A Pharmacoeconomic Analysis of Rimexolone for the Treatment of Ophthalmic Inflammatory Conditions

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Abstract

Topical steroids are the standard first-line therapy for treating ophthalmic inflammatory conditions. However, potent ophthalmic steroids can lead to an elevation of intraocular pressure (IOP), which can result in greater medical resource utilization and increased costs. We have developed a decision analysis model from a societal perspective to evaluate the costs and consequences of the treatment of ophthalmic inflammatory conditions with two potent topical steroids: prednisolone and rimexolone. Data for the model are based on information from clinical trials, national databases, published literature, and responses by ophthalmologists to a questionnaire on treatment patterns for elevated IOP. Three steroid-responsive conditions are examined separately with the model: uveitis; postoperative inflammation following cataract surgery; and other ophthalmic inflammatory conditions (blepharitis, episcleritis, postoperative refractive surgery, and corneal transplant). The model evaluates patients with acute conditions versus those with chronic conditions and those with mild to moderate elevation of IOP versus those with severe elevation of IOP. Although the unit cost of rimexolone is higher than that of prednisolone, use of rimexolone leads to cost savings because the incidence of elevated IOP is decreased. If rimexolone is used instead of prednisolone for the treatment of ophthalmic inflammatory conditions, the estimated cost saved (at 1995 AWP prices) is approximately $10 million across the entire US population. The savings across the health maintenance organization population on an annualized basis is approximately $3.9 million. Even if rimexolone were priced higher than current market charges (at 130% to 150% of the AWP of prednisolone), cost savings ranging from $2.9 million to $720,000 would accrue with use of rimexolone compared with prednisolone. However, if rimexolone were priced at 160% of the AWP of prednisolone, its use would incur an additional cost of $300,000. The primary medical resource utilized in treating elevated IOP in ophthalmic inflammatory conditions is physician visits. Medications are responsible for only one-fifth to one-third of the total cost of treating elevated IOP. This analysis indicates that rimexolone is associated with decreased medical resource utilization and cost savings to the entire healthcare system.

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Although a variety of therapies are currently used for treating ophthalmic inflammatory conditions, the principal treatment for these conditions is topical steroids. Ophthalmic topical steroids are highly effective at controlling inflammation; however, they may also elevate intraocular pressure (IOP). Elevated IOP is a potentially serious condition; if untreated or unsuccessfully treated, it can lead to visual loss or even blindness. Treatment of elevated IOP can lead to significant utilization of medical resources and to associated costs.

A range of topical steroids is currently available for treatment of ophthalmic inflammatory conditions. In general, more potent topical steroids, such as dexamethasone and prednisolone, are more effective in controlling inflammation but may be more likely to produce elevation of IOP. Patients receiving less potent steroids (eg, fluorometholone) or nonsteroidal antiinflammatory drugs (NSAIDs; eg, diclofenac) are more likely to fail their initial treatment because of poor control of ophthalmic inflammation and thereby incur the additional costs of switching to more potent

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steroids. A recently developed potent topical steroid, rimexolone, is less likely to elevate IOP. When used for the treatment of uveitis, rimexolone elevated IOP less than did prednisolone[1]; in the treatment of ocular inflammation after cataract extraction, the influence of rimexolone on IOP elevation was equivalent to that of placebo.[2] Therefore, therapy with rimexolone may decrease treatment costs for ophthalmic inflammatory conditions by decreasing resource utilization associated with treating elevated IOP, such as physician visits, diagnostic tests, and antiglaucoma medications. The overall cost of therapy with rimexolone as compared with alternative agents depends on the cost of treating elevated IOP, the cost of switching patients who fail therapy, and the cost of the chosen ophthalmic medication. No studies have compared total medical resource utilization and treatment costs for rimexolone versus alternative ophthalmic steroids for the treatment of ophthalmic inflammatory conditions.

