A retrospective analysis of the duration of oral antibiotic therapy for the treatment of acne among adolescents: Investigating practice gaps and potential cost-savings

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Background: Duration of oral antibiotic therapy in acne has not been widely studied. Recent guidelines suggest it should be limited to 3 to 6 months.

Objective: We sought to compare the duration of oral antibiotic use with recent guidelines and determine the potential cost-savings related to shortened durations.

Methods: This is a retrospective cohort study from the MarketScan Commercial Claims and Encounters database. Claims data were used to determine duration and costs of antibiotic therapy.

Results: The mean course duration was 129 days. The majority (93%) of courses were less than 9 months. Among the 31,634 courses, 18,280 (57.8%) did not include concomitant topical retinoid therapy. The mean (95% confidence interval) duration with and without topical retinoid use was 133 (131.5-134.7) days and 127 (125.4-127.9) days, respectively. The mean excess direct cost of antibiotic treatment for longer than 6 months was $580.99/person.

Limitations: Claims cannot be attributed to a specific diagnosis or provider. The database does not provide information on acne severity.

Conclusions: Duration of antibiotic use is decreasing when compared with previous data. However, 5547 (17.53%) courses exceeded 6 months, highlighting an opportunity for reduced antibiotic use. If courses greater than 6 months were shortened to 6 months, savings would be $580.99/person. (J Am Acad Dermatol 2014;71:70-6.)

Key words: acne treatment; acne vulgaris; costs; oral antibiotics; topical retinoids; treatment guidelines.

Acne is a common condition affecting approximately 90% of teenagers.[1,2] In 2004, costs attributed to acne exceeded $2.5 billion. Of this, $1.74 billion were associated with prescription drugs.[3] There has been interest in ensuring health care costs are associated with quality outcomes. Evidence-based practice is one way to reveal opportunities to improve outcomes and efficiency.

In 2003 and 2009, an international group of experts in acne research released recommendations for the use of oral antibiotics.[4,5] They suggested that oral antibiotics should be administered for 3 months and then discontinued if a patient has little or no

clinical improvement.[5] The optimal duration of antibiotics therapy is unknown; however, recommendations of recently published guidelines suggest that the duration of antibiotic therapy can be limited to 3 to 6 months.[5-9] These recommendations are supported by the finding that improvement from oral antibiotics largely occurs in 6 to 8 weeks.[10] In addition, trials have shown that after 3 months of oral antibiotics patients have sustained improvement of at least 50% at 12 to 24 weeks at a rate of 74.1% to 84.7% with a topical retinoid and 45.8% to 63.5% with a vehicle control.[11-14] These findings suggest that short courses of antibiotics can be beneficial, and effects persist for months. Shortening the duration of antibiotic therapy could alleviate concerns about bacterial resistance, reduce medication-related adverse effects, and decrease spending on prescription drugs.

There are few published data regarding the use of oral antibiotics for acne. The mean duration of antibiotic treatment was reported in 2 studies in 1983 and 2003 as 21 (range 6-48) months and 11.5 (SD = 18.7) months, respectively.[15,16] Thus, given the aforementioned concerns and recent recommendations, there is a need to re-evaluate long-term use of antibiotics for acne. The aims of this study are to compare the duration of oral antibiotic use with recent guidelines and to describe the costs and potential cost-savings related to shortened courses using a national insurance claims database. Additional data on topical retinoid use were gathered to assess how often topical retinoids were prescribed with oral antibiotics.

METHODS
Data source

This is a retrospective cohort study from the MarketScan Commercial Claims and Encounters database from January 1, 2008, through December 31, 2010. The database consists of claims for employees, retirees, and dependents of more than 250 employers nationwide. Individuals have private insurance plans; no Medicaid or Medicare data are included. The database includes claims from more than 130 payers and describes health care use and expenditures for approximately 56 million individuals per year. Claims are identified by unique patient identifiers and contain information on age,

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CAPSULE SUMMARY

- Expert guidelines recommend shortening oral antibiotic therapy for acne and using topical retinoids as effective maintenance therapy.

- Our database study found that the average oral antibiotic course was 129 days. In all, 58% of courses did not include a concomitant topical retinoid.

- Shortened durations can reduce costs and concerns about bacterial resistance.

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gender, location, and type of plan. Pharmacy claims contain information on medications (dosage, strength, and amount dispense), days supplied, and costs. It does not capture prescriptions that were not filled.

Study design and study population

The study population consists of individuals aged 9 to 21 years who were continuously enrolled with at least 2 claims for a diagnosis of acne (*International Classification of Diseases, Ninth Revision* code 706.1) within 18 months and seen by a dermatologist. Enrollees excluded were those with a diagnosis that would require an oral antibiotic typically used for acne (folliculitis, rosacea, Lyme disease, Rocky Mountain spotted fever, chlamydia, syphilis, malaria, pneumonia) or would require a medication known to cause or exacerbate acne (systemic steroids [testosterone, progesterone, corticosteroids], lithium, phenobarbital, phenytoin, epidermal growth factor inhibitors, isoniazid). Patients treated with isotretinoin within 30 days of an antibiotic were excluded to avoid courses shortened as a result of therapeutic escalation. Patients who were treated with isotretinoin before antibiotic use or more than 30 days after a course were included.

Eligible oral antibiotic and topical retinoid claims were identified by the National Drug Code associated with their generic names and their Master Form Code. Drug claims were then extracted for each qualified antibiotic. A long-term antibiotic course was defined as at least 60 days, as this is the minimum duration (about 8 weeks) to demonstrate clinical effectiveness.[5] Shorter courses were excluded to eliminate antibiotics prescribed for acute issues or those who stopped treatment prematurely. A course was composed of 1 or multiple serial prescriptions. The end date was defined as the date of the last prescription claim plus the days supplied. Adherence is often imperfect for chronic medications, with missed doses and delays between distributions.[5,17-20] To capture multiple distributions as part of a single course, distributions separated by less than 14 days were considered to be part of 1 course. Some analyses were duplicated using a 21- or 28-day delay between drug distributions to investigate if the clinical outcomes were sensitive.