

## Is Prior Authorization of Topical Tretinoin for Acne Cost Effective?

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### **Abstract**

**Objective:** To determine whether prior authorization of topical tretinoin for acne is in the best interest of health insurers and, if so, to determine the optimal prior authorization age for topical tretinoin.

**Study Design:** A retrospective, cross-sectional study of data from the National Ambulatory Medical Care Survey was performed.

**Patients and Methods:** We performed a sensitivity analysis using published data on the age distribution for topical tretinoin prescriptions for acne and nonacne indications to estimate the cost of topical tretinoin and the cost of performing prior authorizations as a function of the prior authorization age.

**Results:** A prior authorization age of 25 for topical tretinoin is not cost effective for health insurers. If prior authorization is required, an age threshold of 35 or older is most cost effective. The total cost of topical tretinoin (the sum of the drug costs plus the prior authorization costs) changes little with changes in the prior authorization age; if the prior authorization age is set too low, total costs increase (because the number of prior authorizations increase).

**Conclusions:** Prior authorization for topical tretinoin is of no great benefit to insurers. As the prior authorization age decreases, the cost of requir-

ing prior authorization increases. Eliminating prior authorization altogether would result in at most a small increase in costs and would be balanced by the benefits to both patients and physicians.

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In the context of drug utilization management, prior authorization refers to the preapproval process required for reimbursement of prescriptions for particular drugs or drug categories.<sup>1</sup> Health insurers use prior authorization to help control drug costs.<sup>2,3</sup> In theory, prior authorization restricts the use of costly, newly introduced, or potentially toxic drugs to only those patients who need them.<sup>1</sup> Prior authorization can result in savings to insurers when applied to expensive medications that have less expensive alternatives, such as new antibiotics and nonsteroidal anti-inflammatory agents<sup>4,5</sup>; in practice, prior authorization generally is limited to only a few expensive agents.<sup>2,6</sup> The prior authorization process is inconvenient for patients and time-consuming for physicians.<sup>7,8</sup> The administrative expense of prior authorization is not well documented<sup>1</sup> and may account for the use of prior authorization only for expensive drugs and its abandonment in other cases.<sup>8</sup>

Topical tretinoin is approved for treating acne vulgaris, mottled hyperpigmentation, surface roughness, and fine wrinkling.<sup>9-11</sup> Although most topical tretinoin use is for acne, it has also been used effectively for other disease states.<sup>10,12,13</sup> Health insurers may pay for topical tretinoin for some indications but not for others and may use a prior authorization process to determine for which instances the costs will be covered.<sup>14</sup> To decrease the costs associated with prior authorization of every prescription for topical tretinoin, an age threshold is sometimes used to distinguish covered prescriptions from those that