The purpose of this study was to compare the overall costs of treating ophthalmic inflammatory conditions with rimexolone versus treatment with prednisolone. On the basis of costs and treatment patterns in the United States, we used separate scenarios to compare costs for three groups of ophthalmic conditions: (1) anterior uveitis; (2) postoperative inflammation following cataract surgery; and (3) other ophthalmic inflammatory conditions including blepharitis, episcleritis, postoperative inflammation following refractive surgery or corneal graft transplantation, and other steroid-responsive conditions.

In comparing rimexolone with prednisolone, the model presumed that drug efficacies would be identical, and therefore, treatment differences would result only from the differential incidence of elevated IOP. This study thus focused on evaluating the incidence of elevated IOP for each comparative therapy and the marginal resource utilization and costs resulting from treatment of elevated IOP.

··· METHODS ···

Data Sources

Information on medical resource utilization and costs for rimexolone versus prednisolone therapy for ophthalmic inflammatory conditions was obtained from published literature, clinical trial data, and a panel of five ophthalmologists, who were selected primarily on the basis of their clinical expertise and published research.[11] We developed a mail questionnaire to collect detailed information from the clinical panel on incidence and treatment patterns for steroid-induced elevated IOP for each type of ophthalmic inflammatory condition considered. For uveitis and the other ophthalmic inflammatory conditions, information was collected separately on acute and chronic disease. For patients with postoperative inflammation, only information on acute therapy was requested. In addition, information on the treatment of elevated IOP in each condition was stratified according to the magnitude of IOP elevation: mild to moderate elevation (elevation of 10 to 20 mm Hg from baseline) and severe elevation (elevation more than 20 mm Hg from baseline).

From the information supplied by ophthalmologists, costs were determined for 4 weeks of therapy for the treatment of acute conditions and for 3 months of therapy for treatment of chronic conditions. Furthermore, in each scenario, elevation of IOP was presumed to occur after 3 weeks of topical steroid therapy. Costs were determined from a societal perspective; only direct medical costs were included.

Estimation of the Incidence of Ophthalmic Inflammatory Conditions

The annual incidence of uveitis, 17/100,000, was based on results from two European epidemiologic studies; 45% of cases are acute and 55% are chronic.[3,4] This incidence is also identical to the summary value suggested by Baarsma[5] for uveitis in "Western countries mainly inhabited by a Caucasian population" and therefore is likely to be applicable to the US managed care population.

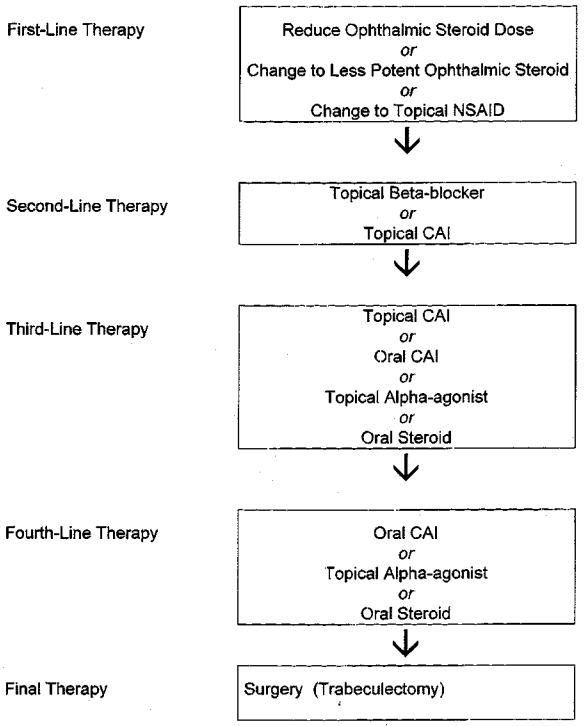
The incidence of postoperative inflammation was determined from a recent report published in the United States.[6] The annual rate of cataract surgery in the United States is 25.4 surgeries per 1000 individuals aged 65 and older,[6] where individuals 65 and older represent 12.55% of the total US population.[7] Approximately 50% of cataract surgery patients are treated for postoperative inflammation.

