

**CENTER FOR DRUG EVALUATION AND  
RESEARCH**

*APPLICATION NUMBER:*

**21-132**

**PROPRIETARY NAME REVIEW(S)**



**Department of Health and Human Services  
Public Health Service  
Food and Drug Administration  
Center for Drug Evaluation and Research  
Office of Surveillance and Epidemiology**

Date: July 22, 2009

To: Wiley Chambers, MD, Acting Director  
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Subject: Proprietary Name Review

Drug Name: Acuvail (Ketorolac Tromethamine) Ophthalmic Solution  
0.45%

Application Type/Number: NDA 22-427

Sponsor: Allergan

OSE RCM #: 2008-1776

**\*\*\* This document contains proprietary and confidential information that should not be released to the public.\*\*\***

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## EXECUTIVE SUMMARY

The Proprietary Name Risk Assessment findings indicate the use of an alternate proprietary name rather than a modified proprietary name product line extension is reasonable for this formulation of ketorolac tromethamine ophthalmic solution. However, the results of the Proprietary Name Risk Assessment found that the proposed name, Acuvail, is potentially vulnerable to name confusion that could lead to medication errors with another proposed proprietary name for a pending application, (b) (4). At this time, the acceptability of the proprietary name, Acuvail, is dependent upon which application is approved first. (b) (4) is currently a pending application in the Agency. If Acuvail is approved first, we will recommend that the second product (b) (4), seek an alternate name.

If any of the proposed product characteristics as stated in this review are altered prior to approval of the product, we rescind this Risk Assessment finding, and recommend that the name be resubmitted for review. Additionally, if the product approval is delayed beyond 90 days from the date of this review, the proposed name must be resubmitted for evaluation.

## 1 BACKGROUND

### 1.1 INTRODUCTION

This review is in response to a request from the Division of Anti-Infective and Ophthalmology Products, for assessment of the proposed proprietary name, Acuvail, regarding its potential confusion with other proprietary or established drug names in normal practice settings. The Applicant submitted an external (b) (4) study in support of their proposed proprietary name.

### 1.2 PRODUCT INFORMATION

Acuvail is a new drug application indicated for the treatment of pain and inflammation following cataract surgery. Acuvail contains the active ingredient, ketorolac tromethamine, as a 0.45% preservative-free ophthalmic solution. Acuvail is dosed by patients and by medical personnel on the day of surgery.

	Recommended Dosing
Patient Dosing	Apply 1 drop to the affected eye twice daily beginning one day prior to cataract surgery, continued on the day of surgery and through the first two weeks of the postoperative period.
Medical Personnel	Approximately 2 hours prior to surgery, administer 1 drop approximately every 20 minutes by medical personnel for a total of 3 drops. Prior to discharge, instill 1 additional drop.

Acuvail will be supplied as a sterile solution in clear, LDPE, single-use vials containing 0.4 mL each. It may be administered in conjunction with other topical ophthalmic medications; however, it should not be administered while wearing contacts.

## 2 METHODS AND MATERIALS

Appendix A describes the general methods and materials used by the Division of Medication Error Prevention and Analysis (DMEPA) when conducting a proprietary name risk assessment for all

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proprietary names. Sections 2.1, 2.2, and 2.3 identify specific information associated with the methodology for the proposed proprietary name, Acuvail.

## 2.1 SEARCH CRITERIA

For this review, particular consideration was given to drug names beginning with the letter ‘A’ when searching to identify potentially similar drug names, as 75% of the confused drug names reported by the USP-ISMP Medication Error Reporting Program involve pairs beginning with the same letter.<sup>1,2</sup>

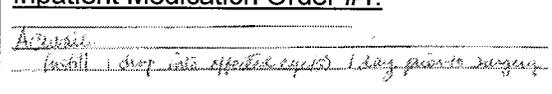
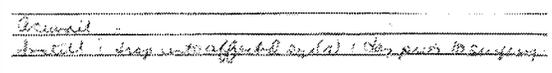
To identify drug names that may look similar to Acuvail, the DMEPA staff also considers the orthographic appearance of the name on lined and unlined orders. Specific attributes taken into consideration include the length of the name (seven letters), upstrokes (two, capital letter ‘A’, and lowercase ‘l’), down strokes (none), cross strokes (none), and dotted (one, lower case ‘i’). Additionally, several letters in Acuvail may be vulnerable to ambiguity when scripted (see Appendix B). As a result, the DMEPA staff also considers these alternate appearances when identifying drug names that may look similar to Acuvail.

When searching to identify potential names that may sound similar to Acuvail, the DMEPA staff search for names with similar number of syllables (three), stresses (AK-u-vail or ak-U-vail), and placement of vowel and consonant sounds. Additionally, the DMEPA staff considers that pronunciation of parts of the name can vary such as ‘Ac-’ may sound like ‘Oc-’ (see Appendix B). Moreover, names are often mispronounced and/or spoken with regional accents and dialects, so other potential pronunciations of the name are considered. The Applicant did not provide their intended pronunciation of the proprietary name in the proposed name submission and, therefore, it could not be taken into consideration.

## 2.2 FDA PRESCRIPTION ANALYSIS STUDIES

In order to evaluate the potential for misinterpretation of the proposed proprietary name in handwriting and verbal communication of the name, the following inpatient medication orders and verbal prescription was communicated during the FDA prescription studies.

**Figure 1. Acuvail Rx Study (conducted on December 16, 2008)**

HANDWRITTEN REQUISITION MEDICATION ORDER	VERBAL PRESCRIPTION
<p><u>Inpatient Medication Order #1:</u></p> 	<p>Acuvail #1 Instill 1 drop into affected eye 1 day prior to surgery</p>
<p><u>Inpatient Medication Order #2:</u></p> 	

<sup>1</sup> Institute for Safe Medication Practices. Confused Drug name List (1996-2006). Available at <http://www.ismp.org/Tools/confuseddrugnames.pdf>

<sup>2</sup> Kondrack, G and Dorr, B. Automatic Identification of Confusable Drug Names. Artificial Intelligence in Medicine (2005)

### **2.3 EXTERNAL PROPRIETARY NAME RISK ASSESSMENT**

For this product, the Applicant submitted an external evaluation of the proposed proprietary name. The Division of Medication Error Prevention and Analysis conducts an independent analysis and evaluation of the data provided, and responds to the overall findings of the assessment. When the external proprietary name risk assessment identifies potentially confusing names that were not captured in DMEPA's database searches or in the Expert Panel Discussion, these names are included in the Safety Evaluator's Risk Assessment and analyzed independently by the Safety Evaluator to determine if the potentially confusing name could lead to medication errors in usual practice settings.