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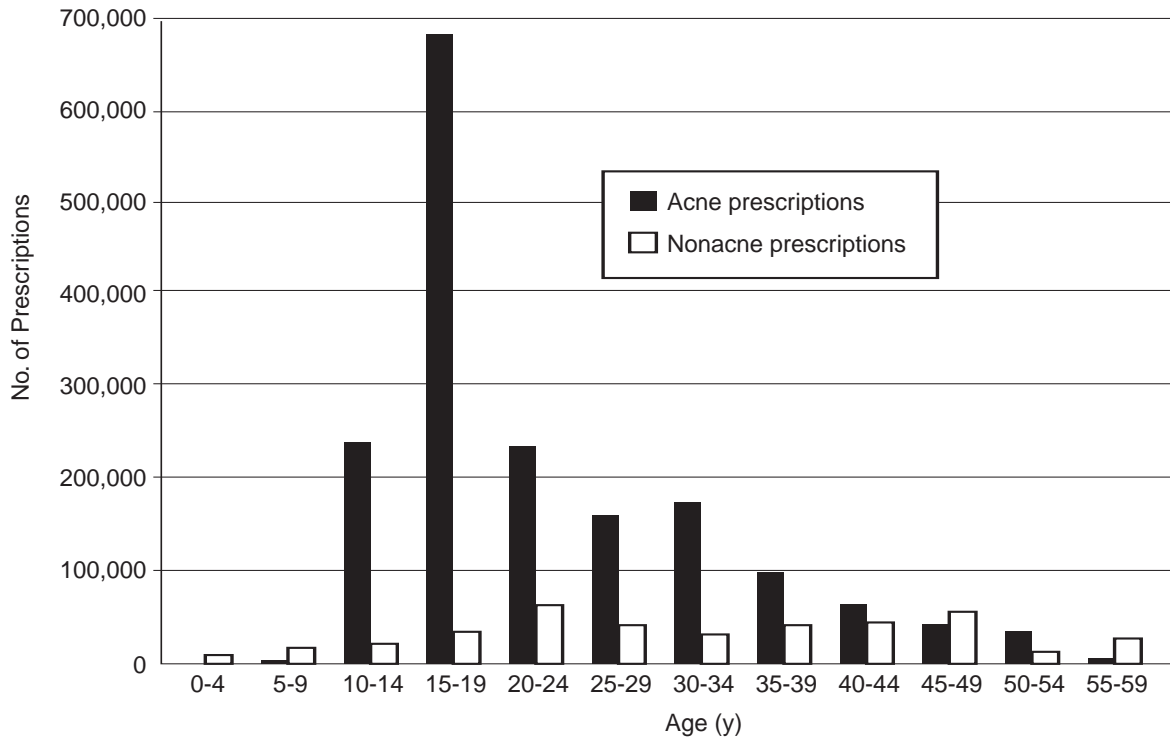
are not covered. The use of an age threshold is based on the assumption that topical tretinoin is used primarily for acne (a covered indication) in the young and for photoaging (a noncovered indication) in older patients. An age threshold of 25 is typical for topical tretinoin,<sup>14</sup> although acne, and topical tretinoin use for acne, occurs frequently in patients in their 30s and 40s.<sup>12</sup> Choosing a prior authorization age that is too low results in added costs to the insurer and inconvenience to the physician and patient. The purpose of this study was to determine whether prior authorization for topical tretinoin is in the best interest of the insurer and, if so, to determine the optimal prior authorization age for topical tretinoin.

... METHODS ...

We determined the total cost of topical tretinoin prescriptions to the insurer (ie, the sum of the cost

of topical tretinoin plus the cost of performing prior authorizations) as a function of the prior authorization age. Our model assumed that topical tretinoin was covered for all patients with acne above and below the prior authorization age and for patients without acne below the prior authorization age. We made the conservative assumption that only patients with acne would attempt prior authorization (this assumption favors the use of prior authorization in the cost analysis), and therefore the cost of performing the prior authorizations was the number of patients with acne above the prior authorization age times the unit cost of the prior authorization. Thus we determined the cost for tretinoin ( $C_{ra}$ ) and the cost of doing the prior authorizations ( $C_{pa}$ ) using the following equations:  $C_{ra} = P_{ra} \times (N_{a,b} + N_{a,a} + N_{na,b})$  and  $C_{pa} = P_{pa} \times N_{a,a}$ , where  $P_{ra}$  is the unit cost to the insurer for topical tretinoin,  $P_{pa}$  is the unit expense of doing a single prior authorization,  $N_{na,b}$  is the number of patients below the prior authorization age treated with topical tretinoin for

**Figure 1.** Number of Topical Tretinoin Prescriptions for Acne and Nonacne Indications by Age



acne,  $N_{a,a}$  is the number of patients above the prior authorization age treated with topical tretinoin for acne, and  $N_{na,b}$  is the number of patients below the prior authorization age treated with topical tretinoin for nonacne indications. The number of patients in each category was obtained from published data<sup>12</sup> for 5-year age intervals and was normalized to 100,000 covered lives (Figure 1). A sample calculation is presented in the Table.