The incidence of other inflammatory conditions was determined from the 1993 National Health Interview Survey.[8] The combined incidence of two other major inflammatory conditions, blepharitis and episcleritis, is estimated to be 46.6/100,000, with 45% of cases being acute and 55% chronic.

Delineation of Treatment Patterns

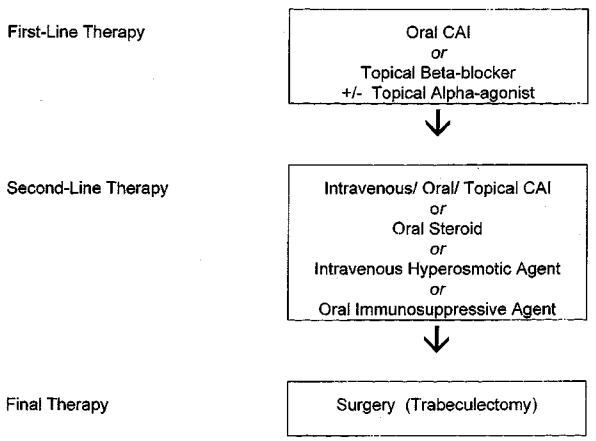
In general, the treatment patterns used in the model were similar for elevated IOP across all conditions and for different durations (acute versus chronic). However, treatment patterns differed for patients with mild to moderate elevation of IOP versus those with severe elevation. General treatment patterns for patients with mild to moderate elevation of IOP and

Figure 1. Treatment of Mild to Moderate Steroid-Induced Elevation of Intraocular Pressure



NSAID = nonsteroidal anti-inflammatory drugs; CAI = carbonic anhydrase inhibitor

Figure 2. Treatment of Severe Steroid-Induced Elevation of Intraocular Pressure



CAI = carbonic anhydrase inhibitor

for those with severe elevation of IOP are presented in Figures 1 and 2, respectively.

A proportion of individuals with mild to moderate IOP elevation are initially treated by a change in their topical steroid regimen to either a less frequent dose (eg, from two drops every 2 hours to two drops four times a day), to a less potent steroid (eg, from prednisolone to fluorometholone), or to a topical nonsteroidal anti-inflammatory drug (eg, diclofenac). However, many patients with elevated IOP are not treated in this manner. Instead, these patients and also patients who do not respond successfully to first-line therapy are treated with second-line therapy consisting of a topical ß-blocker or a topical carbonic anhydrase inhibitor (CAI). Agents used for second-line, third-line, or fourth-line therapy may overlap; for example, patients not treated with a topical CAI as second-line therapy may receive this treatment as third-line therapy. Patients not treated or unsuccessfully treated with second-line therapy progress to third-line therapy, which may be an oral CAI, a topical CAI, a topical α-agonist, or an oral steroid. Fourth-line therapies consist of an oral steroid, an oral CAI, or a topical α-agonist. For patients with mild to moderate elevation of IOP that is untreated or unsuccessfully treated, the final therapeutic option is trabeculectomy.

Patients with severe IOP elevation are at greater risk of imminent visual loss, and therefore their pattern of treatment is abbreviated. First-line therapy for this group is generally an oral CAI or a topical ß-blocker, alone or with a topical α-agonist. Second-line therapy consists of an oral steroid, an intravenous hyperosmotic agent, a topical CAI, an intravenous CAI, an oral CAI, or an oral immunosuppressive agent. If the IOP remains high after these two lines of treatment, trabeculectomy is performed.

For the treatment patterns presented, the therapeutic agents used in the model were as follows: topical ß-blockers—betaxolol or timolol; intravenous CAI—acetazolamide (Diamox®); oral CAIs—acetazolamide (Diamox®) and methazolamide (Nepta-zane®); topical CAI—dorzolamide (Trusopt®); topical α-agonist—apraclonidine (Iopidine®); IV hypertonic agent—mannitol; oral steroids—prednisone and beta-methasone (Celestone®); and oral immunosuppressive agent—azathioprine. These choices of medications were

based on responses to the questionnaire by the ophthalmologist panel.