After the Safety Evaluator has determined the overall risk associated with proposed name, the Safety Evaluator compares the findings of their overall risk assessment with the findings of the proprietary name risk assessment submitted by the Applicant. The Safety Evaluator then determines whether the Division's risk assessment concurs or differs with the findings. When the proprietary name risk assessments differ, the Division of Medication Error Prevention and Analysis provides a detailed explanation of these differences.

## **3 RESULTS**

### **3.1 DATABASE AND INFORMATION SOURCES**

The searches yielded a total of twenty-seven names as having some similarity to the proposed name, Acuvail.

Seventeen of the names were thought to look like Acuvail. These include: (b) (4), Acusil, Acudial, Actonel, Accuneb, Accutane, Accuhist, Accusite, Ansaid, Amoxil, Acutect, Cluvax, Aclovate, Anusol, Advair (b) (4)\*\*\* and (b) (4)\*\*\*. The remaining ten names were thought to look and sound similar to Acuvail: Acular, Oruvail, Accupril, Actidil, (b) (4), Acuvue, Acuvview, Ocuville, (b) (4), and Acupril.

Additionally, DMEPA staff did not identify any United States Adopted Names (USAN) stems in the proposed proprietary name, as of May 15, 2009.

### **3.2 EXPERT PANEL DISCUSSION**

The Expert Panel reviewed the pool of names identified by DMEPA staff (See Section 3.1 above) and noted no additional names thought to have orthographic or phonetic similarity to Acuvail.

DDMAC had no concerns regarding the proposed name from a promotional perspective, and did not offer any additional comments relating to the proposed name.

### **3.3 FDA PRESCRIPTION ANALYSIS STUDIES**

A total of twenty-six practitioners responded with none of the responses overlapping with an existing name. Twenty-five of the participants interpreted the name correctly as "Acuvail," with all the correct interpretations occurring in both inpatient written studies. None of the written responses misinterpreted the drug name. In the verbal studies, only one response was a misspelled phonetic variation of the proposed name, Acuvail. See Appendix B for the complete listing of interpretations from the verbal and written prescription studies.

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### 3.4 EXTERNAL STUDY

In the proposed name risk assessment submitted by the Applicant, the (b) (4) assessment identified and evaluated a total of twenty-four names thought to have some potential for confusion with the name Acuvail: Accuneb, Accupril, Accutane, Accuzyme, Aclovate, Actigall, Activase, Activella, Acuflex, Acular, Acular LS, Acunol, Acyclovir, Adrucil, Advil, Akurza, Aquanil, Aquasol A, Avalide, Backaid, Elavil, Lactaid, Ocuville, and Oruvail. Of the names identified by (b) eight names, (Accuneb, Accupril, Accutane, Aclovate, Acular, Acular LS, Ocuville, and Oruvail), were also identified by DMEPA during the database searches. DMEPA evaluated the names Acular and Acular LS as one name, thus, the remaining fifteen names will be added to the Safety Evaluator Assessment.

### 3.5 COMMENTS FROM THE DIVISION

DMEPA notified the Division of Drug Anti-Infective and Ophthalmologic Products via e-mail on June 25, 2009, that we have concerns that Acuvail is vulnerable to name confusion that could lead to medication errors with the pending application within the Agency (b) (4). The acceptability of the proposed proprietary name, Acuvail, is dependent upon which application is approved first. Per e-mail correspondence from the Division of Anti-Infective and Ophthalmologic Products on June 29, 2009, the Division indicated they concur with our assessment with the proposed proprietary name, Acuvail.

### 3.6 SAFETY EVALUATOR RISK ASSESSMENT

Independent searches by the primary Safety Evaluator did not result in additional names which were thought to look or sound similar to Acuvail and represent a potential source of drug name confusion.

One name (b) (4) identified by EPD searches was determined to be the trademarked name by the Applicant and thus was eliminated from further evaluation.

## 4 DISCUSSION

The proposed Acuvail (ketorolac tromethamine ophthalmic solution) product will be an extension of the Acular product line since both are manufactured by Allergan and contain the same active ingredient. In addition to having the same active ingredient as Acular, Acuvail will also have the same indication: treatment of postoperative pain and inflammation in patients who have undergone cataract extraction. A primary difference between Acuvail and Acular is that Acuvail is dosed less frequently than the Acular products (twice daily vs. four times a day) and it is an intermediate strength of ketorolac tromethamine ophthalmic solution (0.45% vs. 0.4% and 0.5%). See chart on page 7 for a comparison of Acuvail and Acular product characteristics.

The Applicant proposes a new and different proprietary name for the proposed strength. In evaluating this proprietary name, we considered whether the product could be safely managed using the name, Acuvail, and considered the risk of inadvertent concomitant administration of the ketorolac products.

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Acuvail & Acular products

**Bolded items = overlapping product characteristics with Acuvail**

Red items = differentiating product characteristics with Acuvail

Proprietary Name	Acuvail	Acular	Acular PF	Acular LS
Established Name	Ketorolac tromethamine	<b>Ketorolac tromethamine</b>	<b>Ketorolac tromethamine</b>	<b>Ketorolac tromethamine</b>
Sponsor	Allergan	Allergan	Allergan	Allergan
Indication	Pain/inflammation s/p cataract surg.	1. Temp relief ocular itching d/t allergies; 2. <b>pain and inflammation s/p cataract surgery</b>	Reduction of <b>ocular pain &amp;</b> photophobia s/p incisional refractive surgery	Reduction of <b>ocular pain</b> , burning, stinging s/p corneal refractive surgery
Strength	0.45%	<b>0.5%</b>	<b>0.5%</b>	<b>0.4%</b>
Usual dose	1 gtt to affected eye	<b>1 gtt</b> to affected eye	<b>1 gtt</b> to affected eye	<b>1 gtt</b> to affected eye
Frequency of administration	BID, through 2 wks postop	<u>Allergies:</u> 4 times a day <u>S/P cataract extraction:</u> 4 times daily, <b>through 2 wks postop</b>	4 times a day up to 3 days after surgery	4 times a day for up to 4 days
Route of administration	Topical (ophthalmic)	Topical (ophthalmic)	Topical (ophthalmic)	Topical (ophthalmic)
Dosage Form	Ophthalmic soln	Ophthalmic soln	Ophthalmic soln	Ophthalmic soln
How Supplied	0.4 mL LDPE vial	LDPE bottles: 5 mL and 10 mL	<b>0.4 mL single-use vials</b>	LDPE bottles: 5 mL & 10 mL

#### 4.1 ACULAR PRODUCT LINE EXTENSION

Currently, the marketed Acular products are: Acular (0.5%), Acular LS (0.4%), and Acular PF (0.4%). Acular was originally approved in 1992, and the PF and LS formulations were introduced thereafter (1997 and 2003, respectively). We cannot definitively determine what “LS” and “PF” are meant to designate, but through review of the product profiles we believe the Applicant most likely intended the modifiers to mean “Low Strength” and “Preservative Free”.

