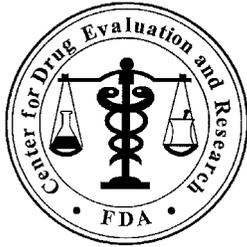


**CENTER FOR DRUG EVALUATION AND
RESEARCH**

APPLICATION NUMBER:

22382Orig1s000

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: March 30, 2010

To: Bob Rappaport, MD, Director
Division of Anesthesia and Analgesia Products

Through: Todd Bridges, RPh, Team Leader
Denise P. Toyer, PharmD, Deputy Director
Division of Medication Error Prevention and Analysis (DMEPA)

From: Deveonne Hamilton-Stokes RN, BSN, Safety Evaluator
Division of Medication Error Prevention and Analysis (DMEPA)

Subject: Proprietary Name Review

Drug Name(s): Sprix (Ketorolac Tromethamine) Nasal Spray
15.75 mg per spray

Application Type/Number: NDA# 022382

Applicant: Roxro Pharma, Inc.

OSE RCM #: 2010-676

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1 INTRODUCTION

This re-assessment of the proprietary name is written in response to the anticipated approval of this NDA within 90 days from the date of this review. The Division of Medication Error Prevention and Analysis (DMEPA) found the proposed proprietary name, Sprix, acceptable in OSE Reviews #2008-2051, dated March 4, 2009 and #2009-393, dated August 26, 2009. The Division of Anesthesia and Analgesia Products did not have any concerns with the proposed name, Sprix, and the Division of Drug Marketing, Advertising and Communication (DDMAC) found the name acceptable from a promotional perspective on January 8, 2009.

2 METHODS AND RESULTS

For the proposed proprietary name, DMEPA staff search a standard set of databases and information sources (see section 4) to identify names with orthographic and/or phonetic similarity to the proposed name that have been approved since the previous proprietary name review. We use the same search criteria previously used in the above stated reviews. Since none of the proposed product characteristics were altered we did not re-evaluate previous names of concern. Additionally, DMEPA searches the United States Adopted Names (USAN) stem list to determine if the name contains any USAN stems as of the last USAN updates. DMEPA bases the overall risk assessment on the findings of a Failure Mode and Effects Analysis (FMEA) of the proposed proprietary name, and focuses on the avoidance of medication errors.

DMEPA staff did not identify any United States Adopted Names (USAN) stems in the proposed proprietary name, Sprix, as of March 25, 2010.

The searches of the databases yielded one new name, (b) (4) thought to look similar to Sprix and represent a potential source of drug name confusion. This name was evaluated using FMEA. The findings of the FMEA indicate that the proposed name, Sprix, is not likely to result in name confusion with (b) (4) for the reasons presented in Appendix A.

3 CONCLUSIONS AND RECOMMENDATIONS

The proprietary name risk assessment findings indicate that the proposed name, Sprix, is not vulnerable to name confusion that could lead to medication errors nor is the name considered promotional. Thus, the Division of Medication Error Prevention and Analysis (DMEPA) has no objection to the proprietary name, Sprix, for this product at this time.

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 Anesthesia and Analgesia Products should notify DMEPA because the proprietary name must be re-reviewed prior to the new approval date.

We are willing to meet with the Division for further discussion, if needed. If you have further questions or need clarifications, please contact Bola Adeolu, OSE Regulatory Project manager, at 301-796-4264.

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

4 REFERENCES

1. OSE review #2008-2051, dated March 4, 2009; Proprietary Name Review of Sprix; Deveonne Hamilton-Stokes, Safety Evaluator.
2. OSE review #2009-393, dated August 26, 2009; Proprietary Name Review of Sprix; Deveonne Hamilton-Stokes, Safety Evaluator.
3. **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.

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

USAN Stems List contains all the recognized USAN stems.

5. **CDER Proposed Names List**

Compiled list of proposed proprietary names submitted to the Division of Medication Error Prevention and Analysis (DMEPA) for review. The list is updated weekly and maintained by DMEPA.

Appendix A: Product with single strength availability but with differentiating product characteristics

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Dosage Form/ Strength	Usual Dose (if applicable)
Sprix (Ketorolac tromethamine)	N/A	15.75 mg	One 15.75 mg spray in each nostril every 6 to 8 hours OR For special populations: One 15.75 mg spray in only one nostril every 6 to 8 hours for up to 5 days

(b) (4)

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Application Type/Number	Submission Type/Number	Submitter Name	Product Name
NDA-22382	ORIG-1	ROXRO PHARMA INC	Sprix (ketorolac tromethamine) nasal spray

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/s/

DEVEONNE G HAMILTON-STOKES
03/30/2010

TODD D BRIDGES
03/30/2010

DENISE P TOYER
03/30/2010



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: August 26, 2009

To: Bob Rappaport, MD
Director, Division of Anesthesia, Analgesia, and Rheumatology
Products

Through: Todd Bridges, RPh, Team Leader
Denise P. Toyer, PharmD, Deputy Director
Division of Medication Error Prevention and Analysis (DMEPA)

From: Deveonne Hamilton-Stokes RN, BSN, Safety Evaluator
Division of Medication Error Prevention and Analysis (DMEPA)

Subject: Proprietary Name Review

Drug Name(s): Sprix (Ketorolac Tromethamine) Nasal Spray
15.75 mg per spray

Application Type/Number: NDA# 22-382

Applicant: Roxro Pharma, Inc.

OSE RCM #: 2009-393

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1 INTRODUCTION

This review is written in response to the anticipated approval of this NDA within 90 days from the date of this review. DMEPA found the proposed name, Sprix, acceptable in OSE Review #2008-2051, dated March 4, 2009. Since that review, none of Sprix's product characteristics have been altered. Additionally, on January 7, 2009, DDMAC reviewed the proposed name and had no concerns regarding the proposed name from a promotional perspective. Furthermore, the review Division did not have any concerns with the proposed name, Sprix during our initial review.