Resource Utilization and Event Probabilities

All patients initially required two ophthalmology outpatient visits: one visit to assess the inflammatory condition and initiate treatment, and a follow-up visit after 3 weeks to evaluate response to treatment. At this follow-up visit, patients who developed elevated IOP were identified, placed on an initial therapy to treat elevated IOP, and subsequently required at least one additional ophthalmologist visit. Response to therapy was evaluated at the additional visit(s); patients not responding to therapy were switched to the next line treatment.

For each alternative treatment of elevated IOP, the physician questionnaire collected information on resource utilization and event probabilities associated with treatment. Resource utilization included the number of physician visits and diagnostic tests or procedures, if any. Event probabilities included the likelihood of a patient developing elevated IOP, of a patient with elevated IOP receiving a particular therapy, and of a patient responding successfully to the therapy. Detailed information on resource utilization and event probabilities associated with each IOP treatment pattern are available from the author.

Medication Doses and Assignment of Costs to Resources Utilized

Daily doses for medications used in the study are presented in Table 1. Although the number of drops per milliliter varied slightly, this study assumed that all ophthalmic solutions and suspensions contained 20 drops per milliliter. Intravenous medications (acetazolamide and mannitol) and topical mitomycin were the only drugs without repeated administration. Doses of ophthalmic (topical) medications are based on treatment of only one eye.

The ophthalmologist panel specified mitomycin as adjuvant therapy for trabeculectomy. Although mitomycin is approved only for intravenous use, off-label topical use for filtering surgery has been described, and a recent study has reported the use of mitomycin as an adjuvant to trabeculectomy.[9] Mitomycin is prepared from 5 mg unit vials. For ocular administration, only a portion would be used, with the unused portion discarded. Thus, the entire cost of the 5 mg vial was used in the model in association with trabeculectomy.

Wherever possible, costs used in the model were based on standard values from national sources. Medication costs were based on 1994 average wholesale prices (AWPs) from the 1995 Physicians GenRx (inflated to 1995 values).[10] For comparable costs for the alternative ophthalmic steroids included in this study (rimexolone or prednisolone), daily costs were calculated for the 10-ml unit. For other study medications, when multiple sizes or quantities were available, the

Table 1. Daily Medication Doses

Medication	Dose
Rimexolone (Vexol®), Prednisolone (Pred Forte®) *(for uveitis & other inflammatory conditions)*	2 drops every 2 hours while awake, total of 16 drops per day
Rimexolone (Vexol®) & Prednisolone (Pred Forte®) *(for postoperative inflammation)*	2 drops 4 times a day, total of 8 drops per day
Prednisolone (Pred Forte®), low dose	1 drop 4 times per day
Fluorometholone (FML®)	1 drop 6 times per day
Topical alpha-agonist (Iopidine®)	1 drop 3 times per day
Topical beta-blocker (Betoptic® or Timoptic®)	1 drop twice a day
Intravenous CAI (Diamox®)	500 mg (single administration) only
Oral CAI (Diamox®), Diamox SQ®)	1 g per day
Oral CAI (Neptazane®)	150 mg per day
Topical CAI (Trusopt®)	1 drop 3 times per day
Topical diclofenac (Voltaren®)	1 drop 4 times per day
Intravenous hyperosmotic agent (Mannitol IV)	100 g (single administration only)
Oral immunosuppressive agent (Azathioprine)	200 mg per day
Oral steroid: Betamethasone (Celestone®)	3 6 mg per day
Oral steroid: Prednisone (Deltasone®)	60 mg per day
Mitomycin (topical)	5 mg vial (single administration only)