Given the precedence with the use of modifiers to distinguish the Acular products, we believe that confusion would arise if the name Acular were used for the proposed product instead of the proposed name, Acuvail. Currently, prescribers can rely on the modifier to specify the Acular product and omit the strength when prescribing. Thus, if the proposed product were to be managed under the name Acular, we believe this could result in confusion between the Acular 0.5% product and the proposed 0.45%

formulation because prescribers are not accustomed to writing the product strength for this single strength product.

Another option would be to use the name Acular with a new modifier for the proposed product to align with the nomenclature of the existing product line. However, the proposed product differs in strength (0.45%) and dosing frequency (four times daily vs. twice daily), and it would be challenging to identify a suitable modifier that adequately conveys these attributes and differentiates the product from the existing Acular products. For these reasons, this nomenclature approach is not a good option.

#### 4.2 ACUVAIL RISK ASSESSMENT OUTSIDE PRODUCT LINE

When assessing the name, Acuvail, DMEPA identified and evaluated a total of 41 names from a safety perspective. Fifteen names lacked orthographic and/or phonetic similarity and were not evaluated further (see Appendix C).

Failure mode and effect analysis (FMEA) was then applied to determine if the proposed proprietary name could potentially be confused with the remaining 26 names and lead to medication errors. This analysis determined that the name similarity between Acuvail was unlikely to result in medication errors with any of the 25 of the 26 products for the reasons presented in Appendices D through I. The FMEA indicates that the proposed name is vulnerable to name confusion with (b) (4), which is a pending application in the pipeline. (b) (4)

(b) (4)

(b) (4)

Because of the strong orthographic similarities and overlapping product characteristics, there is an increased potential for confusion between these products. Therefore, we believe that there is an increase in the potential for confusion if the names Acuvail and (b) (4)\* are introduced into the marketplace together. See table on page 9 for a comparison of both products.

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**Comparison of Acuvail and (b) (4)**

Proprietary Name	Acuvail	(b) (4)
Established Name	Ketorolac tromethamine	
Sponsor	Allergan	
Indication	Pain/inflammation s/p cataract surgery	
Strength	0.45%	
How Supplied	0.4 mL LDPE vials	
Usual Dose and Range	1 gtt to affected eye	
Frequency of Administration	Twice daily, through 2 wks postop	
Route of Administration	Topical (ophthalmic)	
Dosage Form	Ophthalmic solution	
	<i>Acuvail</i> <i>Acuvail</i>	

**5 CONCLUSIONS AND RECOMMENDATIONS**

The Proprietary Name Risk Assessment findings indicate the use of an alternate proprietary name rather than a modified proprietary name product line extension is reasonable for this formulation of ketorolac tromethamine ophthalmic solution. However, our FMEA indicates that the proposed name, Acuvail, is vulnerable to name confusion that could lead to medication errors with the pending (b) (4) (b) (4). Therefore, at this time, the acceptability of the proprietary name, Acuvail, is dependent upon which application is approved first. If Acuvail is approved first, we will recommend that the second product (b) (4), seek an alternate name.

DMEPA considers this a final review; however, if approval of the NDA is delayed beyond 90 days from the date of this review, the Division of Anti-infective and Ophthalmic Products should notify DMEPA because the proprietary name must be re-reviewed prior to the new approval date.

**5.1 COMMENTS TO THE DIVISION**

We are willing to meet with the Division for further discussion, if needed. If you have further questions or need clarifications, please contact Darrell Jenkins, OSE Project Manager, at 301-796-0558.

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## 5.2 COMMENTS TO THE APPLICANT

We have completed our review of the proposed proprietary name, Acuvail, and have concluded that the proposed name is vulnerable to confusion that could lead to medication errors with a pending application in the Agency. Therefore, at this time, the acceptability of the proprietary name, Acuvail, is dependent upon which application is approved first. If Acuvail is approved first, we will recommend that the second product seek an alternate name. If the second name is approved prior to your application, then you will be requested to seek an alternate name.

## 6 REFERENCES

### 6.1 OSE REVIEW

1. *OSE Review #03-0246, Proprietary Name Review, Dallas, S; dated November 14, 2003.*

### 6.2 DATABASE AND INFORMATION RESOURCES

1. *Micromedex Integrated Index (<http://csi.micromedex.com>)*

Micromedex contains a variety of databases covering pharmacology, therapeutics, toxicology and diagnostics.

2. *Phonetic and Orthographic Computer Analysis (POCA)*

POCA is a database which was created for the Division of Medication Error Prevention and Analysis, FDA. As part of the name similarity assessment, proposed names are evaluated via a phonetic/orthographic algorithm. The proposed proprietary name is converted into its phonemic representation before it runs through the phonetic algorithm. Likewise, an orthographic algorithm exists which operates in a similar fashion.

3. *Drug Facts and Comparisons, online version, St. Louis, MO (<http://factsandcomparisons.com>)*

Drug Facts and Comparisons is a compendium organized by therapeutic course; it contains monographs on prescription and OTC drugs, with charts comparing similar products.

4. *AMF Decision Support System [DSS]*

DSS is a government database used to track individual submissions and assignments in review divisions.

5. *Division of Medication Errors Prevention and Analysis proprietary name consultation requests*

This is a list of proposed and pending names that is generated by the Division of Medication Error Prevention and Analysis from the Access database/tracking system.

6. *Drugs@FDA (<http://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm>)*

Drugs@FDA contains most of the drug products approved since 1939. The majority of labels, approval letters, reviews, and other information are available for drug products approved from 1998 to the present. Drugs@FDA contains official information about FDA approved brand name, generic drugs, therapeutic biological products, prescription and over-the-counter human drugs and discontinued drugs and “Chemical Type 6” approvals.

7. **Electronic online version of the FDA Orange Book** (<http://www.fda.gov/cder/ob/default.htm>)

The FDA Orange Book provides a compilation of approved drug products with therapeutic equivalence evaluations.

8. **U.S. Patent and Trademark Office** (<http://www.uspto.gov>)

USPTO provides information regarding patent and trademarks.

9. **Clinical Pharmacology Online** ([www.clinicalpharmacology-ip.com](http://www.clinicalpharmacology-ip.com))

Clinical Pharmacology contains full monographs for the most common drugs in clinical use, plus mini monographs covering investigational, less common, combination, nutraceutical and nutritional products. It also provides a keyword search engine.

10. **Data provided by Thomson & Thomson's SAEGIS™ Online Service, available at**  
([www.thomson-thomson.com](http://www.thomson-thomson.com))

The Pharma In-Use Search database contains over 400,000 unique pharmaceutical trademarks and trade names that are used in about 50 countries worldwide. The data is provided under license by IMS HEALTH.