We performed a sensitivity analysis to determine the prior authorization age associated with the minimum total cost for different topical tretinoin unit costs and different unit expenses of doing prior authorizations. The prior authorization age with the minimum total cost was determined by identifying the prior authorization age that minimized total cost ( $C_t$ ), where  $C_t = C_{ra} + C_{pa} = P_{ra} \times (N_{a,b} + N_{a,a} + N_{na,b}) + P_{pa}$

$\times N_{a,a}$ . In the model,  $N_{a,b}$ ,  $N_{a,a}$ , and  $N_{na,b}$  were obtained from previously published data<sup>12</sup> on the age distribution of topical tretinoin use, and the sensitivity analysis was performed for different estimates of  $P_{ra}$  and  $P_{pa}$ .

... RESULTS ...

The total cost of topical tretinoin, the cost of topical tretinoin for patients without acne, and the cost of prior authorizations were calculated assuming a topical tretinoin unit cost per prescription of \$28 (the estimated distributor cost) and a unit expense of \$7.50 for performing a single prior authorization. As expected, as the prior authorization age decreased, the costs for topical tretinoin for patients

**Table.** Sample Calculation of Optimal Authorization Age

Age Group (y)	Tretinoin Prescriptions for Acne	Sum of all Tretinoin Prescriptions for Acne Up to Given Age	Tretinoin Prescriptions Not for Acne	Sum of Tretinoin Prescriptions for Acne Up to Given Age	Sum of Tretinoin Prescriptions for Acne Above Given Age	Tretinoin Cost	Prior Authorization Cost	Total Cost (Tretinoin Costs + Prior Authorization Costs)	Cost per 100,000 Lives (Total Costs per US Population/ 2500)
0-4	0	0	5522	5522	1,733,231	48,685,084	17,332,310	66,017,394	26,407
5-9	1332	1332	10,097	15,619	1,731,899	48,967,800	17,318,990	66,286,790	26,515
10-14	238,010	239,342	21,338	36,957	1,493,889	49,565,264	14,938,890	64,504,154	25,802
15-19	683,831	923,173	34,899	71,856	810,058	50,542,436	8,100,580	58,643,016	23,457
20-24	234,068	1,157,241	62,908	134,764	575,990	52,303,860	5,758,900	58,063,760	23,226
25-29	157,786	1,315,027	40,399	175,163	418,204	53,435,032	4,182,040	57,617,072	23,047
30-34	174,585	1,489,612	30,034	205,197	243,619	54,275,984	2,436,190	56,712,174	22,685 *
35-39	97,514	1,587,126	42,974	248,171	146,105	55,479,256	1,461,050	56,940,306	22,776
40-44	64,913	1,652,039	46,990	295,161	81,192	56,794,976	811,920	57,606,896	23,043 *
45-49	46,995	1,699,034	55,803	350,964	34,197	58,357,460	341,970	58,699,430	23,480
50-54	30,560	1,729,594	14,175	365,139	3637	58,754,360	36,370	58,790,730	23,516
55-59	3637	1,733,231	28,937	394,076	0	59,564,596	0	59,564,596	23,826

\*The lowest cost of \$22,685 occurs at a prior authorization age of 35.

†Tretinoin prescriptions for acne patients and for nonacne patients below the prior authorization age x a tretinoin unit cost of \$28.

‡Patients above the prior authorization age prescribed Tretinoin for Acne x a unit expense of \$10.