Daily doses are based on drug labeling information (Physicians GenRx, 1995. Doses presented in this table represent maximal doses and may not generally be used for treating all of the ophthalmic conditions included in this study (eg, postoperative inflammation). For cost calculations, it was assumed that all ophthalmic solutions and suspensions contain 20 drops per ml

unit cost was based on that for the largest size/quantity, which was generally the lowest unit cost. As 1995 costs were not available for the topical CAI (Trusopt®) or for rimexolone, average wholesale prices were obtained from the manufacturers. Costs for physician visits, tests, and surgeries were derived from the maximum allowable reimbursements of the Health Care Finance Administration 1995 Resource-Based Relative Value Scale.[11] Table 2 presents costs per day for medications and cost per unit for other medical resources used in the model. The costs associated with an ophthalmologist visit also included the cost for any tests performed during the visit that were not additionally reimbursable, such as tonometry.

Table 2. Medical Resource Utilization Costs (1995 US Dollars)

Medication	Cost/Day
Rimexolone (Vexol®) *(for uveitis & other inflammatory conditions)*	2.16
Rimexolone (Vexol®) *(for postoperative inflammation)*	1.08
Prednisolone (Pred-Forte®) *(for uveitis & other inflammatory conditions)*	1.80
Prednisolone (Pred-Forte®) *(for postoperative inflammation)*	0.90
Prednisolone (Pred Forte®), low dose	0.45
Fluorometholone (FML®)	0.66
Topical alpha-agonist (Iopidine®)	1.01
Topical beta-blocker (weighted mean of Betoptic® and Timoptic®)	0.34
Intravenous CAI (Diamox®)*	36.59
Oral CAI (Diamox®)	1.47
Oral CAI (Diamox SQ®)	1.93
Oral CAI (Neptazane®)	2.38
Topical CAI (Trusopt®)	0.63
Topical diclofenac (Voltaren®)	1.13
Intravenous hyperosmotic agent (Mannitol IV)*	17.10
Oral immunosuppressive agent (Azathioprine)	4.72
Oral steroid—Betamethasone (Celestone®)	8.16
Oral steroid—Prednisone (Deltasone®)	0.20
Mitomycin (topical)*	128.79
Other Medical Resources	**Cost/Day**
Ophthalmologist visits	56.08
Trabeculectomy	950.28
Laser surgery	495.06
Fundus photography	30.45
Gonioscopy	23.19
Visual fields testing	23.89

*Cost per one-time administration.

··· RESULTS ···

Determination of the Incidence of Elevated IOP

The incidences of mild to moderate and severe elevation of IOP are presented in Table 3. Mean values from the ophthalmologists' questionnaire were used to assess the impact of prednisolone on elevating IOP because clinicians have substantial experience with prednisolone. However, most ophthalmologists have only limited experience with rimexolone. Therefore, in order to project the incidence of IOP after rimexolone use in actual clinical practice, the incidence data for prednisolone were modified by using clinical trial data on rimexolone. The ratios of the incidence of rimexolone-induced elevated IOP to incidence of prednisolone-induced elevated IOP were 1:4.5 at 4 weeks (acute conditions) and 1:3.3 at 6 weeks (chronic conditions). This means that the incidence of elevated IOP among rimexolone users with acute conditions was 22.2% (1/4.5) of the incidence among prednisolone users with acute conditions; and similarly, the incidence among rimexolone users with chronic conditions was 30.3% (1/3.3) of the incidence among prednisolone users with chronic conditions. Patients with chronic conditions were more likely to have elevated IOP because they were exposed to topical steroids for a longer time (Table 3). These values for the incidences of elevated IOP were reviewed and validated by the ophthalmologist panel.

Overall Cost of Therapy

Table 4 presents the overall cost of rimexolone therapy versus the cost of prednisolone therapy for each ophthalmic inflammatory disease scenario across the US managed care population. The total per- patient cost of therapy with either rimexolone or prednisolone, including the cost of treating elevated IOP, was determined for each ophthalmic inflammatory

condition. Per patient costs were then multiplied by the number of patients among the US managed care population who developed each ophthalmic inflammatory condition in a given year. The US managed care population, including individuals enrolled in health maintenance organizations (HMOs), independent practice associations (IPAs), and preferred provider organizations (PPOs), was estimated at 98 million (Group Health Association of America). Individuals in other types of managed care plans, such as those with pharmacy benefit managers (PBMs) were not included. Table 4 shows that the potential total annual savings, calculated conservatively, is approximately $4 million if rimexolone is used in place of prednisolone (at their AWPs).

