

Seborrheic Dermatitis

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Educational Objectives

After completing this program, readers should be able to:

- Identify the pathophysiology and epidemiology of seborrheic dermatitis.
- Describe and differentiate the treatment options for seborrheic dermatitis.
- Explain the role of the pharmacist in the treatment of seborrheic dermatitis.

Abstract

Seborrheic dermatitis is a common chronic inflammatory skin condition, characterized by scaling and poorly defined erythematous patches. It may be associated with pruritus, and it primarily affects sebum-rich areas, such as the scalp, face, upper chest, and back. Although its pathogenesis is not completely understood, some postulate that the condition results from colonization of the skin of affected individuals with species of the genus *Malassezia* (formerly, *Pityrosporum*). A variety of treatment modalities are available, including eradication of the fungus, reducing or treating the inflammatory process, and decreasing sebum production.



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ited by the absence of validated diagnostic criteria as well as a grading scale of severity; however, as one of the most common skin disorders,² it affects approximately 11.6% of the general population and up to 70% of infants in the first three months of life may have the condition. Among adults, the peak incidence is in the third and fourth decades of life.³ There appears to be an ethnic predilection, with few cases seen in African-Americans.⁴ Seborrheic dermatitis also occurs more frequently in patients with Parkinson's disease and in patients treated with certain psychotropic drugs such as haloperidol decanoate (Haldol, Ortho-McNeil), lithium (Eskalith, GlaxoSmithKline, buspirone (BuSpar, Bristol-Myers Squibb), and chlorpromazine (Thorazine, GlaxoSmithKline).

Seborrheic dermatitis is one of the most common dermatoses seen in individuals infected with human immunodeficiency virus (HIV) infection, particularly those who have a CD4 T-cell count of below 400 cells/mm³.⁵ Other medical conditions associated with an increased incidence of seborrheic dermatitis are neuroleptic-induced parkinsonism, familial amyloidosis, and trisomy 21.⁶⁻⁸

Clinical Presentation and Differential Diagnosis

Seborrheic dermatitis is characterized by the development of pruritic, erythematous patches with easily detachable, greasy large scales. Although it may appear in various anatomical locations, it tends to occur in areas that contain numerous sebaceous glands, such as the scalp, face, upper chest, and back (Table 1). Seborrheic dermatitis of the scalp commonly presents as dandruff, a milder eruption, characterized by smaller dry, flaking scales. In HIV-positive individuals, the onset of the lesions may be sudden; the lesion can be more widespread and recalcitrant with an associated discharge. When seborrheic dermatitis appears on the face, it tends to affect the lateral sides of the nose and nasolabial folds as well as the eyebrows and glabella.

The diagnosis is generally a clinical one, with a strong emphasis on the patient's history and clinical examination findings. A number of conditions may be confused with seborrheic dermatitis, such as psoriasis, atopic and contact dermatitis, and erythrasma. In addition, because of the similarities in distribution, seborrheic dermatitis can be easily confused with rosacea.

In children, seborrheic dermatitis is commonly confused with tinea capitis. During the examination, a superficial skin scraping prepared with potassium hydroxide can be used to confirm the diagnosis. In young patients, seborrheic dermati-

Introduction

A common disorder of the skin, seborrheic dermatitis is characterized by the development of erythematous patches with yellow-gray scales that appear most often appear on the face, scalp, upper chest, and back.¹ A milder variant is dandruff, which is manifested by dry, flaking scales on the scalp. The extent of involvement, as well as the severity of symptoms, helps to dictate treatment.¹

Epidemiology

Estimates of the prevalence of seborrheic dermatitis are lim-

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Table 1 Manifestations of Seborrheic Dermatitis

Site	Subtype
Scalp	Cradle cap, dandruff
Eyes, face	Seborrheic blepharitis
Chest	Annular
Generalized	Erythrodermic

tis can be manifested atypically as a generalized, eczematous eruption, similar to that seen in Wiskott–Aldrich syndrome, but purpura and petechiae are specific for the syndrome. A skin biopsy is rarely needed to make the diagnosis, but it can be useful if the presentation is atypical. The differential diagnosis is presented in Table 2.