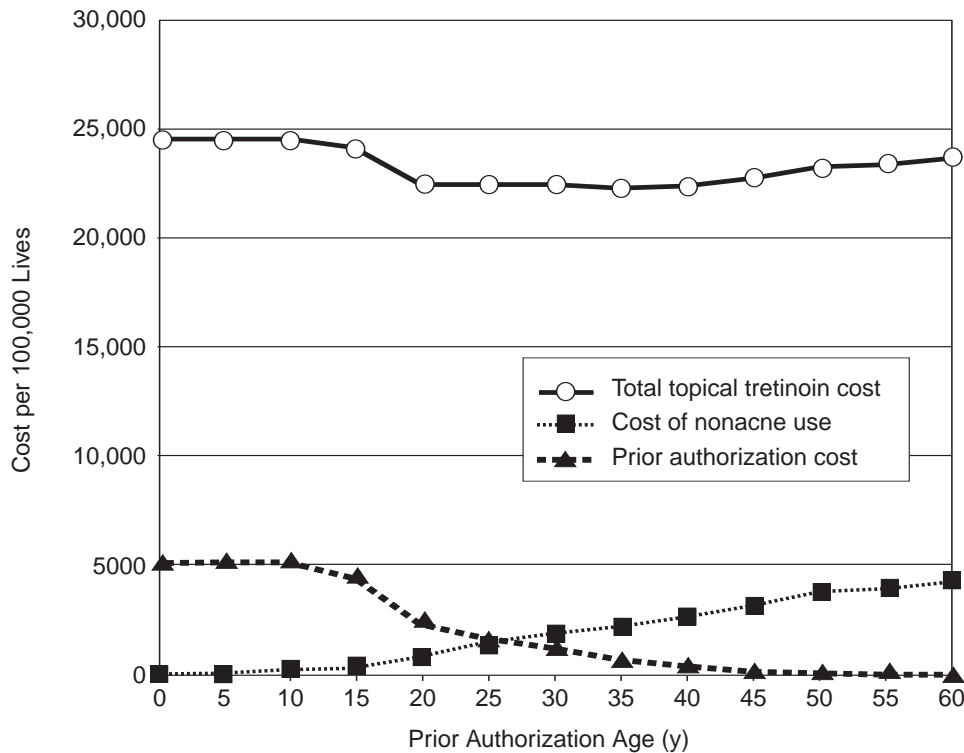
without acne decreased but the costs of doing the prior authorization increased (Figure 2). The total cost of topical tretinoin was relatively insensitive to the prior authorization age. For a prior authorization age of 60 (essentially the same as no prior authorization), the total cost of topical tretinoin was \$23,800 per 100,000 covered lives or \$0.020 per member per month. The minimum total topical tretinoin cost (\$22,400 per 100,000 covered lives or \$0.019 per member per month) occurred at a prior authorization age of 35 and represents a savings of 6% compared with no prior authorization age. The maximum cost occurs at a prior authorization age of 10 (\$24,780 per 100,000 covered lives or \$0.021 per member per month) and represents a 4% loss compared with no prior authorization age.

Different insurers may have different unit expenses for performing prior authorizations. We determined the prior authorization age associated with

the minimum total cost of topical tretinoin for different prior authorization unit expenses and different topical tretinoin unit costs (associated with different strengths of topical tretinoin). This model permits insurers to determine the prior authorization age that minimizes their total costs for topical tretinoin based on their contract unit cost for topical tretinoin and their unit expense for performing prior authorizations. For prior authorization costs above \$7 per authorization, the optimum prior authorization age was 35 years or older for all topical tretinoin costs within the estimation range (Figure 3).

The maximal savings obtained by choosing the optimal prior authorization age and the maximal loss associated with choosing the worst prior authorization age depends on the details of the model. For a topical tretinoin unit cost of \$28 and a prior authorization unit expense of \$10, the maximal savings is 5% (with a prior authorization age of

**Figure 2.** Effect of Prior Authorization Age on Total Costs for Topical Tretinoin



35) and the maximal loss is 12% (with a prior authorization age of 10) relative to the total costs of no prior authorization (Figure 4a). If patients with nonacne conditions also attempt prior authorization (Figure 4b), the maximal savings are lower (2%, with a prior authorization age of 40) and the maximal losses are greater (18%, with a prior authorization age of 10).