Table 5 presents the annualized potential savings if rimexolone is used instead of prednisolone across the overall US population. Population figures were determined by using the annual incidence of each ophthalmic inflammatory condition and were based on an estimated US population of 249 million.[7] These estimates indicated an annual savings of approximately $10 million.

Distribution of Costs

Table 6 presents the distribution of the costs of rimexolone and prednisolone therapy among categories of resource utilization for acute and chronic uveitis. Costs for postoperative inflammation and other ophthalmic inflammatory conditions show similar distributions. As evident from this table, the main cost for treatment of uveitis is that of physician visits, which do not vary significantly between rimexolone and prednisolone for either acute or chronic uveitis. Medications comprise a substantially smaller proportion of the total costs, but the proportional cost for medications is higher for rimexolone treatment than for prednisolone treat-

Table 3. Incidence of Elevated Intraocular Pressure After Rimexolone and Prednisolone Use

Condition	Prednisolone Users		Rimexolone Users‡	
	Mild to Moderate Elevation of IOP*	Severe Elevation of IOP†	Mild to Moderate Elevation of IOP*	Severe Elevation of IOP†
Acute uveitis	12.5%	5.5%	2.8%	1.2%
Chronic uveitis	27.0%	15.0%	8.2%	4.5%
Postoperative inflammation	12.5%	4.9%	2.8%	1.1%
Other conditions, acute	6.0%	1.9%	1.3%	0.4%
Other conditions, chronic	15.0%	9.5%	4.5%	2.9%

*Mild to moderate elevation is 10 to 20 mm Hg above baseline
†Severe elevation is greater than 20 mm Hg above baseline
‡Incidence of elevated IOP among rimexolone users is based on clinical trial data and validation by ophthalmologist panel

Table 4. Annualized Savings Associated with Rimexolone Versus Prednisolone Therapy in the US Managed Care Population

Condition	Incidence*	Treatment Cost (US Dollars)		
		Rimexolone Therapy	Prednisolone Therapy	Difference in Cost (US Dollars)
Acute uveitis	7.65/100,000	2,185,750	2,309,451	123,701
Chronic uveitis	9.35/100,000	5,191,481	5,702,410	510,929
Postoperative inflammation	319/100,000	34,456,976	36,879,781	2,422,805
Other acute inflammatory conditions	21/100,000	3,599,236	3,621,874	22,638
Other chronic inflammatory conditions	25.6/100,000	8,366,095	9,220,593	854,497
Total		**53,799,538**	**57,734,109**	**3,934,570**

Based on an estimated US population of 98 million enrollees in managed care health plans (see results)
*See Materials and Methods for estimation of incidence.

ment, reflecting the greater cost of rimexolone. Costs for tests and surgery comprise smaller proportions of the overall total. However, the proportion of total costs attributable to tests and surgery is lower for rimexolone patients. This reflects the higher incidence of elevated IOP among prednisolone users and costs of subsequent tests and treatment.

Sensitivity Analysis

Sensitivity analyses were performed to calculate treatment costs when the cost of rimexolone was varied in relation to the cost of prednisolone (Table 7). In the basic model the AWP of rimexolone was 120% that of prednisolone. Sensitivity analyses were performed with the cost of rimexolone assumed to be 130% to 160% that of prednisolone. The differences in treatment costs ranged from an annual cost savings of approximately $2.9 million with rimexolone at 130% of the cost of prednisolone to a cost increase of $332,000 with rimexolone at 160% of the cost of prednisolone.