Pathogenesis

The pathogenesis of seborrheic dermatitis is not completely understood, but there seems to be a strong association with skin colonization with yeasts of the genus *Malassezia*.^{9,10} These yeasts are present on the skin of affected individuals, and antifungal therapy that decreases the number of *Malassezia* organisms present has been shown to be effective in the treatment of seborrheic dermatitis.¹¹

Although no correlation has been made regarding the number of fungal organisms and severity of disease, several hypotheses suggest the exact pathogenic mechanism used by *Malassezia*. The fact that there is a preponderance of disease in sebum-rich areas has led to the idea that fungal metabolites react with triglycerides released from sebaceous glands, producing an inflammatory mediator.¹¹

Another theory is that the lipid layer of the fungus leads to keratinocyte production of proinflammatory cytokines, causing inflammation and the skin eruption.¹² No genetic predisposition has been identified with seborrheic dermatitis.

Therapy

Several modalities may be effective in the treatment of seborrheic dermatitis. The mechanism of action of the most common treatments includes inhibition of skin yeast colonization, reduction of pruritus and erythema, loosening of the crusts

Table 2 Differential Diagnosis Of Seborrheic Dermatitis

Tinea capitis	Erythrasma
Langerhans cell histiocytosis	Wiskott–Aldrich cutaneous lupus
Psoriasis	Dermatomyositis
Atopic dermatitis	Vitamin B deficiency
Contact dermatitis	Zinc deficiency
Rosacea	Drug eruption

and scales, and reduction of inflammation. These therapies consist of antifungal agents, corticosteroids, immunomodulators, and keratolytics (Table 3). However, some of these modalities have multiple characteristics, such as the anti-inflammatory properties inherent in many of the antifungal agents as well as the keratolytic properties of selenium, zinc, and tar preparations.

Prescription Antifungal Medications

Azoles. Antifungal agents are the mainstay of antiseborrheic therapy, mostly in the azole form. These agents work by inhibiting ergosterol, an important component of the fungal cell wall, via interference with the fungal cytochrome P-450 (CYP 450) system.¹³ This causes an increase in the production of sterol precursors, a fungistatic process that does not allow the fungus to grow or reproduce. Many of the azoles also have anti-inflammatory properties; they inhibit 5-lipoxygenase production, which then blocks leukotriene B₄ synthesis in the skin.¹⁴ The best studied of the azoles are ketoconazole, itraconazole, and bifonazole.

Ketoconazole (Nizoral, PriCara) has undergone at least 10 randomized controlled trials demonstrating its effect on scalp dermatitis and on other parts of the body. Ketoconazole is available in various popular topical over-the-counter preparations, including foams, gels, and creams. It may also be prescribed as a 200-mg/day regimen for four weeks (Table 4).¹⁵ Intermittent use of ketoconazole has also been effective if it is used consistently in inducing remission of the condition,¹⁶ and it may also be effective in combination with other drugs such as zinc and selenium.

Another useful azole is itraconazole (Sporanox, Janssen). Oral itraconazole has an affinity for highly keratinized areas of the body, such as the skin, hair, and nails. The medication persists in the skin for two to four weeks, allowing for a therapeutic reservoir that is beneficial for a shorter duration, thereby aiding in increasing compliance.¹⁷ The suggested regimen for itraconazole capsules is 200 mg/day for seven days.¹⁷

Bifonazole ointment (e.g., Canesten, Bayer) is available in Canada but not in the U.S.. It has also been used effectively.

Table 3 Categories of Medications Used In the Treatment of Seborrheic Dermatitis

Antifungals
• Azoles
• Allyamines
• Benzylamines
• Hydroxypyridones
• Selenium
• Zinc
• Tea tree oil
Immunomodulators
Corticosteroids
Others
• Metronidazole
• Tar
• Phototherapy

Other Prescription Antifungal Agents

Additional antifungal medications that have been useful in the treatment of seborrheic dermatitis are the allylamines (terbinafine), the benzylamines (butenafine), and the hydroxypyridones (ciclopirox).