11. **Natural Medicines Comprehensive Databases** ([www.naturaldatabase.com](http://www.naturaldatabase.com))

Natural Medicines contains up-to-date clinical data on the natural medicines, herbal medicines, and dietary supplements used in the western world.

12. **Stat!Ref** ([www.statref.com](http://www.statref.com))

Stat!Ref contains full-text information from approximately 30 texts; it includes tables and references. Among the database titles are: Handbook of Adverse Drug Interactions, Rudolphs Pediatrics, Basic Clinical Pharmacology, and Dictionary of Medical Acronyms Abbreviations.

13. **USAN Stems** (<http://www.ama-assn.org/ama/pub/category/4782.html>)

USAN Stems List contains all the recognized USAN stems.

14. **Red Book Pharmacy's Fundamental Reference**

Red Book contains prices and product information for prescription, over-the-counter drugs, medical devices, and accessories.

15. **Lexi-Comp** ([www.lexi.com](http://www.lexi.com))

Lexi-Comp is a web-based searchable version of the Drug Information Handbook.

16. **Medical Abbreviations Book**

Medical Abbreviations Book contains commonly used medical abbreviations and their definitions.

## APPENDICES

### Appendix A:

FDA's Proprietary Name Risk Assessment considers the potential for confusion between the proposed proprietary name and the proprietary and established names of drug products existing in the marketplace and those pending IND, NDA, BLA, and ANDA products currently under review by the Center. DMEPA defines a medication error as any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer.<sup>3</sup>

For the proposed proprietary name, DMEPA staff search a standard set of databases and information sources to identify names with orthographic and phonetic similarity and hold a Center for Drug Evaluation and Research (CDER) Expert Panel discussion to gather professional opinions on the safety of the proposed proprietary name. DMEPA staff also conducts internal CDER prescription analysis studies. When provided, DMEPA considers external prescription analysis study results and incorporate into the overall risk assessment.

The Safety Evaluator assigned to the Proprietary Name Risk Assessment is responsible for considering the collective findings, and provides an overall risk assessment of the proposed proprietary name. DMEPA bases the overall risk assessment on the findings of a Failure Mode and Effects Analysis (FMEA) of the proprietary name, and focuses on the avoidance of medication errors.

FMEA is a systematic tool for evaluating a process and identifying where and how it might fail.<sup>4</sup> DMEPA uses FMEA to analyze whether the drug names identified with orthographic or phonetic similarity to the proposed proprietary name could cause confusion that subsequently leads to medication errors in the clinical setting. DMEPA uses the clinical expertise of its staff to anticipate the conditions of the clinical setting where the product is likely to be used based on the characteristics of the proposed product.

In addition, the product characteristics provide the context for the verbal and written communication of the drug names and can interact with the orthographic and phonetic attributes of the names to increase the risk of confusion when there is overlap or, in some instances, decrease the risk of confusion by helping to differentiate the products through dissimilarity. Accordingly, the DMEPA staff considers the product characteristics associated with the proposed drug throughout the risk assessment because the product characteristics of the proposed may provide a context for communication of the drug name and ultimately determine the use of the product in the *usual* clinical practice setting.

Typical product characteristics considered when identifying drug names that could potentially be confused with the proposed proprietary name include, but are not limited to; established name of the proposed product, proposed indication of use, dosage form, route of administration, strength, unit of measure, dosage units, recommended dose, typical quantity or volume, frequency of administration, product packaging, storage conditions, patient population, and prescriber population. Because drug name confusion can occur at any point in the medication use process, DMEPA staff considers the potential for confusion throughout the entire U.S. medication use process, including drug procurement, prescribing and ordering, dispensing, administration, and monitoring the impact of the medication.<sup>5</sup> DMEPA provides the product characteristics considered for this review in section one.

The Division of Medication Error Prevention and Analysis considers the spelling of the name, pronunciation of the name when spoken, and appearance of the name when scripted. DMEPA also compares the spelling of the proposed proprietary name with the proprietary and established name of existing and proposed drug products

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<sup>3</sup> National Coordinating Council for Medication Error Reporting and Prevention. <http://www.nccmerp.org/about/MedErrors.html>. Last accessed 10/11/2007.

<sup>4</sup> Institute for Healthcare Improvement (IHI). Failure Modes and Effects Analysis. Boston. IHI:2004.

<sup>5</sup> Institute of Medicine. Preventing Medication Errors. The National Academies Press: Washington DC. 2006.

because similarly spelled names may have greater likelihood to sound similar to one another when spoken or look similar to one another when scripted. DMEPA staff also examines the orthographic appearance of the proposed name using a number of different handwriting samples. Handwritten communication of drug names has a long-standing association with drug name confusion. Handwriting can cause similarly and even dissimilarly spelled drug name pairs to appear very similar to one another. The similar appearance of drug names when scripted has led to medication errors. The DMEPA staff applies expertise gained from root-cause analysis of such medication errors to identify sources of ambiguity within the name that could be introduced when scripting (e.g., “T” may look like “F,” lower case ‘a’ looks like a lower case ‘u,’ etc). Additionally, other orthographic attributes that determine the overall appearance of the drug name when scripted (see Table 1 below for details). In addition, the DMEPA staff compares the pronunciation of the proposed proprietary name with the pronunciation of other drug names because verbal communication of medication names is common in clinical settings. If provided, DMEPA will consider the Sponsor’s intended pronunciation of the proprietary name. However, DMEPA also considers a variety of pronunciations that could occur in the English language because the Sponsor has little control over how the name will be spoken in clinical practice.

**Table 1.** Criteria used to identify drug names that look- or sound-similar to a proposed proprietary name.

Type of similarity	Considerations when searching the databases		
	Potential causes of drug name similarity	Attributes examined to identify similar drug names	Potential Effects
Look-alike	Similar spelling	Identical prefix Identical infix Identical suffix Length of the name Overlapping product characteristics	<ul style="list-style-type: none"> <li>Names may appear similar in print or electronic media and lead to drug name confusion in printed or electronic communication</li> <li>Names may look similar when scripted and lead to drug name confusion in written communication</li> </ul>
	Orthographic similarity	Similar spelling Length of the name Upstrokes Down strokes Cross-strokes Dotted letters Ambiguity introduced by scripting letters Overlapping product characteristics	<ul style="list-style-type: none"> <li>Names may look similar when scripted, and lead to drug name confusion in written communication</li> </ul>
Sound-alike	Phonetic similarity	Identical prefix Identical infix Identical suffix Number of syllables Stresses Placement of vowel sounds Placement of consonant sounds Overlapping product characteristics	<ul style="list-style-type: none"> <li>Names may sound similar when pronounced and lead to drug name confusion in verbal communication</li> </ul>

Lastly, the DMEPA staff also considers the potential for the proposed proprietary name to inadvertently function as a source of error for reasons other than name confusion. Post-marketing experience has demonstrated that proprietary names (or components of the proprietary name) can be a source of error in a

variety of ways. Consequently, DMEPA considers and evaluates these broader safety implications of the name throughout this assessment and the medication error staff provides additional comments related to the safety of the proposed proprietary name or product based on professional experience with medication errors.