2 METHODS AND RESULTS

For the proposed proprietary name, DMEPA staff search a standard set of databases and information sources (see section 4) to identify names with orthographic and phonetic similarity to the proposed name that have been approved since the previous OSE proprietary name review. We used the same search criteria used in OSE Review #2008-2051 for the proposed proprietary name, Sprix. Since none of the proposed product characteristics were altered we did not re-evaluate previous names of concern. Additionally, DMEPA searches the USAN stem list to determine if the name contains any USAN stems as of the last USAN updates. DMEPA bases the overall risk assessment on the findings of a Failure Mode and Effects Analysis (FMEA) of the proposed proprietary name, and focuses on the avoidance of medication errors.

The searches of the databases did not yield any new names thought to look or sound similar to Sprix and represent a potential source of drug name confusion.

Additionally, DMEPA staff did not identify any United States Adopted Names (USAN) stems in the proposed proprietary name, as of August 20, 2009.

3 CONCLUSIONS AND RECOMMENDATIONS

The re-review of Sprix did not identify any additional names thought to look or sound similar to the proposed name since our last review. Thus, the Division of Medication Error Prevention and Analysis (DMEPA) has no objection to the proprietary name, Sprix, for this product at this time.

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 Anesthesia, Analgesia and Rheumatology Products should notify DMEPA because the proprietary name must be re-reviewed prior to the new approval date.

4 REFERENCES

1. OSE review ##2008-2051 Proprietary Name Review of Sprix; Hamilton-Stokes, Deveonne

2. *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.

3. *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.

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

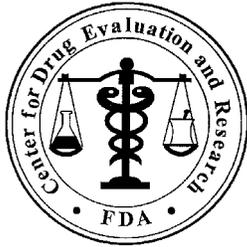
USAN Stems List contains all the recognized USAN stems.

This is a representation of an electronic record that was signed electronically and this page is the manifestation of the electronic signature.

/s/

TODD D BRIDGES on behalf of DEVEONNE G HAMILTON-STOKES
08/26/2009

DENISE P TOYER
08/26/2009



**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: March 4, 2009

To: Bob Rappaport, MD
Director, Division of Anesthesia, Analgesia, and Rheumatology
Products

Through: Todd Bridges, RPh, Team Leader
Denise P. Toyer, PharmD, Deputy Director
Carol Holquist, RPh, Director
Division of Medication Error Prevention and Analysis (DMEPA)

From: Deveonne Hamilton-Stokes RN, BSN, Safety Evaluator
Division of Medication Error Prevention and Analysis (DMEPA)

Subject: Proprietary Name Review

Drug Name(s): Sprix (Ketorolac Tromethamine) Nasal Spray
15.75 mg/spray

Application Type/Number: NDA# 22-382

Applicant: Roxro Pharma, Inc.

OSE RCM #: 2008-2051

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EXECUTIVE SUMMARY

The Proprietary Name Risk Assessment findings indicate that the proposed name, Sprix, is not vulnerable to name confusion that could lead to medication errors. As such, the Division of Medication Error Prevention and Analysis (DMEPA) does not object to the use of the proprietary name, Sprix, for this product. This finding was consistent with and supported by an independent risk assessment of the proprietary name submitted by the Applicant. The Division of Anesthesia, Analgesia, and Rheumatology Products concurs with this assessment.

If any of the proposed product characteristics as stated in this review are altered, DMEPA rescinds this Risk Assessment finding, and the name must be resubmitted for review. In the event that our Risk Assessment finding is rescinded, the evaluation of the name on resubmission is independent of the previous Risk Assessment and, as such, the conclusions on re-review of the name are subject to change. 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 consult was written in response to a request from the Division of Anesthesia, Analgesia, and Rheumatology Products for assessment of the proprietary name, Sprix, regarding potential name confusion with other proprietary or established drug names. Additionally the Applicant submitted an independent analysis of the name by the (b) (4) (b) (4) for review and comment. Furthermore, the container label, carton labeling and insert labeling were provided for review and comment and will be evaluated under a separate review and is forthcoming (OSE# 2008-2052).

1.2 REGULATORY HISTORY

This is a 505(b)(2) Application which provides for a new dosage form (nasal spray). The reference listed drug (RLD) for this product is Toradol (NDA 19-698) which was approved on November 30, 1989.

1.3 PRODUCT INFORMATION

Sprix is indicated for short term (up to 5 days) management of moderate to severe pain, (b) (4) (b) (4). The usual recommended dose for adult patients less than 65 years of age is one 15.75 mg spray in each nostril every 6 to 8 hours. The maximum daily dose should not exceed 126 mg. The recommended dose for special populations (greater than 65 years of age, renally impaired or patients weighing less than 110 lb {50 kg}) is one 15.75 mg spray in one nostril only, every 6-8 hours. The maximum daily dose for these special populations should not exceed 63 mg. Sprix will be supplied in boxes containing 1 nasal spray bottle or 5 single-day nasal spray bottles. Each nasal spray bottle delivers 126 mg or 8 sprays of Sprix. Patients may keep unused containers of Sprix unrefrigerated in a cool, dry location out of direct sunlight for up to 60 days. Bottles of Sprix should be discarded within 24 hours of priming.

2 METHODS AND MATERIALS

This section describes the methods and materials used by DMEPA staff to conduct a proprietary name risk assessment. The primary focus for this assessment is to identify and remedy potential sources of medication error prior to drug approval. 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.¹

2.1 PROPRIETARY NAME RISK ASSESSMENT

FDA's Proprietary Name Risk Assessment considers the potential for confusion between the proposed proprietary name, Sprix, 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 CDER.