The break-even costs for rimexolone (as a percentage of the cost of prednisolone) that would result in rimexolone and prednisolone therapy having identical overall costs were also determined. For acute and chronic uveitis, the break-even costs for rimexolone were 153% and 156% of the cost of prednisolone, respectively. Similarly, for postoperative inflammation and for other acute and chronic ophthalmic inflammatory conditions, the break-even costs for rimexolone were 182%, 122%, and 142%, respectively, of the cost of prednisolone.

The incidence of IOP elevation resulting from use of ophthalmic steroids (Table 3) was determined from values obtained from the ophthalmologists' questionnaire. As these values are key to this economic analysis, we evaluated the impact of using extreme values for incidence of IOP elevation (the upper and lower 95% confidence limits of each value) on resultant costs of rimexolone versus prednisolone.

Table 5. Annualized Savings Associated with Rimexolone Versus Prednisolone Therapy in the Total US Population

Condition	Incidence*	Treatment Cost (US Dollars)		
		Rimexolone Therapy	Prednisolone Therapy	Difference in Cost (US Dollars)
Acute uveitis	7 65/100,000	5,553,590	5,869,224	315,634
Chronic uveitis	9 35/100,000	13,196,653	14,515,550	1,318,897
Postoperative inflammation	319/100,000	87,556,791	93,748,438	6,191,647
Other acute inflammatory conditions	21/100,000	9,144,998	9,202,517	57,519
Other chronic inflammatory conditions	25.6/100,000	21,258,624	23,453,692	2,171,120
Total		**136,710,656**	**146,788,421**	**10,077,765**

Based on an estimated US population of 249 million. The base case model used rimexolone at the average wholesale price, which equals 120% of the average wholesale price of prednisolone.
*See Materials and Methods for estimation of incidence.

Table 6. Distribution of Rimexolone Costs for Acute and Chronic Uveitis

Resource Utilization Category	Percentage of Total Cost			
	Rimexolone Treatment		Prednisolone Treatment	
	Acute Uveitis	Chronic Uveitis	Acute Uveitis	Chronic Uveitis
Doctor visits	78.4	63.2	79.7	65.8
Medications	20.7	33.9	16.4	25.6
Surgery	0.7	1.6	2.8	4.7
Tests	0.2	1.3	1.1	3.9
Total	**100**	**100**	**100**	**100**

Based on a US population of 249 million, using the incidence figures for acute and chronic uveitis as presented in Table 4.

For this sensitivity analysis, the base case cost (120% of prednisolone) of rimexolone was used. Results of this sensitivity analysis are presented in Table 8. When the incidence of elevated IOP is assumed to be at the upper 95% confidence limit, the difference in IOP elevation between the two treatments is increased. The costs for both treatments increase, as does the difference in costs between the two. This increased cost, $7.8 million annually, represents a 100% increase over the base model cost.

When the IOP elevation rate is assumed to be at the lower 95% confidence limit, the difference in the incidence of elevated IOP after rimexolone treatment versus prednisolone treatment is decreased. For two conditions (severely elevated IOP in postoperative inflammation patients and patients with other acute conditions), the lower 95% confidence limit of the rate of IOP elevation is zero and thus is the same for rimexolone and prednisolone patients. However, even at these low values of IOP elevation, rimexolone treatment still incurs lower costs than does prednisolone treatment.

··· DISCUSSION ···

This study compared the direct costs of rimexolone therapy and alternative ophthalmic steroid therapy for ophthalmic inflammatory conditions. However, comparing the cost of the medications alone does not provide an accurate picture of the cost of therapy because other medical care resources are also used in treating patients with ophthalmic inflammatory conditions. Specifically, patients who develop steroid-induced elevation of IOP will require additional physician visits, medications, tests, and, potentially, surgery. Our comprehensive analysis indicates that the costs of treating steroid-induced elevated IOP constitute the majority of the overall therapy costs. Our results also demonstrate that an estimated cost savings of approximately $4 million would accrue across the entire US managed care population if rimexolone were used for the treatment of ophthalmic inflammatory conditions. Physician visits represent about two-thirds of the total cost of treating elevated IOP, whereas medications account for only a minor share of the costs (ranging from one-fifth to one-third the total cost).