Allylamines and benzylamines. Both terbinafine (Lamisil, Novartis), an allylamine, and butenafine (Mentax, Penderm) a benzylamine, have similar methods of action; they inhibit squalene epoxidase, an important enzyme in the production of the fungal cell membrane. In addition, terbinafine diffuses directly into sebum. It is available in an oral formulation. After topical administration of butenafine, residual concentrations remain in the skin for up to 72 hours. Butenafine has anti-inflammatory properties, inhibiting ultraviolet B (UVB)-induced erythema.¹⁸

Hydroxypyridones. Ciclopirox (Loprox, Medicis) is a member of the hydroxypyridone family of antifungals. It can be used as a leave-on product in the form of a cream, gel, or solution (topical suspension). It has fungicidal and fungistatic properties against a broad range of fungi as well as *in vitro* activity against gram-positive and gram-negative organisms.^{19,20} Ciclopirox also has anti-inflammatory properties, inhibiting prostaglandin and leukotriene synthesis.¹⁸ Its method of action differs from that of other antifungals. It does not interfere with fungal cell membrane synthesis; instead, it inhibits the uptake of essential compounds via the cell membrane, thereby altering cellular permeability.²¹ The suggested regimen for ciclopirox is a 1% to 1.5% shampoo used two to three times per week until clearance is achieved, then every week to every other week for prophylaxis.²²

Adverse Events. The adverse effects associated with topical antifungals (Table 5) are irritant contact dermatitis in a small percentage of patients as well as a burning or itching sensation and dryness in approximately 2% to 3% of patients.²³ Because oral antifungal agents interfere with the CYP 450 system in the fungus, they may also interfere with the host CYP 450 system, limiting their practical use for the treatment of seborrheic dermatitis. Of the antifungals that work via the fungal CYP 450 system, itraconazole and fluconazole (Diflucan, Pfizer) have the weakest binding to human CYP 450 and consequently cause fewer adverse effects. Among the antifungal agents, ciclopirox is better tolerated and better accepted than ketoconazole.²⁴

Antibiotics

In a randomized, double-blind study by Parsad et al., metronidazole (Flagyl, Pfizer) was effective in a gel formulation when applied twice daily for eight weeks.²⁵ Adverse effects, although not commonly associated with topical metronidazole, may consist mainly of a rare contact sensitization after repeated use.²⁶

Nonprescription Antifungal Agents

Selenium. Selenium sulfide is present in over-the-counter shampoo formulations (e.g., Selsun, Ross). It has been effective in the treatment of seborrheic dermatitis as a twice-weekly regimen,²⁷ but in the same study, it was also shown to be

Table 4 Antifungal Formulations

Azoles

- Ketoconazole (Nizoral): 2% shampoo, foam, cream, gel, 200-mg tablets; itraconazole (Sporanox): 100-mg tablets; bifonazole (Canesten)

Allylamines

- Terbinafine (Lamisil): 1% gel, cream, solution, 250-mg tablets

Benzylamines

- Butenafine (Mentax): 1% cream

Hydroxypyridones

- Ciclopirox (Loprox): 0.77% gel, cream, shampoo, solution, suspension

slightly inferior to ketoconazole. The topical use of selenium has been reported to have a rare association with hyperpigmentation.²⁸

Pyrrithione zinc. Pyrrithione zinc is the active ingredient in most of the over-the-counter anti-dandruff shampoos (e.g., Head and Shoulders, Procter & Gamble), but its method of action is unknown. It is thought to have both fungistatic and antimicrobial activities.²⁹ This product is available in concentrations of 1% and 2% in shampoos as well as a 1% cream formulation.³⁰ Although it was found to be inferior to ketoconazole in a head-to-head study,³¹ it might still be effective alone or in combination with either ketoconazole or ciclopirox.

Tea tree oil. Known as *Melaleuca alternifolia*, tea tree oil is derived from an Australian tree and has been used as a natural alternative for treating scalp seborrheic dermatitis. In one study, some benefit was noted with a 5% concentration;³² however, the product's estrogenic and anti-androgenic properties limit its practical use.³³ The topical use of tea tree oil is generally regarded as safe. Rare adverse reactions have consisted primarily of an occasional irritant dermatitis.³⁴

Topical Corticosteroids

Short-term topical corticosteroid therapy, occasionally prescribed to reduce the inflammatory component of the disease,

Table 5 Adverse Effects of Various Therapies

Topical antifungal agents (e.g., azoles, allylamines): irritant contact dermatitis, itching, burning, dryness

Metronidazole: contact sensitization

Selenium: hyperpigmentation (rare)

Tea tree oil: irritant contact dermatitis

Topical corticosteroids: skin atrophy, telangiectasis, folliculitis, hypopigmentation

Immunomodulators: questionable association with lymphoma

Tar: hyperpigmentation, exfoliative dermatitis, skin atrophy, keratoacanthomas, malignancy

