

Contains Nonbinding Recommendations
Draft Guidance on Butenafine Hydrochloride

This draft guidance, once finalized, will represent the Food and Drug Administration's (FDA's) current thinking on this topic. It does not create or confer any rights for or on any person and does not operate to bind the FDA or the public. You can use an alternative approach if the approach satisfies the requirements of the applicable statutes and regulations. If you want to discuss an alternative approach, contact the Office of Generic Drugs.

Active Ingredient: Butenafine hydrochloride

Dosage Form; Route: Cream; topical

Recommended Studies: One study

1. Type of study: Bioequivalence Study with Clinical Endpoint
Design: Randomized, double blind, parallel, placebo-controlled in vivo
Strength: 1%
Subjects: Males and nonpregnant, nonlactating females with tinea pedis
Additional comments: Specific recommendations are provided below.

Analytes to measure (in appropriate biological fluid): Not Applicable

Bioequivalence based on (90% CI): Clinical endpoint

Waiver request of in vivo testing: Not Applicable

Dissolution test method and sampling times: Not Applicable

Applicants intending to propose an alternative approach by which to demonstrate bioequivalence should refer to the guidance for industry *Controlled Correspondence Related to Generic Drug Development* and the guidance for industry *Formal Meetings Between FDA and ANDA Applicants of Complex Products Under GDUFA* for additional information describing the procedures on how to clarify regulatory expectations regarding your individual drug development program.

Additional comments regarding the bioequivalence study with clinical endpoint:

1. The Office of Generic Drugs (OGD) recommends a bioequivalence study with clinical endpoint in the treatment of tinea pedis. Subjects are to be randomized to receive the generic butenafine hydrochloride topical cream, 1%, the reference product, or the placebo vehicle. The study drug is to be administered by gently massaging the cream into the affected and surrounding skin areas twice daily, in the morning and evening, for 7 consecutive days (i.e., 1 week). The primary endpoint is to be evaluated at the test-of-cure visit (Study Week 6, 5 weeks after the end of treatment).

2. Although all tinea pedis lesions on both feet are to be treated in this study, a target lesion on one foot is to be identified as the most severe lesion and evaluated at the baseline visit and at each study visit. Score each of the following signs and symptoms using the following scale:
 - a. **Signs:** fissuring/cracking, erythema, maceration, and scaling
 - b. **Symptoms:** pruritus and burning/stinging
 - c. **Scoring Scale:** Each score should be objectively defined. The following is an example of an acceptable scale.

| | | |
|---|------------|---|
| 0 | = none | (complete absence of any signs or symptoms) |
| 1 | = mild | (slight) |
| 2 | = moderate | (definitely present) |
| 3 | = severe | (marked, intense) |
3. Inclusion Criteria (the sponsor may add additional criteria):
 - a. Males and females aged ≥ 18 years.
 - b. Clinical diagnosis of tinea pedis with lesions localized to the interdigital spaces or predominantly interdigital, but may extend to other areas of the foot (the non-interdigital lesions should not be hyperkeratotic, i.e., characteristic of tinea pedis moccasin), and provisionally confirmed at baseline by a positive potassium hydroxide (KOH) wet mount preparation (i.e., skin scrapings from the target site are placed on a microscope slide with a drop of 10% KOH, and microscopic examination reveals segmented fungal hyphae).
 - c. The sum of the clinical signs and symptoms scores of the target lesion is at least 4, including a minimum score of at least 2 for erythema AND a minimum score of 2 for either scaling or pruritus (on a scale of 0 to 3, where 2 indicates moderate severity).
4. Exclusion Criteria (the sponsor may add additional criteria):
 - a. Pregnant or lactating or planning to become pregnant during the study period.
 - b. Use of antipruritics, including antihistamines, within 72 hours prior to entry into the study.
 - c. Use of topical corticosteroid, antibiotic or antifungal therapy within 2 weeks prior to entry into the study.
 - d. Use of systemic (e.g., oral or injectable) corticosteroid, antibiotic or antifungal therapy within 1 month prior to entry into the study.
 - e. Use of oral terbinafine or itraconazole within 2 months prior to entry into the study.
 - f. Use of immunosuppressive medication or radiation therapy within 3 months prior to entry into the study.
 - g. Confluent, diffuse moccasin-type tinea pedis of the entire plantar surface.
 - h. Presence of any other infection of the foot or other disease process that might confound the treatment evaluation.
 - i. History of dermatophyte infections unresponsive to systemic or topical antifungal drugs.
 - j. Known hypersensitivity to clotrimazole or to any component of the formulations.

5. A positive skin fungal culture at baseline should not be an inclusion criterion due to the time lag between obtaining the culture specimen and receiving the culture results. However, a skin fungal culture must be obtained at baseline at the target site. Testing should be performed to identify the isolates at the species level (e.g., *Trichophyton rubrum*, *Trichophyton mentagrophytes*, *Trichophyton tonsurans*, or *Epidermophyton floccosum*). Only subjects with a pretreatment baseline skin fungal culture from the target site that is positive for *Trichophyton rubrum*, *Trichophyton mentagrophytes*, *Trichophyton tonsurans*, or *Epidermophyton floccosum* should be included in the per protocol (PP) and modified intent to treat (mITT) populations for the primary endpoint analysis. Subjects with a negative baseline fungal culture should be excluded from the PP and mITT populations but included in the safety population for the safety analyses.
6. *Trichophyton rubrum* is the most common infecting organism in tinea pedis. Therefore, > 50% of the subjects should have fungal cultures positive for *T. rubrum* upon entry into the study.
7. Subjects should avoid the use of occlusive wrappings or dressings over the application site.
8. The protocol should include a list of the prescription and over-the-counter drug products that are prohibited during the study, such as:
 - a. Any other topical products applied to the target site
 - b. Systemic (e.g., oral or injectable) antibiotics or antifungals.
 - c. Systemic corticosteroid or immunosuppressive drugs.
 - d. Antipruritics, including antihistamines, within 24 hours of study visits.
9. The recommended primary endpoint of the study is the proportion of subjects with therapeutic cure, defined as both mycological cure and clinical cure, at the test-of-cure visit conducted 5 weeks (+/- 4 days) after the end of treatment, (Study Day 38-46). Mycological cure is defined as a negative KOH test AND a negative fungal culture. Clinical cure is defined as a total severity score no more than 2 with no individual severity score greater than 1, on a 4-point scale provided above.
10. Subjects who receive or self-administer topical drug therapy to the feet for the treatment of irritation/pruritus after the treatment phase of the study should be analyzed in the mITT and PP populations as a treatment failure.
11. Refer to the product-specific guidance on Adapalene; Benzoyl Peroxide Topical Gel 0.3%; 2.5% for a recommended approach to statistical analysis and study design for bioequivalence studies with clinical endpoints.¹
12. Study data should be submitted in a standardized format. Please refer to the study data standards published at www.fda.gov²

¹ [Product-Specific Guidances for Generic Drug Development available at: https://www.fda.gov/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/ucm075207.htm](https://www.fda.gov/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/ucm075207.htm)

² Study Data Standards for Submission to CDER and CBER available at:
<https://www.fda.gov/ForIndustry/DataStandards/StudyDataStandards/ucm587508.htm>