The population base of this study included all indi-

Table 7. Results of Sensitivity Analysis of Annualized Savings Associated with Rimexolone Versus Prednisolone Therapy Varying the Cost of Rimexolone Compared with the Cost of Prednisolone

Cost of Rimexolone Compared with Cost of Prednisolone	Treatment Cost (US Dollars)		Difference in Cost (US Dollars)
	Rimexolone Therapy	Prednisolone Therapy	
130%	54,882,976	57,772,561	2,889,585
140%	55,953,959	57,772,561	1,818,602
150%	57,024,867	57,772,561	747,694
160%	58,095,645	57,772,561	-323,084*

Based on an estimated US population of 98 million enrollees in managed care health plans (see results).
*Represents increased costs with rimexolone therapy.

Table 8. Results of Sensitivity Analysis of Annualized Savings Associated with Rimexolone Versus Prednisolone Therapy Varying the Probability of Steroid-Induced Elevation of Intraocular Pressure (IOP) to the Upper and Lower 95% Confidence Intervals

Incidence of IOP Elevation	Treatment Cost (US Dollars)		Difference in Cost (US Dollars)
	Rimexolone Therapy	Prednisolone Therapy	
Rate of IOP elevation at upper 95% confidence interval	55,025,444	62,847,888	7,822,444
Rate of IOP elevation at lower 95% confidence interval	51,624,404	52,880,741	1,256,336

Based on an estimated US population of 98 million enrollees in managed care health plans (see results).

viduals enrolled in HMOs, IPAs, and PPOs, which constitute only a subset of all managed care individuals, because those enrolled in PBMs were not included. Furthermore, the managed care population is diverse, and hence individuals enrolled in HMOs are more likely to have limited choice of outpatient medications than are those in IPAs or PPOs. However, as the medical treatment of individuals in HMOs, IPAs, and PPOs is coordinated (managed) to some degree, including choice of medications, it is appropriate to evaluate the impact of changing ophthalmic steroid therapy in this population.

The costs and doses of ophthalmic medications presented in Tables 1 and 2 represent monocular treatment regimens. For patients with other ophthalmic inflammatory conditions (eg, blepharitis and episcleritis), inflammation is predominantly binocular. A sizable number of uveitis patients also have binocular disease. These patients would therefore receive binocular treatment with ophthalmic steroids. The risk of elevated IOP is likely to be the same for either monocular or binocular steroid treatment. However, it is uncertain whether such patients would develop monocular or binocular elevations in IOP. Also, treatment patterns for patients with binocular elevation of IOP are likely to be different from those for patients with monocular elevation—for example, binocular surgery would not be performed. Thus, we examined only the costs associated with monocular ophthalmic inflammatory conditions.

In this study we examined only the medical resource utilization and associated costs for patients developing steroid-induced elevation of IOP. However, elevated IOP also has clinical and quality of life consequences. Elevated IOP can be painful; in addition, its treatment involves agents (eg, nonselective topical beta-blockers) that may cause systemic side effects, which can potentially lead to further use of medical resources and decreased quality of life. Although they are less common occurrences, permanent visual field loss and even blindness can result from steroid-induced elevation of IOP. These ramifications suggest that rimexolone therapy provides additional benefits beyond those directly associated with cost savings.

··· CONCLUSION ···

The key contributor to the cost of treating ophthalmic inflammatory conditions is the utilization of medical resources for treating elevated IOP. The cost of medication for treating ophthalmic inflammatory conditions or elevated IOP is a minor component of the overall cost of therapy. Because rimexolone is associated with a lower incidence of elevated IOP, its use is expected to result in less utilization of medical resources for elevated IOP, including physician visits, concomitant and alternative medications, diagnostic tests, and surgery. Therefore, although rimexolone is priced higher than competing high-potency steroids, its use is expected to result in overall cost savings to the healthcare system.

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