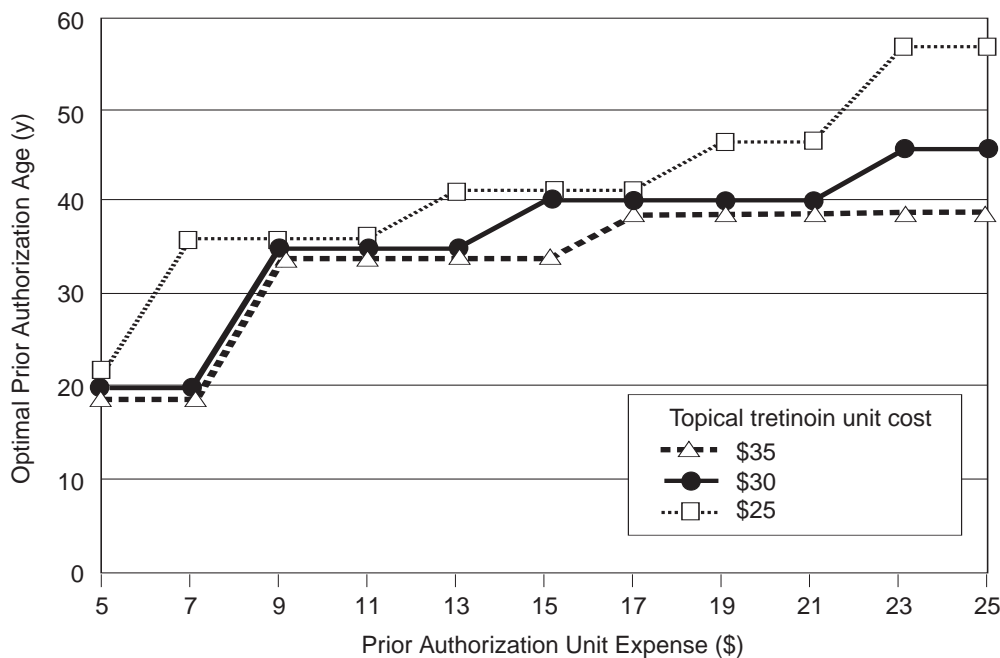
... DISCUSSION ...

Using a threshold age for determining whether topical tretinoin should be covered by insurers is complicated by the large number of patients in their 30s and 40s who have acne. When insurers determine the optimal threshold age, they need to consider the inconvenience to patients and the loss of time by physicians involved in the prior authorization process. Another consideration is the cost of administering prior authorizations. In the case of topical tretinoin, prior authorization appears to be of no benefit to insurers. Even at an optimal

prior authorization age, prior authorization of topical tretinoin has a minimal effect on insurer's drug costs. The total drug cost to the insurer is fairly insensitive to the prior authorization age unless the age is set too low, in which case the costs to the insurer increase. (With low prior authorization ages, the costs of processing the increased number of prior authorizations increase faster than the cost of topical tretinoin decreases.) Given that the total cost to the insurer is nearly flat with prior authorization ages from 25 to 45 and that the inconvenience to patients and physicians is greater as prior authorization age decreases, removing the prior authorization requirement or having a prior authorization age of 35 or even 40 may be ideal.

One limitation of our analysis is that the absence of any prior authorization age could change prescribing patterns, potentially affecting the validity of the model. Prior authorization is intended to influence prescribers, making them less likely to prescribe selected agents. With no prior authorization age, physicians might increase their prescribing of topical