Phototherapy: burning, itching, increased risk of malignancy with long-term use

is not associated with antimicrobial activity. Several corticosteroids of varying potencies have been used to treat seborrheic dermatitis, most commonly hydrocortisone and beclomethasone dipropionate. However, topical corticosteroids have been associated with the potential development of skin atrophy, telangiectasias, folliculitis, and hypertrichosis. These events have led to the replacement of topical corticosteroids by better-tolerated antifungal drugs.³⁵

Seborrheic dermatitis secondary to immunosuppression, such as that associated with HIV infection, has not been associated with an increased growth or number of colonies of *Malassezia (Pityrosporum)*; therefore, treatment with corticosteroids may be most beneficial in this circumstance.³⁶

Immunomodulators

Tacrolimus and Pimecrolimus. Tacrolimus (Protopic, Astellas) and pimecrolimus (Elidel, Galderma) inhibit calcineurin and have been beneficial in the treatment of seborrheic dermatitis. Both drugs act primarily in an anti-inflammatory fashion by inhibiting cytokine production; however, tacrolimus also has potent fungicidal activity *in vitro* against *Malassezia*.³⁷ In randomized trials, both tacrolimus and pimecrolimus have been effective, and they are not associated with the adverse-effect profile of corticosteroids.

However, the side-effect profile associated with these drugs is itself controversial. In 2005 and 2006, respectively, the FDA issued a public health advisory and a boxed warning for tacrolimus³⁸ and pimecrolimus.³⁹ The label change noted that although a causal relationship has not been established, rare cases of malignancy (e.g., skin and lymphoma) have been reported in patients treated with topical calcineurin inhibitors; thus, long-term use of these agents should be avoided and application limited to areas of involvement. Therefore, tacrolimus and pimecrolimus should be used mainly in the short term in patients with seborrheic dermatitis, and its use should be noted to be off-label. The profile for long-term use remains controversial because of the potential for adverse effects.

Other Treatments

Tar. Tar has historically been the treatment of choice for many dermatological diseases. As early as 1895, Kaposi showed its usefulness for seborrheic dermatitis.⁴⁰ Its method of action likely involves its inherent antifungal properties as well as the ability to decrease the inflammatory response. Studies have also shown the ability of tar to reduce sebum production.⁴¹ Tar has been found to be equivalent to ketoconazole in its fungistatic properties,⁴² but concerns about its safety profile remain.

The use of tar commonly leads to the development of local folliculitis, contact dermatitis of the fingers, exacerbation of psoriasis in affected individuals, local skin atrophy, telangiectases, pigmentation, exfoliative dermatitis, and keratoacanthomas. Kaposi also described tar toxicity, consisting of nausea, vomiting, and tarry black urine when the substance was administered to small children, who commonly are affected by seborrheic dermatitis. There is also a possible association with an increased risk of malignancy, specifically squamous cell carcinoma.⁴³ Therefore, a number of concerns are involved with the use of tar for treating seborrheic dermatitis.

Light Therapy. Phototherapy has been proposed as a useful treatment for extensive seborrheic dermatitis, but no randomized trials have been performed to show its efficacy. Adverse effects commonly seen with phototherapy are burning and itching sensations as well as an increased risk of malignancy after exposure to UV light.⁴⁴

Summary

A number of antifungal agents are beneficial for patients with seborrheic dermatitis, chief among them, topical selenium, zinc, ketoconazole, and ciclopirox for milder symptoms. Selenium and zinc are appropriate when disease involvement is mostly limited to the scalp. These agents are especially effective when used in combination, such as with topical corticosteroids or immunomodulators.⁴⁵

Ciclopirox appears to be a better choice than other topical agents for more extensive mild disease. It is easier to use (only twice to three times per week as a shampoo), and its anti-inflammatory properties appear to be more efficacious than those of the other antifungal medications.⁴⁵

Combination therapy may also be useful, especially in the form of selenium or zinc with the addition of a topical antifungal agent.³¹ For more extensive disease involvement, the use of a systemic antifungal medication may be necessary, such as oral itraconazole or terbinafine.¹⁵ Some concerns exist about the safety of these systemic agents; therefore, they should be reserved for severe cases.¹⁵

Role of the Pharmacist

Because seborrheic dermatitis is a condition that is visible, patients commonly feel embarrassed and may view themselves as disfigured. Patients can benefit greatly from the input of a pharmacist. The pharmacist should obtain a medication history to ascertain the severity of the patient's symptoms, then offer counseling about the most appropriate over-the-counter regimen. The pharmacist may also refer the patient to a specialist if necessary. The pharmacist should discuss the goals of treatment, realistic expectations, length of therapy, appropriate use of products, the importance of adhering to the regimen, and any possible adverse effects.