For the proprietary name, Sprix, the DMEPA staff search a standard set of databases and information sources to identify names with orthographic and phonetic similarity (see Section 2.1.1.1) and held an CDER Expert Panel discussion to gather professional opinions on the safety of the proposed proprietary name (see Section 2.1.1.2). DMEPA also conducts internal FDA prescription analysis studies (see Section 2.1.2).

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 (see Section 2.1.3). The overall risk assessment is based on the findings of a Failure Mode and Effects Analysis (FMEA) of the proprietary name, and is focused on the avoidance of medication errors. FMEA is a systematic tool for evaluating a process and identifying where and how it might fail.² FMEA is used to analyze whether the drug names identified with look- or sound-alike similarity to the proposed name could cause confusion that subsequently leads to medication errors in the clinical setting. 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.³ DMEPA uses the clinical expertise of its staff to anticipate the conditions of the clinical setting that the product is likely to be used in 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. As such, the staff considers the product characteristics associated with the proposed drug throughout the risk assessment, since 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 drug name include, but are not limited to established name of the proposed product, the proposed indication, 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 considers the potential for confusion throughout the

¹ National Coordinating Council for Medication Error Reporting and Prevention. <http://www.nccmerp.org/aboutMedErrors.html>. Last accessed 10/11/2007.

² Institute for Healthcare Improvement (IHI). Failure Modes and Effects Analysis. Boston. IHI:2004.

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

entire U.S. medication use process, including drug procurement, prescribing and ordering, dispensing, administration, and monitoring the impact of the medication.⁴

2.1.1 Search Criteria

The DMEPA staff considers the spelling of the name, pronunciation of the name when spoken, and appearance of the name when scripted as outlined in Appendix A.

For this review, particular consideration was given to drug names beginning with the letter ‘S’ when searching to identify potentially similar drug names, as 75% of the confused drug names reported by the United States Pharmacopeia-Institute of Medication Practices (USP-ISMP) Medication Error Reporting Program involve pairs beginning with the same letter.^{5,6}

To identify drug names that may look similar to Sprix, the staff also consider the other orthographic appearance of the name on lined and unlined orders. Specific attributes taken into consideration include the length of the name (5 letters), upstrokes (1, capital letter ‘S’), down strokes (one, ‘p’), cross-strokes (one, ‘x’), and dotted letters (1, ‘i’). Additionally, several letters in Sprix may be vulnerable to ambiguity when scripted, including the capital letter ‘S’ may appear as ‘A’ or ‘L’; lower case ‘p’ may appear as a lower case ‘g’, ‘j’, ‘y’, or ‘z’; lower case ‘r’ may appear as ‘n’; lower case ‘i’ may appear as a lower case ‘e’, ‘l’ or ‘o’; and lower case ‘x’ may appear as a lower case ‘v’. As such, the staff also considers these alternate appearances when identifying drug names that may look similar to Sprix.

When searching to identify potential names that may sound similar to Sprix, the DMEPA staff search for names with similar number of syllables (1), stresses (Sprix or Sprick), and placement of vowel and consonant sounds. In addition, several letters in Sprix may be subject to interpretation when spoken, including the letter ‘i’ may be interpreted as letter ‘e’; and the letter ‘x’ may be interpreted as ‘s’ or ‘z’. Additionally, the combination letters ‘Sp’ may sound like the letter ‘p’, and ‘ix’ may sound like ‘icks’ or ‘riz’. The Applicant’s intended pronunciation of the proprietary name is “spricks” and was taken into consideration when identifying potential names.

The DMEPA staff also consider the product characteristics associated with the proposed drug throughout the identification of similar drug names, since the product characteristics of the proposed drug ultimately determine the use of the product in the clinical practice setting. For this review, the DMEPA staff were provided with the following information about the proposed product: the proposed proprietary name (Sprix), the established name (ketorolac tromethamine), proposed indication (short term management of moderate to severe pain), strength (15.75 mg), dose (15.75 mg or 31.5 mg), frequency of administration (every 6 to 8 hours), route of administration (nasally) and dosage form of the product (nasal spray). Appendix A provides a more detailed listing of the product characteristics the medication error staff generally takes into consideration.

Lastly, the DMEPA staff also considers the potential for the proposed 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. As such, these broader safety implications of the name are considered and evaluated throughout this assessment and the medication error staff provides additional comments related to the safety of the proposed name or product based on their professional experience with medication errors.

⁴ Institute of Medicine. Preventing Medication Errors. The National Academies Press: Washington DC. 2006.

⁵ Institute for Safe Medication Practices. Confused Drug name List (1996-2006). Available at <http://www.ismp.org/Tools/confuseddrugnames.pdf>

⁶ Kondrack, G and Dorr, B. Automatic Identification of Confusable Drug Names. Artificial Intelligence in Medicine (2005)

2.1.1.1 Database and Information Sources

The proposed proprietary name, Sprix, was provided to the DMEPA staff to conduct a search 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 Sprix using the criteria outlined in Section 2.1.1. A standard description of the databases used in the searches is provided in Section 7. To complement the process, the DMEPA staff uses 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, DMEPA staff reviews the United States Adopted Names (USAN) stem list to determine if any USAN stems are present within the proprietary name. The findings of the individual Safety Evaluators were then pooled and presented to the Expert Panel.

2.1.1.2 CDER Expert Panel Discussion

An Expert Panel Discussion is held by DMEPA to gather CDER professional opinions on the safety of the product and the proprietary name, Sprix. Potential concerns regarding drug marketing and promotion related to the proposed names are also discussed. This group is composed of DMEPA staff and representatives from the Division of Drug Marketing, Advertising, and Communications (DDMAC).

