) compared to baseline, however not for the regimen without moisturizer use.<sup>44</sup>

A percutaneous penetration study on human skin applying the ceramides-containing moisturizer before or after azelaic acid gel 15% did not affect the skin absorption profile of the azelaic

acid gel. The multivesicular emulsion ceramide-containing moisturizing lotion enhanced penetration of the azelaic acid gel when applied before the drug to human skin.<sup>44</sup>

Barrier damage in papulopustular rosacea has been shown to be similar to atopic dermatitis.<sup>28</sup> Ceramide-containing cleansers and moisturizers have been successfully used in various inflammatory skin conditions such as atopic dermatitis, acne, and xerosis and may offer benefits to rosacea patients.<sup>45-48</sup>

Between 61% and 81% of patients with rosacea reported sun exposure as a contributory factor.<sup>23,42</sup> The ROSacea COnsensus (ROSCO) guidelines stress that skincare regimens should include using sunscreen with an SPF  $\geq 30$ .<sup>23</sup> Moisturizers with a sun protection factor may be practical for use in rosacea-prone skin.<sup>42</sup> Further oral photoprotection can be considered using polypodium leucotomos or nicotinamide.<sup>49,50</sup>

## CONCLUSION

There are limited data on rosacea in SOC, but the condition is not rare in this population. In addition, a history of skin sensitivity should raise the index of suspicion of rosacea in SOC populations. Prescription medications combined with gentle cleansers, moisturizers, and sunscreen may support successful rosacea therapy; however, skincare's role and beneficial ingredients for rosacea require more studies.

Increasing SOC subjects in clinical trial trials and increasing resident/physician dermatology education on rosacea in SOC are two critical steps towards increasing awareness of rosacea in SOC.

## DISCLOSURES

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All authors participated in the steps of the project, selection of the literature, review of the manuscript, and agreed with the content.

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## AUTHOR CORRESPONDENCE

Anneke Andriessen PhD

E-mail:..... anneke.a@tiscali.nl