### **1. Database and Information Sources**

DMEPA staff conducts searches of the internet, several standard published drug product reference texts, and FDA databases to identify existing and proposed drug names that may sound-alike or look-alike to the proposed proprietary name using the criteria outlined in Section 2.1. Section 6 provides a standard description of the databases used in the searches. To complement the process, the DMEPA staff use a computerized method of identifying phonetic and orthographic similarity between medication names. The program, Phonetic and Orthographic Computer Analysis (POCA), uses complex algorithms to select a list of names from a database that have some similarity (phonetic, orthographic, or both) to the trademark being evaluated. Lastly, the DMEPA staff review the USAN stem list to determine if any USAN stems are present within the proprietary name. The individual findings of multiple safety evaluators are pooled and presented to the CDER Expert Panel.

### **2. CDER Expert Panel Discussion**

DMEPA conducts an Expert Panel Discussion to gather CDER professional opinions on the safety of the proposed product and the proposed proprietary name. The Expert Panel is composed of Division of Medication Errors Prevention (DMEPA) staff and representatives from the Division of Drug Marketing, Advertising, and Communications (DDMAC). The Expert Panel also discusses potential concerns regarding drug marketing and promotion related to the proposed names.

The primary Safety Evaluator presents the pooled results of the DMEPA staff to the Expert Panel for consideration. Based on the clinical and professional experiences of the Expert Panel members, the Panel may recommend the addition of names, additional searches by the primary Safety Evaluator to supplement the pooled results, or general advice to consider when reviewing the proposed proprietary name.

### **3. FDA Prescription Analysis Studies**

Three separate studies are conducted within the Centers of the FDA for the proposed proprietary name to determine the degree of confusion of the proposed proprietary name with marketed U.S. drug names (proprietary and established) due to similarity in visual appearance with handwritten prescriptions or verbal pronunciation of the drug name. The studies employ healthcare professionals (pharmacists, physicians, and nurses), and attempts to simulate the prescription ordering process. The primary Safety Evaluator uses the results to identify orthographic or phonetic vulnerability of the proposed name to be misinterpreted by healthcare practitioners.

In order to evaluate the potential for misinterpretation of the proposed proprietary name in handwriting and verbal communication of the name, inpatient medication orders and/or outpatient prescriptions are written, each consisting of a combination of marketed and unapproved drug products, including the proposed name. These orders are optically scanned and one prescription is delivered to a random sample of the 123 participating health professionals via e-mail. In addition, a verbal prescription is recorded on voice mail. The voice mail messages are then sent to a random sample of the participating health professionals for their interpretations and review. After receiving either the written or verbal prescription orders, the participants send their interpretations of the orders via e-mail to DMEPA.

### **4. Comments from the OND review Division or Generic drugs**

DMEPA requests the Office of New Drugs (OND) or Office of Generic Drugs (OGD) Regulatory Division responsible for the application for their comments or concerns with the proposed proprietary name and any clinical issues that may impact the DMEPA review during the initial phase of the name review. Additionally,

when applicable, at the same time DMEPA requests concurrence/non-concurrence with DDMAC's decision on the name. The primary Safety Evaluator addresses any comments or concerns in the safety evaluator's assessment.

The OND or OGD Regulatory Division is contacted a second time following our analysis of the proposed proprietary name. At this point, DMEPA conveys their decision to accept or reject the name. The OND or OGD Regulatory Division is requested to concur/not concur with DMEPA's final decision.

## **5. Safety Evaluator Risk Assessment of the Proposed Proprietary Name**

The primary Safety Evaluator applies his/her individual expertise gained from evaluating medication errors reported to FDA, conducts a Failure Mode and Effects Analysis, and provides an overall risk assessment of name confusion. Failure Mode and Effects Analysis (FMEA) is a systematic tool for evaluating a process and identifying where and how it might fail.<sup>6</sup> When applying FMEA to assess the risk of a proposed proprietary name, DMEPA seeks to evaluate the potential for a proposed proprietary name to be confused with another drug name because of name confusion and, thereby, cause errors to occur in the medication use system. FMEA capitalizes on the predictable and preventable nature of medication errors associated with drug name confusion. FMEA allows the Agency to identify the potential for medication errors due to orthographically or phonetically similar drug names prior to approval, where actions to overcome these issues are easier and more effective than remedies available in the post-approval phase.

In order to perform an FMEA of the proposed name, the primary Safety Evaluator must analyze the use of the product at all points in the medication use system. Because the proposed product is has not been marketed, the primary Safety Evaluator anticipates the use of the product in the usual practice settings by considering the clinical and product characteristics listed in Section one. The Safety Evaluator then analyzes the proposed proprietary name in the context of the usual practice setting and works to identify potential failure modes and the effects associated with the failure modes.

In the initial stage of the Risk Assessment, the Safety Evaluator compares the proposed proprietary name to all of the names gathered from the above searches, Expert Panel Discussion, and prescription studies, external studies, and identifies potential failure modes by asking:

***“Is the proposed proprietary name convincingly similar to another drug name, which may cause practitioners to become confused at any point in the usual practice setting?”***

An affirmative answer indicates a failure mode and represents a potential for the proposed proprietary name to be confused with another proprietary or established drug name because of look- or sound-alike similarity. If the answer to the question is no, the Safety Evaluator is not convinced that the names possess similarity that would cause confusion at any point in the medication use system, thus the name is eliminated from further review.

In the second stage of the Risk Assessment, the primary Safety Evaluator evaluates all potential failure modes to determine the likely *effect* of the drug name confusion, by asking:

***“Could the confusion of the drug names conceivably result in medication errors in the usual practice setting?”***

The answer to this question is a central component of the Safety Evaluator's overall risk assessment of the proprietary name. If the Safety Evaluator determines through FMEA that the name similarity would not ultimately be a source of medication errors in the usual practice setting, the primary Safety Evaluator eliminates the name from further analysis. However, if the Safety Evaluator determines through FMEA that

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<sup>6</sup> Institute for Healthcare Improvement (IHI). Failure Mode and Effects Analysis. Boston. IHI:2004.

the name similarity could ultimately cause medication errors in the usual practice setting, the Safety Evaluator will then recommend the use of an alternate proprietary name.