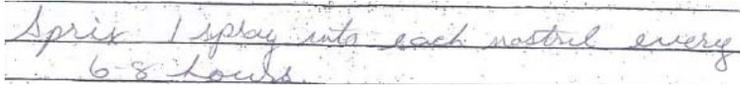
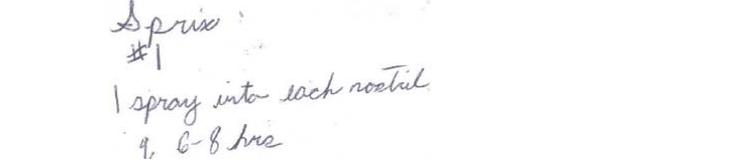
The pooled results of DMEPA staff were presented to the Expert Panel for consideration. Based on the clinical and professional experiences of the Expert Panel members, the Panel may recommend the addition of names, additional searches by the Safety Evaluator to supplement the pooled results, or general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

2.1.2 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 Sprix 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 a total of 123 healthcare professionals (pharmacists, physicians, and nurses), and attempts to simulate the prescription ordering process. The results are used by the Safety Evaluator to identify any orthographic or phonetic vulnerability of the proposed name to be misinterpreted by healthcare practitioners.

In order to evaluate the potential for misinterpretation of Sprix in handwriting and verbal communication of the name, inpatient medication orders are written, each consisting of a combination of marketed and unapproved drug products, including the proposed name. These prescriptions are optically scanned and one prescription is delivered to a random sample of 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 the DMEPA staff.

Figure 1. Sprix Prescription Study (conducted on January 23, 2009)

HANDWRITTEN PRESCRIPTION AND MEDICATION ORDERS	VERBAL PRESCRIPTION
<p><u>Inpatient Medication Order:</u></p> 	<p>“Sprix 1 spray into each nostril every 6-8 hours”</p>
<p><u>Outpatient Prescription:</u></p> 	

2.1.3 External Proprietary Name Risk Assessment

For this product, the Applicant submitted an external evaluation of the proposed proprietary name, Fanapt. 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 assessment of the 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.

2.1.4 Comments from the Division of Anesthesia, Analgesia, and Rheumatology Products

DMEPA requests the regulatory division in the Office of New Drugs responsible for the application for their comments and/or clinical/other concerns on the proposed proprietary name at 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. Any comments or concerns are addressed in the safety evaluator’s assessment.

The Review Division is contacted a second time following our analysis of the proposed name. At this point, DMEPA conveys their decision to accept or reject the name. The regulatory division is requested to concur /not concur with DMEPA’s final decision.

2.1.5 Safety Evaluator Risk Assessment of the Proposed Proprietary Name

Based on the criteria set forth in Section 2.1.1, the Safety Evaluator Risk Assessment applies their individual expertise gained from evaluating medication errors reported to FDA to conduct a Failure Mode and Effects Analysis and provide an overall risk 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.⁷ When applying FMEA to assess the risk of a proposed proprietary name, the Division of Medication Error Prevention and Analysis seeks to evaluate the potential for a proposed name to be confused with another drug name as a result of the name confusion and 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 look- or sound-alike 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 Safety Evaluator must analyze the use of the product at all points in the medication use system. Because the proposed product is not yet marketed, the Safety Evaluator anticipates the use of the product in the usual practice settings by considering the clinical and product characteristics listed in Appendix A. 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 evaluation, and studies, and identifies potential failure modes by asking: “Is the name Sprix convincing 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 Sprix 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 name possesses similarity that would cause confusion at any point in the medication use system and the name is eliminated from further review.

In the second stage of the Risk Assessment, all potential failure modes are evaluated 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 ultimately not be a source of medication errors in the usual practice setting, the name is eliminated from further analysis. However, if the Safety Evaluator determines through FMEA that the name similarity could ultimately cause medication errors in the usual practice setting, the Safety Evaluator will then recommend that an alternate proprietary name be used. In rare instances, the FMEA findings may provide other risk-reduction strategies, such as product reformulation to avoid an overlap in strength or an alternate modifier designation may be recommended as a means of reducing the risk of medication errors resulting from drug name confusion.

DMEPA will object to the use of proposed proprietary name when the one or more of the following conditions are identified in the Safety Evaluator’s Risk Assessment:

1. 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 trade name or otherwise. [21 U.S.C 321(n); see also 21 U.S.C. 352(a) & (n)].
2. The Division of Medication Error Prevention and Analysis 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)].

⁷ Institute for Healthcare Improvement (IHI). Failure Modes and Effects Analysis. Boston. IHI:2004.

3. FMEA identifies potential for confusion between the proposed proprietary name and other proprietary or established drug names, and demonstrates that medication errors are likely to result from the drug name confusion under the conditions of usual clinical practice.
4. The proposed proprietary name contains a USAN stem, particularly in a manner that is contradictory to the USAN Council's definition.
5. DMEPA identifies a potential source of medication error within the proposed proprietary name. 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.

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 is awarded approval first has the right to the use the name, while DMEPA will recommend that the second product to reach approval seek an alternative name.

If none of these conditions are met, then DMEPA will not object to the use of the proprietary name. If any of these conditions are met, then DMEPA will object to the use of the proprietary name. The threshold set for objection to the proposed proprietary name may seem low to the Applicant; however, the safety concerns set forth in criteria 1 through 5 are supported either by FDA Regulation or by external healthcare authorities, including the Institute of Medicine (IOM), World Health Organization (WHO), Joint Commission for Healthcare Organizations (JCAHO), and Institute for Safe Medication Practices (ISMP), who have examined medication errors resulting from look- or sound-alike drug names and called for Regulatory Authorities to address the issue prior to approval.