**Figure 3.** Optimal Prior Authorization Age as a Function of Topical Tretinoin and Prior Authorization Costs

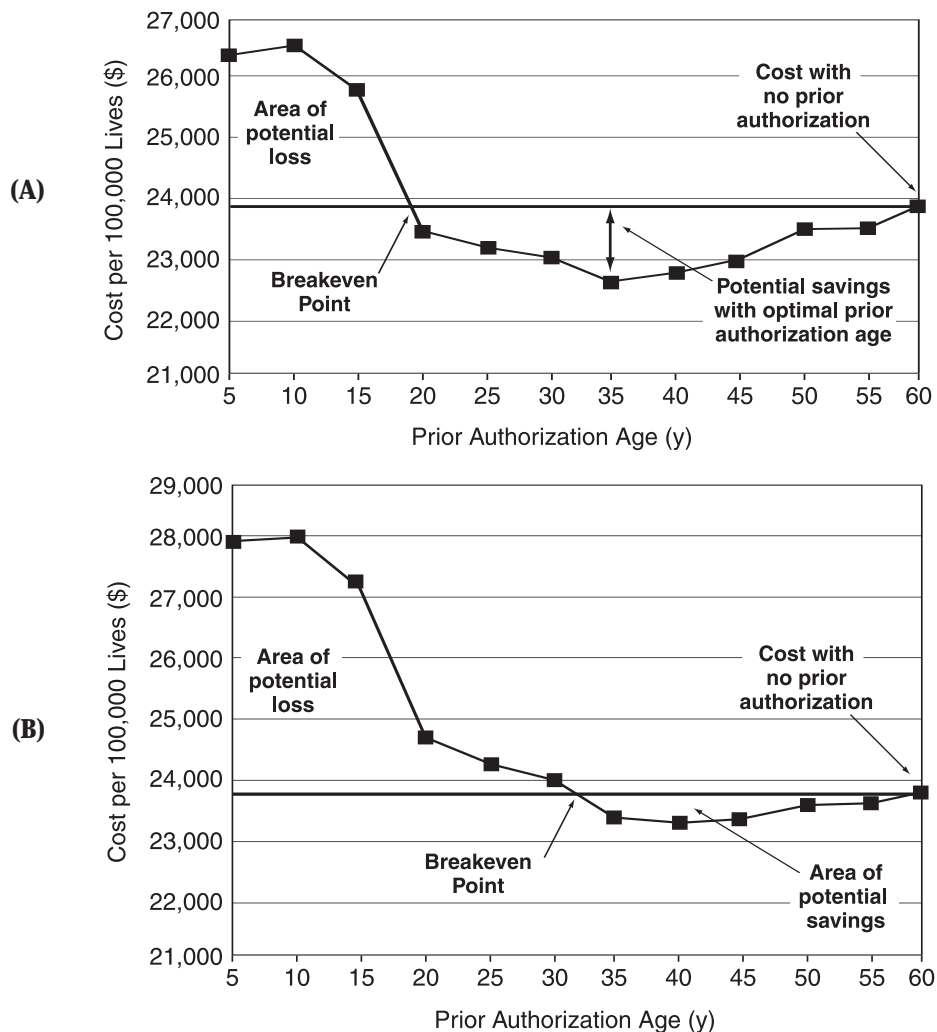


... COSTS OF CARE ...

tretinoin (Retin A<sup>®</sup>) for photoaging in older patients. The likelihood of this is reduced, however, by the availability of a topical tretinoin product (Renova<sup>®</sup>) designed and approved for treating photoaging; other forms of topical tretinoin may cause dryness and irritation, making them less suitable for this indication.

Is prior authorization needed at all? Prior authorization does affect insurers' drug costs for expensive pharmaceutical products. However, in the case of topical tretinoin, the cost of performing prior authorizations represents a considerable percentage of the total cost of the drug. Our model indicates that rais-

**Figure 4.** Effect of Prior Authorization Age on Potential Loss and Potential Savings (for Tretinoin Unit Cost of \$28 and Prior Authorization Unit Expense of \$10). **(A)** Costs calculated assuming only patients with acne attempt prior authorization. **(B)** Costs calculated assuming patients with acne or nonacne conditions attempt prior authorization.\*



\*The horizontal line at \$23,800 represents the cost to the insurer of no prior authorization. The point at which the curve crosses this line is the breakeven point. In both examples, the magnitude of potential savings (the distance between the breakeven line and the curve below the breakeven line) from choosing the ideal prior authorization age is smaller than the magnitude of potential loss (the distance between the breakeven line and the curve above the breakeven line) from choosing too low a prior authorization age.

ing the prior authorization age to 35 or 40 may result in savings compared with the lower prior authorization ages typically used. Eliminating prior authorization altogether would result in at most a small increase in costs and would be balanced by the benefits to both patients and physicians.

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