DMEPA will object to the use of proposed proprietary name when the primary Safety Evaluator identifies one or more of the following conditions in the Risk Assessment:

- a. DDMAC finds the proposed proprietary name misleading from a promotional perspective, and the Review Division concurs with DDMAC's findings. The Federal Food, Drug, and Cosmetic Act provides that labeling or advertising can misbrand a product if misleading representations are made or suggested by statement, word, design, device, or any combination thereof, whether through a PROPRIETARY name or otherwise [21 U.S.C 321(n); See also 21 U.S.C. 352(a) & (n)].
- b. DMEPA identifies that the proposed proprietary name is misleading because of similarity in spelling or pronunciation to another proprietary or established name of a different drug or ingredient [CFR 201.10.(C)(5)].
- c. FMEA identifies the potential for confusion between the proposed proprietary name and other proprietary or established drug name(s), and demonstrates that medication errors are likely to result from the drug name confusion under the conditions of usual clinical practice.
- d. The proposed proprietary name contains an USAN (United States Adopted Names) stem.
- e. DMEPA identifies a potential source of medication error within the proposed proprietary name. For example, the proprietary name may be misleading or, inadvertently, introduce ambiguity and confusion that leads to errors. Such errors may not necessarily involve confusion between the proposed drug and another drug product.

If DMEPA objects to a proposed proprietary name on the basis that drug name confusion could lead to medication errors, the primary Safety Evaluator uses the FMEA process to identify strategies to reduce the risk of medication errors. DMEPA is likely to recommend that the Sponsor select an alternative proprietary name and submit the alternate name to the Agency for DMEPA to review. However, in rare instances FMEA may identify plausible strategies that could reduce the risk of medication error of the currently proposed name. In that instance, DMEPA may be able to provide the Sponsor with recommendations that reduce or eliminate the potential for error and, thereby, would render the proposed name acceptable.

In the event that DMEPA objects to the use of the proposed proprietary name, based upon the potential for confusion with another proposed (but not yet approved) proprietary name, DMEPA will provide a contingency objection based on the date of approval. Whichever product, the Agency approves first has the right to use the proprietary name, while DMEPA will recommend that the second product to reach approval seek an alternative name.

The threshold set for objection to the proposed proprietary name may seem low to the Sponsor. However, the safety concerns set forth in criteria a through e are supported either by FDA regulation or by external healthcare authorities, including the Institute of Medicine (IOM), World Health Organization (WHO), the Joint Commission, and the Institute for Safe Medication Practices (ISMP). These organizations have examined medication errors resulting from look- or sound-alike drug names and called for regulatory authorities to address the issue prior to approval. Additionally, DMEPA contends that the threshold set for the Proprietary Name Risk Assessment is reasonable because proprietary drug name confusion is a predictable and a preventable source of medication error that, in many instances, the Agency and/or Sponsor can identify and rectify prior to approval to avoid patient harm.

Furthermore, post-marketing experience has demonstrated that medication errors resulting from drug name confusion are notoriously difficult to rectify post-approval. Educational and other post-approval efforts are low-leverage strategies that have had limited effectiveness at alleviating medication errors involving drug name confusion. Sponsors have undertaken higher-leverage strategies, such as drug name changes, in the past but at great financial cost to the Sponsor and at the expense of the public welfare, not to mention the Agency's

credibility as the authority responsible for approving the error-prone proprietary name. Moreover, even after Sponsors' have changed a product's proprietary name in the post-approval phase, it is difficult to eradicate the original proprietary name from practitioners' vocabulary, and as a result, the Agency has continued to receive reports of drug name confusion long after a name change in some instances. Therefore, DMEPA believes that post-approval efforts at reducing name confusion errors should be reserved for those cases in which the potential for name confusion could not be predicted prior to approval.

**Appendix B:** Letters with possible orthographic or phonetic misinterpretation

Letters in Name, Acuvail	Scripted may appear as	Spoken may be interpreted as
Capital 'A'	O, S, U, Ci	any vowel
lower case 'c'	a, e, r, or u	'k'
lower case 'u'	e, i, n, o, or v	any vowel
Lower case 'v'	r, n, or u	'b', 'f'
lower case 'a'	c, e, o, or u	any vowel
lower case 'i'	'cl', or 'l'	't'
lower case 'l'	c, e, or r	'h'

**Appendix C:** Names lacking convincing look-alike and/or sound alike similarities with Acuvail

Proprietary Name	Proprietary Name	Proprietary Name
Amoxil	Advil	Accuhist
Accutane	Akurza	Accuzyme
Accuneb	Avalide	Activella
(b) (4)	Backaid	Acuflex
(b) (4)	Lactaid	Acyclovir

\*\*\* Note: This is proprietary and confidential information that should not be released to the public.\*\*\*

**Appendix D:** Proprietary names used only in Foreign Countries

Proprietary Name	Similarity to Acuvail	Country
Accusite	Look	Europe
Cluvax	Look	Chile, Ecuador
Acupril	Look	Mexico, Netherlands, Portugal

**Appendix E:** Discontinued products with no generic equivalent

Proprietary Name	Similarity to Acuvail	Status	Source
Acutect (Technecium Tc-99M Apcitide)	Look	Discontinued, no generics available	Drugs@FDA
Actidil (Triprolidine HCl)	Look/Sound	Discontinued, no generic available	Drugs@FDA

**Appendix F:** Products with no overlap in strength and dose.

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)
Acuvail (Ketorolac tromethamine)	N/A	0.45%	<u>Usual dose:</u> 1 drop to affected eye twice daily beginning 1 day prior to cataract surgery, continued on the day of surgery and through the first 2 weeks of the postoperative period.

(b) (4)

Acusil Dietary supplement- tablets	Look	Multiple ingredients, strengths	1 capsule in the morning and 1 capsule in the evening with 8 ounces of water.
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Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)
Diastat <b>Acudial</b> (Diazepam)	Look	10 mg/2mL; 20 mg/4 mL	0.2 to 0.5 mg/kg, age dependent, x 1. May give 2 <sup>nd</sup> dose 4-12 hrs after 1 <sup>st</sup> dose.
Oruvail [Availability: <i>Generic only</i> ] (Ketoprofen) extended-release caps	Look/Sound	100 mg, 150 mg, 200 mg	200 mg po daily
Acuvue Disposable Contact Lens	Look/Sound	Varies by Contact Rx	Daily wear or extended wear from 1-7 days
Acuvue Disposable Contact Lens	Look/Sound	Varies by Contact Rx	Daily wear or extended wear from 1-7 days
Ansaid (Flurbiprofen)	Look	50 mg, 100 mg	200 mg to 300 mg per day given 2, 3, or 4 times a day
Actonel (Risedronate sodium)	Look	5 mg, 30 mg, 35 mg, 75 mg, 150 mg	5 mg daily, 35 mg once per week, 75 mg taken on 2 consecutive day, or 150 mg once a month
Activella (Estradiol/norethindrone)	COPA	0.5 mg/0.1 mg; 1 mg/0.5 mg	1 tablet po once daily
Elavil (Amitriptyline HCl)	COPA	Inj: 10 mg/mL Tabs: 10 mg, 25 mg, 50 mg, 75 mg, 100 mg, 150 mg	20 mg to 300 mg po daily.