Furthermore, DMEPA contends that the threshold set for the Proprietary Name Risk Assessment is reasonable because proprietary drug name confusion is a predictable and preventable source of medication error that, in many instances, can be identified and remedied prior to approval to avoid patient harm.

Additionally, post-marketing experience has demonstrated that medication errors resulting from drug name confusion are notoriously difficult to remedy post-approval. Educational efforts and so on are low-leverage strategies that have proven to have limited effectiveness at alleviating the medication errors involving drug name confusion. Higher-leverage strategies, such as drug name changes, have been undertaken in the past; but at great financial cost to the Applicant, and at the expense of the public welfare, not to mention the Agency's credibility as the authority responsible for the approving the error-prone proprietary name. Moreover, even after Applicants have changed a product's proprietary name in the post-approval phase, it is difficult to eradicate the original proprietary name from practitioner's vocabulary, and as such, 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 (see limitations of the process).

If DMEPA objects to a proposed proprietary name on the basis that drug name confusion could lead to medication errors, the FMEA process is used to identify strategies to reduce the risk of medication errors. DMEPA is likely to recommend that the Applicant 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, and so DMEPA may be able to provide the Sponsor with recommendations that reduce or eliminate the potential for error would render the proposed name acceptable.

3 RESULTS

3.1 PROPRIETARY NAME RISK ASSESSMENT

3.1.1 Database and Information Sources

Our search identified a total of thirty-four (34) names as having some similarity to the name Sprix.

Twenty-four (24) of the thirty-four (34) names were thought to look like Sprix, which include: Gynix, Spiriva, Rapis, Apriso, Loprox, Hiprex, SP RX 228, Sprintec, Serax, Amrix, Spanzar, Aprela, Iplex, Plavix, (b) (4) Semprex, Syn-Rx, Sporanox, Inspra, Sprinza, (b) (4) Spec-T, Syrex and Symax. One name (Cintrex) was thought to sound similar to Sprix. The remaining nine (9) names were thought to look and sound similar to Sprix are: Aprix-DN, SPRX (1, 2, 3, 105), Spirix, Suprax, Sprex, Prix, Serpex, Sprycel and Spri-X. Additionally, our internet search found a distasteful definition of Sprix. We conveyed this finding to the Applicant via email. They stated that they were aware of the definition and did not believe their trade name, Sprix, would be a problem and asked us to continue our review of Sprix.

The Division of Medication Error Prevention and Analysis did not identify any USAN stems in the name Sprix as of January 12, 2009.

3.1.2 CDER 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 Sprix and have the potential for confusion.

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

3.1.3 FDA Prescription Analysis Studies

A total of 28 practitioners responded, but none of the responses overlapped with any existing or proposed drug names. About 78% of the participants (n=22) interpreted the name correctly as “Sprix”, with correct interpretation occurring more frequently in the written studies. The remainder of the respondents (n= 6) misinterpreted the drug name. Misinterpretations in the written studies include ‘rix’ being misinterpreted as ‘ise’ or ‘ox’ and the letter ‘S’ being misinterpreted as the letter ‘A’. Misinterpretations in the verbal study include ‘rix’ being misinterpreted as ‘icks’ or ‘itz’. The majority of misinterpretations occurred in the verbal prescription study. Additionally, one respondent (n=1) in the inpatient written study misinterpreted the name as “Aprix” which looks and sounds like the currently marketed drug Apri. See Appendix B for the complete listing of interpretations from the verbal and written prescription studies.

3.1.4 External Proprietary Name Risk Assessment

In the proposed name risk assessment submitted by the Applicant, the (b) (4) identified and evaluated a total of forty drug names thought to have some potential for confusion with the name Sprix. (b) (4) did not specifically list whether they share look-alike and/or sound-alike characteristics with Sprix. Thirty-one (italicized) of the forty names were not previously identified in our staff searches, the Expert Panel Discussion or FDA prescription studies. The names identified by (b) (4) were: *Apri, Aspirin, Aspidrox, Asprimox, Boostrix, Caprex, Easprin, Eprex, Esidrix, Estrin, Gerix, Hiprex, Hispril, Inspra, Lasix, Prax, Salix, Satric, Serax, Serpex, Sitrex, Sloprin, Sorine, Sparine, Spiriva, Sporanox, Sprintec, Sprx-105, Starlix, Stri-dex, Strifon, Sufrex, Suprax, Supred, Suprins, Surbex, Syprine, Vesprin, Vicks, and Zostrix*. These names were evaluated and the results are discussed in section 3.1.6.

3.1.5 Comments from the Division of Anesthesia, Analgesia, and Rheumatology Products

In response to the OSE January 7, 2009 e-mail, DAARP did not forward any comments and/or clinical/other concerns on the proposed name at the initial phase of the name review.

DMEPA notified DAARP via e-mail that we had found no objections to the proposed proprietary name, Sprix, on February 13, 2009. Per e-mail correspondence from the Division of Anesthesia, Analgesia, and Rheumatology Products on March 2, 2009, they indicated they concur with our assessment of the proposed name, Sprix.

3.1.6 Safety Evaluator Risk Assessment

Independent searches by the primary Safety Evaluator identified one additional name, Sprixx, which was thought to look and sound similar to Sprix and represent a potential source of drug name confusion. As such, a total of sixty-six (66) names were analyzed to determine if the drug names could be confused with Sprix and if the drug name confusion would likely result in a medication error.

Thirty-two (32) names lacked orthographic and/or phonetic similarities and were not evaluated further (see Appendix C).