To decrease the risk of drug interactions, the pharmacist should maintain updated medication profiles for each patient, including the use of herbal products, nonprescription drugs, and natural supplements. The pharmacist should monitor for concomitant drugs with a narrow therapeutic index or drugs that may interact with other medications. The range of treatments for seborrheic dermatitis can be overwhelming to patients, but a pharmacist can help find the appropriate therapy or advise them when consultation with a dermatologist is warranted.

Pharmacists can be helpful in counseling patients about adverse effects, treatment outcomes, compliance, and the appropriate use of their prescribed therapies.

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Conflict-of-Interest Statement (COI Policy)

Dr. Berk has no relationships to disclose. Dr. Scheinfeld reports that he has financial relationships with Stiefel Laboratories as a consultant, as a scientific advisor, and as a member of the speaker's bureau.

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5. We are now issuing electronic certificates for CE credit. Please be sure to include your e-mail address, if applicable, on the CE Registration and Evaluation Form. If you do not have e-mail, a certificate will be mailed to you.
6. Payment of \$10 per exam is required for processing and maintenance of records. Make checks payable to P&T®. This processing fee is non-refundable.
7. Send the completed form, answer sheet, and \$10 payment to:
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Attn: Continuing Education Credit
1015 Walnut Street, Suite 115
Philadelphia, PA 19107
8. Be sure to mail the CE Registration and Evaluation Form and your \$10 payment within one year of the date of publication. After that date, this article will no longer be designated for credit and forms cannot be processed.

Continuing Education Questions for Physicians and Pharmacists

TOPIC: Seborrheic Dermatitis

ACPE Program #0079-0000-10-018-H01-P

CE Evaluation: Select the one best answer to each of the following questions, and record your response on the examination answer sheet. Complete the additional requested information. Forward the answer sheet, with appropriate payment, to The Jefferson School of Population Health, Thomas Jefferson University, at the address indicated. A certificate of completion will be mailed within six to eight weeks of receipt of your exam/payment. (A minimum test score of 70% is required.)

Multiple Choice

Select the one correct answer.

- Seborrheic dermatitis treatments employ all of the following mechanisms of action except:**
 - inhibition of skin yeast colonization.
 - reduction of pruritus and erythema.
 - loosening of crusts and scales.
 - increasing inflammation.
- Common therapies for seborrheic dermatitis include all of the following drug classes except:**
 - fluoroquinolones.
 - antifungal agents.
 - corticosteroids.
 - immunomodulators.
- Which of the following antifungal medication classes is not commonly used in the treatment of seborrheic dermatitis?**
 - azoles
 - polyenes
 - allylamines
 - benzylamines
- Which of the following is the usual recommended ketoconazole regimen for the treatment of seborrheic dermatitis?**
 - a 200-mg/day regimen for one week
 - a 500-mg/day regimen for two weeks
 - a 200-mg/day regimen for four weeks
 - a 500-mg/day regimen for four weeks
- All of the following are common side effects associated with the use of tar for the treatment of seborrheic dermatitis except:**
 - local folliculitis.
 - contact dermatitis.
 - exacerbation of psoriasis.
 - headache.
- Although the pathogenesis of seborrheic dermatitis is not completely understood, it is postulated that it is a result of the colonization of the skin by which fungus?**
 - Glomeromycota*
 - Malassezia*
 - Candida*
 - Lachancea*
- The most common areas on the body where erythematous patches associated with seborrheic dermatitis are found include all of the following except:**
 - the back.
 - the upper chest.
 - the shins.
 - the scalp.
- Seborrheic dermatitis is common in infants during the first three months of life. What percentage of infants are affected?**
 - 30%
 - 50%
 - 70%
 - 90%
- All of the following make patients more susceptible to seborrheic dermatitis except:**
 - a high-protein diet.
 - the third or fourth decade of life.
 - Parkinson's disease.
 - the use of certain psychotropic drugs such as haloperidol and lithium.
- Which of the following is a proposed mechanism for the inflammation and skin eruption common in seborrheic dermatitis?**
 - production of pro-inflammatory cytokines in the skin resulting from a reaction to the lipid layer of the fungus
 - an acute hypersensitivity reaction that results in mucosal inflammation
 - components of the fungal cell membranes reacting with the surface of the keratinocytes, allowing for recognition by the antigen-presenting cells of the epidermis
 - a T-cell mediated immune response to urushiol produced by the *Malassezia* genus of fungi