**Appendix G:** Drug names with single strength availability but with differentiating product characteristics

Product name with potential for confusion	Similarity to Product Name	Strength	Usual Dose	Other Differentiating Product Characteristics
<b>Acuvail</b> (ketorolac tromethamine)		0.45%	1 gtt to affected eye twice daily through the first 2 weeks of the postoperative period.	
Actigall (Ursodiol)	COPA	300 mg caps	8 mg to 10 mg/kg/day given in 2 or 3 divided doses	<b>Dosage form:</b> Capsule vs. solution (ophthalmic) <b>Route of administration:</b> Oral vs. topical (ophthalmic) <b>Indication:</b> Gallstones vs. ocular pain/inflammation s/p cataract surgery
Adrucil (Fluorouracil) <i>Available in generics only</i>	COPA	50 mg/mL vial	Varies per condition	<b>Dosage form:</b> Injection vs. ophthalmic solution <b>Route of administration:</b> Intravenous vs. topical (ophthalmic) <b>Dose:</b> Varies per condition vs. 1 gtt to affected eye for 2weeks <b>Frequency of administration:</b> Once daily/once weekly vs. twice daily
Aquanil (water, cetyl alcohol, stearyl alcohol, benzyl alcohol, sodium lauryl sulfate, xanthum gum)	COPA	none	Apply generous amount to the skin and gently rub. Remove excess with water, a soft tissue or cloth	<b>Dosage form:</b> Emollient vs. ophthalmic solution <b>Route of administration:</b> Topical (skin) vs. topical (ophthalmic) <b>Frequency of administration:</b> As needed vs. twice daily <b>Prescription status:</b> OTC vs. Rx <b>Indication:</b> Facial cleanser vs. ocular pain/inflammation s/p cataract surgery

Aquasol A (Vitamin A Palmitate)	COPA	50,000 IU/mL	100,000 IU daily for 3 days followed by 50, 000 IU daily for 2 weeks	<p><b><u>Dosage form:</u></b> Injection vs. ophthalmic solution</p> <p><b><u>Route of administration:</u></b> Intramuscular vs. topical (ophthalmic)</p> <p><b><u>Dose:</u></b> 100,000 IU once daily x 3 days then 50,000 IU once daily x 2 wk vs. 1 gtt to affected eye for 2 weeks</p> <p><b><u>Frequency of administration:</u></b> Once daily vs. twice daily</p> <p><b><u>Indication:</u></b> Vitamin A deficiency vs. ocular pain/inflammation s/p cataract surgery</p>
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**Appendix H:** Products with limited or no additional information found in DMEPA References 1-16

Proprietary Name	Similarity to Acuvail
Acunol	COPA

**Appendix I:** Potential confusing name with numerical overlap in strength or dose

Failure Mode: Name confusion	Causes (could be multiple)	Effects
<p><b>Acuvail (ketorolac tromethamine)</b> <b>0.45% ophthalmic solution</b></p>		<p><b>Usual dose:</b> 1 drop into affected eye twice daily through 2 weeks after cataract surgery</p>
<p>Ocuvite (vitamin and mineral supplement, various formulas)</p> <p>Tablets</p>	<p>Orthographic similarity: ('Ocu-' vs. 'Acuv-') may appear similar when scripted; both contain 7 letters</p> <p>Phonetic similarity: Both contain 3 syllables; 'Ocu-' and 'Acu-' are phonetically similar, second syllable begins with 'v'</p>	<p>Product differences minimize the likelihood of a medication error in the usual practice setting.</p> <p><i>Rationale:</i></p> <p>Ocuvite and Acuvail may appear similar when scripted or spoken. Although Ocuvite and Acuvail share orthographic similarities, they have several differentiating product characteristics. Ocuvite is a vitamin and mineral supplement for the eye, whereas Acuvail is indicated for the relief of pain and inflammation after cataract surgery. Despite the fact that both products used to treat eye conditions, Ocuvite is administered orally, whereas Acuvail is administered topically into the eye. Additionally, Ocuvite is an over-the-counter medication that does not require a prescription, and may be less likely to be written as a prescription. Contrarily, Acuvail must be prescribed. A prescription for Acuvail will include specific instructions such as "instill 1 drop" and specify which eye to medicate (e.g., OS, OD), and the duration of treatment (2 weeks).</p> <p>Therefore, the differentiating product characteristics and signature will help to minimize confusion between Ocuvite and Acuvail.</p>
<p>Advair HFA Advair Diskus</p> <p>(Fluticasone/Salmeterol)</p> <p>Inhaler</p>	<p>Orthographic similarity: Both begin with 'A'; the endings ('-vair' vs. '-vail') may appear similar when scripted</p> <p>Similar dosing regimen: (1 puff BID vs. 1 drop BID)</p>	<p>Differentiating product characteristics minimize the likelihood of a medication error in the usual practice setting.</p> <p><i>Rationale:</i></p> <p>Orthographic differences: Advair contains an upstroke 'd' towards the beginning of the name, whereas Acuvail contains an upstroke 'l' at the end of the name.</p> <p>Advair HFA/Diskus is indicated for chronic asthma. Acuvail is indicated to treat ocular pain and inflammation after cataract surgery. Since Advair is available in multiple strengths, the strength must be specified. Additionally, Advair is administered via oral inhalation, whereas Acuvail will be administered topically (ophthalmic). Despite their similar dosing regimens, Acuvail will include specific instructions such as "instill 1 drop" and specify which eye to medicate (e.g., OS, OD), and the duration of treatment (2 weeks).</p> <p>Despite some orthographic similarities, the signature and product strength will help to differentiate Advair and Acuvail, even in the event that the modifiers HFA or Diskus are omitted from prescriptions.</p>