The remaining 34 names were determined to have some orthographic and/or phonetic similarity to Sprix, and thus determined to present some risk for confusion. Failure Mode and Effect Analysis (FMEA) was then applied to determine if the proposed name, Sprix, could potentially be confused with any of the thirty-four (34) names and lead to medication error. This analysis determined that the name similarity between Sprix and the identified names was unlike to result in a medication error with thirty-three (33) of the thirty-four (34) products identified for the reasons presented in Appendices D through K. However, the remaining name, Sprixx, is almost identical orthographically and is identical phonetically to the proposed name Sprix. Sprixx is a body-worn, single hand operated personal sanitizer device, which was developed to end hand transmitted infections in the workplace. Although Sprixx will also be used in hospitals, medication errors would be unlikely because Sprixx is a sanitation device used by healthcare providers and therefore would not appear as a medication order or a prescription. In contrast, an inpatient order for the proposed product Sprix, would require a dose, route of administration and frequency of administration. Although, the names are practically identical, the context of use and the differences in product characteristics minimize the likelihood that a medication error would occur between the two products.

Additionally, DMEPA contacted the Applicant via email to ensure that they were aware of the existing Sprixx personal sanitizer that may be used in all types of patient care settings along with the proposed product, Sprix. The Applicant stated they were aware of this information and were not concerned about any confusion between the two products. They asked that we continue with the review of the proposed name, Sprix.

4 DISCUSSION

DMEPA evaluated sixty-six (66) names for their potential similarity to the proposed name, Sprix. The FMEA indicates that the proposed name, Sprix, is not likely to result in name confusion that could lead to medication errors. This finding was consistent with and supported by an independent risk assessment of the proprietary name submitted by the Applicant.

5 CONCLUSIONS

The Division of Medication Error Prevention and Analysis has no objection to the use of the proprietary name, Sprix, for this product. This decision was shared with the OND division who concurred with our findings on March 2, 2009. Furthermore, this finding was consistent with and supported by an independent risk assessment of the proprietary name submitted by the Applicant. Additionally, DDMAC

does not object to the proposed name from a promotional perspective. If **any** of the proposed product characteristics are altered prior to approval of the marketing application; DMEPA rescinds this Risk Assessment finding, and the name must be resubmitted for review. In the event that our Risk Assessment finding is rescinded, the evaluation of the name on resubmission is independent of the previous Risk Assessment and, as such, the conclusions on re-review are subject to change. Additionally, if the product approval is delayed beyond 90 day from the date of this review, the proposed name must be resubmitted for evaluation.

6 RECOMMENDATIONS

6.1 COMMENTS TO THE DIVISION

We would appreciate feedback on the final outcome of this consult. We would be willing to meet with the Division for further discussion, if needed. Please copy the Division of Medication Error Prevention and Analysis on any correspondence to the Applicant pertaining to this issue. If you have further questions or need clarifications, please contact Chris Wheeler, OSE Project Manager, at 301-796-0151.

6.2 COMMENTS TO THE APPLICANT

We have completed our review of the proposed proprietary name, Sprix, and have concluded that it is acceptable.

The proprietary name, Sprix, will be re-reviewed 90 days prior to the approval of the NDA. If we find the name unacceptable following the re-review, we will notify you.

If **any** of the proposed product characteristics are altered prior to approval of the marketing application, the proprietary name must be resubmitted for review.

7 REFERENCES

1. *Micromedex Integrated Index* (<http://weblern/>)

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

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

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. This is a database which was created for DMETS, FDA.

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

Drug Facts and Comparisons is a compendium organized by therapeutic Course; 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 Error Prevention and Analysis proprietary name consultation requests*

This is a list of proposed and pending names that is generated by DMEPA 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](#) and [generic drugs](#) and [therapeutic biological products](#); [prescription](#) and [over-the-counter](#) human drugs and [therapeutic biologicals](#), [discontinued drugs](#) and “[Chemical Type 6](#)” approvals.

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

Provides a compilation of approved drug products with therapeutic equivalence evaluations.

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

Provides information regarding patent and trademarks.

9. Clinical Pharmacology Online (<http://weblern/>)

Contains full monographs for the most common drugs in clinical use, plus mini monographs covering investigational, less common, combination, nutraceutical and nutritional products. Provides a keyword search engine.

10. Data provided by Thomson & Thomson’s SAEGIS™ Online Service, available at www.thomson-thomson.com

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

11. Natural Medicines Comprehensive Databases (<http://weblern/>)

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

12. Stat!Ref (<http://weblern/>)

Contains full-text information from approximately 30 texts. 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>)

List contains all the recognized USAN stems.

14. Red Book Pharmacy’s Fundamental Reference

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

15. Lexi-Comp (www.pharmacist.com)

A web-based searchable version of the Drug Information Handbook.

16. *Medical Abbreviations Book*

Contains commonly used medical abbreviations and their definitions.

APPENDICES

Appendix A:

The medication error staff considers the spelling of the name, pronunciation of the name when spoken, and appearance of the name when scripted. DMEPA also compare the spelling of the proposed proprietary name with the proprietary and established name of existing and proposed drug products because similarly spelled names may have greater likelihood to sound similar to one another when spoken or look similar to one another when scripted. The medication error 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* dissimilarly spelled drug name pairs to appear very similar to one another and the similar appearance of drug names when scripted has lead to medication errors. The medication error staff apply their expertise gained from root-cause analysis of such medication errors to identify sources of ambiguity within the name that could be introduced when scripting (i.e. “T” may look like “F,” lower case ‘a’ looks like a lower case ‘u,’ etc), along with other orthographic attributes that determine the overall appearance of the drug name when scripted (see detail in Table 1 below). Additionally, since verbal communication of medication names is common in clinical settings, the medication error staff compares the pronunciation of the proposed proprietary name with the pronunciation of other drug names. If provided, DMEPA will consider the Sponsor’s intended pronunciation of the proprietary name. However, because the Sponsor has little control over how the name will be spoken in practice, DMEPA also considers a variety of pronunciations that could occur in the English language.