CE Registration and Evaluation Form

Date of publication: **June 2010**

Title: **Seborrheic Dermatitis**

Authors: **Thomas Berk, MD, and Noah Scheinfeld, MD**

Submission deadline: **June 30, 2011**

ACPE Program #0079-0000-10-018-H01-P

Registration

Name: _____ Degree: _____

Street address: _____ Last 4 Digits of Social Security No. (Web ID): _____

City: _____ State: _____ Zip: _____ Telephone: _____

E-mail address: _____ Check one: Physician Pharmacist Other

Time needed to complete this CE activity in hours: 0.5 hr 1 hr 1.5 hr 2 hr Other _____

Certification: I attest to having completed this CE activity. _____

Signature (required) _____ Date _____

Answer Sheet

Please fill in the box next to the letter corresponding to the correct answer

- | | | | | | | | |
|-------------------------------|----------------------------|----------------------------|----------------------------|--------------------------------|----------------------------|----------------------------|----------------------------|
| 1. a <input type="checkbox"/> | b <input type="checkbox"/> | c <input type="checkbox"/> | d <input type="checkbox"/> | 6. a <input type="checkbox"/> | b <input type="checkbox"/> | c <input type="checkbox"/> | d <input type="checkbox"/> |
| 2. a <input type="checkbox"/> | b <input type="checkbox"/> | c <input type="checkbox"/> | d <input type="checkbox"/> | 7. a <input type="checkbox"/> | b <input type="checkbox"/> | c <input type="checkbox"/> | d <input type="checkbox"/> |
| 3. a <input type="checkbox"/> | b <input type="checkbox"/> | c <input type="checkbox"/> | d <input type="checkbox"/> | 8. a <input type="checkbox"/> | b <input type="checkbox"/> | c <input type="checkbox"/> | d <input type="checkbox"/> |
| 4. a <input type="checkbox"/> | b <input type="checkbox"/> | c <input type="checkbox"/> | d <input type="checkbox"/> | 9. a <input type="checkbox"/> | b <input type="checkbox"/> | c <input type="checkbox"/> | d <input type="checkbox"/> |
| 5. a <input type="checkbox"/> | b <input type="checkbox"/> | c <input type="checkbox"/> | d <input type="checkbox"/> | 10. a <input type="checkbox"/> | b <input type="checkbox"/> | c <input type="checkbox"/> | d <input type="checkbox"/> |

Evaluation

Rate the extent to which:

	Very High	High	Moderate	Low	Very Low
1. Objectives of this activity were met	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. You were satisfied with the overall quality of this activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Content was relevant to your practice needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Participation in this activity changed your knowledge/attitudes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. You will make a change in <i>your practice</i> as a result of participation in this activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. This activity presented scientifically rigorous, unbiased, and balanced information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Individual presentations were free of commercial bias	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Adequate time was available for Q&A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Which ONE of the following best describes the impact of this activity on your performance:					
<input type="checkbox"/> This program will not change my behavior because my current practice is consistent with what was taught.					
<input type="checkbox"/> This activity will not change my behavior because I do not agree with the information presented.					
<input type="checkbox"/> I need more information before I can change my practice behavior.					
<input type="checkbox"/> I will immediately implement the information into my practice.					
10. Will you take any of the following actions as a result of participating in this educational activity (check all that apply)					
<input type="checkbox"/> Discuss new information with other professionals					
<input type="checkbox"/> Discuss with industry representative(s)					
<input type="checkbox"/> Other _____					
<input type="checkbox"/> Consult the literature					
<input type="checkbox"/> Participate in another educational activity					
<input type="checkbox"/> None					

Send the completed form and \$10 payment (make checks payable to P&T) to: The Jefferson School of Population Health, Thomas Jefferson University, Attn: Continuing Education Credit, 1015 Walnut Street, Suite 115, Philadelphia, PA 19107.