Failure Mode: Name confusion	Causes (could be multiple)	Effects
<p style="text-align: center;"><b>Acuvail (ketorolac tromethamine)</b> <b>0.45% ophthalmic solution</b></p>		<p><b>Usual dose:</b> 1 drop into affected eye twice daily through 2 weeks after cataract surgery</p>
<p>Aclovate (Aclometasone dipropionate) Ointment/Cream</p>	<p>Orthographic similarity: Both begin with ('Ac-'); both contain '-va-' in the middle of the name</p>	<p>Some orthographic differences and product differences minimize the likelihood of a medication error in the usual practice setting.</p> <p><i>Rationale:</i></p> <p>Aclovate and Acuvail may appear similar when scripted. However, the upstroke 'l' and cross-stroke 't' in Aclovate may help to provide some differentiation between Aclovate and Acuvail. Although Ocuville and Acuvail share orthographic similarities, they have several differentiating product characteristics. Aclovate is indicated for the relief of pruritic dermatoses, whereas Acuvail is indicated for the relief of ocular pain and inflammation after cataract surgery. Despite the fact that both products are administered topically, Aclovate is administered on the skin whereas Acuvail is administered topically into the eye. Additionally, a prescription for Acuvail will include specific instructions such as "instill 1 drop" and specify which eye to medicate (e.g., OS, OD), and the duration of treatment (2 weeks). The instructions for Aclovate will most likely be "apply to affected area".</p> <p>Thus, the differentiating signature will help to minimize confusion between Aclovate and Acuvail.</p>
<p>Accupril (Quinapril HCl) Tablets</p>	<p>Orthographic similarity: Both begin with ('Ac-'); both end in '-il'</p> <p>Phonetic similarity: Both contain 3 syllables; 'Accu' and 'Acu-' are phonetically identical, the endings rhyme ('-pril' vs. '-vail')</p> <p>Overlapping frequency of administration (BID)</p>	<p>Differentiating product characteristics minimize the likelihood of a medication error in the usual practice setting.</p> <p><i>Rationale:</i></p> <p>Orthographic differences: Accupril contains a downstroke 'p' whereas Acuvail does not contain any downstrokes. Accupril may appear slightly longer as it contains 8 letters while Acuvail contains 7 letters.</p> <p>Phonetic differences: The 'pr' sound in Accupril may provide a slight phonetic differentiation from the ending 'vail' in Acuvail.</p> <p>Accupril is indicated for hypertension and heart failure. Acuvail is indicated to treat ocular pain and inflammation after cataract surgery. Since Accupril is available in multiple strengths (5 mg, 10 mg, 20 mg, 40 mg) the strength must be specified. Additionally, Accupril is administered orally, whereas Acuvail will be administered topically into the eye. Despite their overlapping frequency of administration (BID), Acuvail will include specific instructions such as "instill 1 drop" and specify which eye to medicate (e.g., OS, OD), and the duration of treatment (2 weeks). Accupril is prescribed usually prescribed for chronic use.</p> <p>Despite some orthographic and phonetic similarities, the signature and product strength will help to differentiate Accupril and Acuvail.</p>

Failure Mode: Name confusion	Causes (could be multiple)	Effects
<p style="text-align: center;"><b>Acuvail (ketorolac tromethamine)</b> <b>0.45% ophthalmic solution</b></p>		<p><b>Usual dose:</b> 1 drop into affected eye twice daily through 2 weeks after cataract surgery</p>
<p>Anusol-HC (Hydrocortisone) Cream</p>	<p>Orthographic similarity: Both begin with 'A'; both contain 'u' in the middle of the name; the last letter is an upstroke 'l' (if the modifier HC is omitted)</p> <p>Both are available as a single strength (2.5% vs. 0.45%)</p> <p>Overlapping frequency of administration (BID)</p>	<p>Differentiating product characteristics minimize the likelihood of a medication error in the usual practice setting.</p> <p><i>Rationale:</i></p> <p>Orthographic differences (if the modifier HC is omitted from Anusol): Anusol may appear slightly shorter in length as it contains 6 letters as compared to Acuvail's 7 letters. The letters 'n' in Anusol and 'c' in Acuvail may not appear orthographically similar when scripted. Similarly, the open 'v' in Acuvail may appear orthographically different from the 's' in Anusol.</p> <p>Anusol is a topical cream indicated for the treatment or inflammatory and pruritic manifestations of corticoid-responsive dermatoses. Acuvail is indicated to treat ocular pain and inflammation after cataract surgery. Although both drugs are available as a single strength (2.5% vs. 0.45%), each is administered topically, and they share the same frequency of administration (BID), Anusol is administered on the skin (rectally), and Acuvail will be administered in the eye. Additionally, Acuvail will include specific instructions such as "instill 1 drop" and specify which eye to medicate (e.g., OS, OD), and the duration of treatment (2 weeks). The instructions for Anusol can be vague such as "apply to affected area".</p> <p>Despite some orthographic similarities and similar product characteristics, the signature will help to differentiate Anusol and Acuvail.</p>

Failure Mode: Name confusion	Causes (could be multiple)	Effects
<p style="text-align: center;"><b>Acuvail (ketorolac tromethamine)</b> <b>0.45% ophthalmic solution</b></p>		<p><b>Usual dose:</b> 1 drop into affected eye twice daily through 2 weeks after cataract surgery</p>
<p>Acular Acular LS Acular PF (Ketorolac tromethamine) Ophthalmic solution</p>	<p>Orthographic similarity: Both begin with ('Acu-'); both contain an upstroke 'i'</p> <p>Phonetic similarity: Both contain 3 syllables; both begin with 'Acu-'</p> <p>Overlapping indication (postoperative ocular pain and inflammation), dose (1 drop), route of administration (topical, ophthalmic), dosage form (ophthalmic solution)</p> <p>Similar numerical strength (0.4% and 0.5 % vs. 0.45 %).</p>	<p>Orthographic differences will help to minimize the likelihood of a medication error in the usual practice setting.</p> <p><i>Rationale:</i></p> <p>Acular and Acuvail share some orthographic similarities as they both begin with 'Acu-'. However, the endings 'lar' and 'vail' are orthographically different because the upstroke 'i' in Acular appears in the middle of the name, whereas the upstroke 'i' in Acuvail appears as the last letter at the end of the name. From a phonetic perspective, Acular and Acuvail contain the same first two syllables, 'Acu-'; however the endings are phonetically distinct '-lar' vs. '-vail'.</p> <p>Acular and Acuvail share overlapping indications, route of administration, and dosage form. Both products are available as a single strength. However, Acular has three different formulations: Acular, Acular LS (low strength), and Acular PF (preservative-free). Acular and Acular PF are available in the same strength (0.5%). Acular LS is available as 0.4%. Prescriptions for the Acular product line should include the modifier in order to differentiate the formulation. Each Acular product has a different duration of treatment: Acular (no specific duration (for ocular itching), or for 2 weeks after cataract surgery), Acular LS (up to 4 days postop), Acular PF (up to 3 days postop). Because each product in the Acular product has a different duration of treatment, the signature will likely include specific instructions for use (e.g., Acular 1 gtt OD four times a day). Another differentiating product characteristic is that Acular, Acular LS and Acular PF are all dosed four times a day. Contrarily, Acuvail is dosed twice daily.</p> <p>Although Acular and Acuvail share overlapping product characteristics, the instructions for use and the use of modifiers will help to minimize the risk of confusion between Acular and Acuvail. Additionally, the orthographic and phonetic differences will also help to distinguish the products. Therefore, from a look-alike and sound-alike perspective, the Acular products and Acuvail can coexist in the marketplace.</p>

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