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"> Names may appear similar in print or electronic media and lead to drug name confusion in printed or electronic communication Names may look similar when scripted and lead to drug name confusion in written communication

	Orthographic similarity	<p>Similar spelling</p> <p>Length of the name</p> <p>Upstrokes</p> <p>Downstrokes</p> <p>Cross-strokes</p> <p>Dotted letters</p> <p>Ambiguity introduced by scripting letters</p> <p>Overlapping product characteristics</p>	<ul style="list-style-type: none"> Names may look similar when scripted, and lead to drug name confusion in written communication
Sound-alike	Phonetic similarity	<p>Identical prefix</p> <p>Identical infix</p> <p>Identical suffix</p> <p>Number of syllables</p> <p>Stresses</p> <p>Placement of vowel sounds</p> <p>Placement of consonant sounds</p> <p>Overlapping product characteristics</p>	<ul style="list-style-type: none"> Names may sound similar when pronounced and lead to drug name confusion in verbal communication

Appendix B:

FDA Prescription Study Responses

Inpatient	Outpatient	Voice
Sprix	Sprix	Sprix
Sprix	Sprix	Sprix
Sprix	Sprix	Spricks
Sprix	Sprise	Sprix
Aprix	Sprox	Spritz
Sprix	Sprix	Sprix
Sprix		Sprix
Sprix		Sprix
Sprix		Sprix
		Spricks

Appendix C: Names without convincing look-alike and/or sound-alike similarities to Sprix.

Proprietary Name	Similarity to Sprix	Proprietary Name	Similarity to Sprix
Rapris	Look	Esidrix	COPA
Spanzar	Look	Estrin	COPA
Aprala	Look	Hispril	COPA
Plavix	Look	Satric	COPA
Inspra	Look	Sloprin	COPA
Spec-T	Look	Sorine	COPA
Cintrex	Sound	Sparine	COPA
Sporanox	Look	Supred	COPA
(b) (4)	(b) (4)	Suprins	COPA
Symax	Look	Syprine	COPA
Sprycel	Look/Sound	Vesprin	COPA
Aspirin	COPA	Vicks	COPA
Aspidrox	COPA	Stri-dex	COPA
Asprimox	COPA	Strifon	COPA
Boostrix	COPA		
Easprin	COPA		

Appendix D: Medical and Non-medical products identified as similar to Sprix.

Product	Similarity to Sprix	
Syrex	Look	Name of Sodium Chloride Saline Flush
Sprex	Look/Sound	A caustic based detergent
Spri-X	Look/Sound	Swedish company name

Appendix E: Identified foreign product name

Proprietary Name	Similarity to Sprix	Country
Aprix-DN	Look/Sound	Chile
Spirix (Spironolactone)	Look/Sound	Sweden, Denmark, Finland, Norway

Appendix F: Products withdrawn

Proprietary Name	Similarity to Sprix	Status
(b) (4)	(b) (4)	(b) (4)

Appendix G: Product with limited or no additional information found in commonly used drug references such as Clinical Pharmacology Online, Facts & Comparisons, Micromedex, STATRef, the Orange Book, or the Red Book.

Proprietary Name	Similarity to Sprix
Sprinza	Look
Prix	Look/Sound
Sufrex	COPA
Gerix	COPA

Appendix H: Discontinued products with no generic equivalent

Proprietary Name	Similarity to Sprix	Status	Source
Iplex (Mecasermin Rinfabate Recombinant)	Look	Discontinued, no generics available	Drugs@FDA/ Orange book/Redbook 2008
Eprix (Epoetin Alfa)	COPA	Discontinued, no generics available	Drugs@FDA/ Orange book/Redbook 2008

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

Appendix I: Products with no numerical overlap in strength or dose.

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)
Sprix (Ketorolac tromethamine)		15.75 mg	One 15.75 mg spray in each nostril every 6 to 8 hours OR For special populations: One 15.75 mg spray in only one nostril every 6 to 8 hours for up to 5 days
SPRX-(1, 2, 3, 105) (Phendimetrazine Tartrate) Discontinued, generics available	Look	35 mg tablets 105 mg extended-release capsules	Take 1 tablet (35 mg) bid or tid, one hour before meals Take 1 capsule (105 mg) in the morning 30 to 60 minutes before morning meal
Suprax (Cefixime)	Look/Sound	400 mg tablets 100 mg/5 mL and 200 mg/5 mL oral suspension	Tablets: 400 mg daily given as a 400 mg tablet daily or as 200 mg every 12 hours Oral Suspension: 8 mg/kg/day given as a single daily dose or as 4 mg/kg every 12 hours
Sitrex (Phenylephrine/ guaifenesin) Sitrex PD (Phenylephrine/ guaifenesin)	COPA	20 mg/1200 mg tablets 7.5 mg/75 mg oral liquid	Tablets: 1 tablet every 12 hours up to twice a day Liquid: 5 mL to 10 mL every 4 to 6 hours up to 40 mL per day
Starlix (Nateglinide)	COPA	60 mg, 120 mg tablets	60 mg or 120 mg three times daily before meals
Zostrix Zostrix HP Zostrix Neuropathy (Capsaicin)	COPA	0.025%, 0.075%, 0.25% topical cream	Apply a thin film to affected area 3 to 4 times daily
Loprox (Ciclopirox)	Look	0.77% topical cream, suspension and gel 1% topical shampoo	Cream, Suspension, Gel: Apply to the affected and surrounding skin areas twice daily, in the morning and evening Shampoo: Wet hair and apply 1 teaspoon to the scalp. Lather and leave on hair and scalp for 3 minutes

Lasix (Furosemide)	COPA	20 mg, 40 mg, 80 mg tablets 10 mg oral solution 10 mg vial	Oral Initial dose is 20 mg to 80 mg given as a single dose; Maintenance dose is 40 mg to 120 mg once or twice daily Parenteral: 20 mg to 40 mg intravenously or intramuscularly, increasing by 20 mg every hour as needed to attain clinical response
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Appendix J: 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
Sprix (Ketorolac tromethamine)		15.75 mg	One 15.75 mg spray in each nostril every 6 to 8 hours OR For special populations: One 15.75 mg spray in only one nostril every 6 to 8 hours for up to 5 days	
Gynix (Clotrimazole) (Discontinued with generics available)	Look	100 mg Vaginal tablet	Insert 1 vaginal tablet intravaginally once daily at bedtime for 7 days or two tablets intravaginally once daily at bedtime for 3 days	Dosage form: Nasal spray vs. vaginal tablet Route of administration: Nasal vs. intravaginal Frequency of administration: Every 6 to 8 hours vs. once daily
Spiriva (Tiotropium Bromide Monohydrate)	Look	0.081 mg Inhalation powder capsules	Inhalation of 1 capsule daily with the Handihaler inhalation device	Dosage form: Nasal spray vs. inhalation powder capsules Route of administration: Nasal vs. oral inhalation Frequency of administration: Every 6 to 8 hours vs. once daily
Apriso (Mesalamine)	Look	375 mg capsule	Four capsules once daily in the morning	Dosage form: Nasal spray vs. capsules Route of administration: Nasal vs. oral Frequency of administration: Every 6 to 8 hours vs. once daily

Hiprex (Methenamine Hippurate)	Look	1 gram tablet	1 tablet twice daily (morning and night)	<u>Dosage form:</u> Nasal spray vs. tablet <u>Route of administration:</u> Nasal vs. oral <u>Frequency of administration:</u> Every 6 to 8 hours vs. twice daily
Sp RX 228 (Triamcinolone)	Look	0.05% topical cream	Apply 0.025—0.1% cream to the affected areas 2 to 4 times per day	<u>Dosage form:</u> Nasal spray vs. cream <u>Route of administration:</u> Nasal vs. topical <u>Instructions for use:</u> Spray vs. Apply
Sprintec (Ethinyl Estradiol; Bigestunate)	Look	0.035 mg/0.25 mg tablet	1 tablet once daily for 21 days	<u>Dosage form:</u> Nasal spray vs. tablet <u>Route of administration:</u> Nasal vs. oral <u>Frequency of administration:</u> Every 6 to 8 hours vs. once daily <u>Duration of use:</u> Up to 5 days vs. for 21 days
Semprex (D) (Acrivastine; Pseudoephedrine)	Look	8 mg/60 mg capsule	1 capsule by mouth up to four times daily, given every 4 to 6 hours, as needed for up to 14 days	<u>Dosage form:</u> Nasal spray vs. capsule <u>Route of administration:</u> Nasal vs. oral <u>Duration of use:</u> Up to 5 days vs. for 14 days
Syn-Rx (Pseudoephedrine/ Guaifenesin)	Look	600 mg/120 mg tablet	Take 1 tablet every 12 hours for 14 days	<u>Dosage form:</u> Nasal spray vs. tablet <u>Route of administration:</u> Nasal vs. oral <u>Frequency of administration:</u> Every 6 to 8 hours vs. every 12 hours <u>Duration of use:</u> Up to 5 days vs. for 14 days
Serpex (Hydralazine/ HCTZ/Reserpine)	Look/S ound	25 mg/15 mg/ 0.1 mg tablets	Initial dose: 1 tablet orally once a day. Maintenance dose: 1 to 2 tablets/day in 1 to 2 divided doses. Dosage should be determined by individual titration.	<u>Dosage form:</u> Nasal spray vs. tablet <u>Route of administration:</u> Nasal vs. oral <u>Frequency of administration:</u> Every 6 to 8 hours vs. once daily or twice daily

Prax (Pramoxine Hydrochloride)	COPA	1 % topical cream 1 % topical lotion	Apply to affected areas no more than 3 to 4 times a day	<u>Dosage form:</u> Nasal spray vs. cream or lotion <u>Route of administration:</u> Nasal vs. topical <u>Duration of use:</u> Up to 5 days vs. none specified
Salix OTC (Europe)	COPA	None	Allow one tablet to move around and slowly dissolve in mouth. Repeat as needed.	<u>Dosage form:</u> Nasal spray vs. tablet <u>Route of administration:</u> Nasal vs. oral <u>Frequency of administration:</u> Every 6 to 8 hours vs. as needed for dry mouth
Surbex C Surbex T (Multivitamin)	COPA	None	1 tablet by mouth twice daily 1 tablet by mouth once daily	<u>Dosage form:</u> Nasal spray vs. tablet <u>Route of administration:</u> Nasal vs. oral <u>Frequency of administration:</u> Every 6 to 8 hours vs. once or twice daily
Caprex (Capsaicin)	COPA	None	Topical	<u>Dosage form:</u> Nasal spray vs. cream <u>Route of administration:</u> Nasal vs. topical <u>Frequency of administration:</u> Every 6 to 8 hours vs. As needed <u>Instructions for use:</u> Spray vs. Apply

Appendix K: Products orthographically and/or phonetically similar and/or with numerically similar strength or dose

Failure Mode: Name confusion	Causes (could be multiple)	Effects
<p style="text-align: center;">Sprix (Ketorolac tromethamine) 15.75 mg nasal spray</p>		<p>Usual dose: One 15.75 mg spray in each nostril every 6 to 8 hours OR For special populations: One 15.75 mg spray in only one nostril every 6 to 8 hours for up to 5 days</p>
<p>Sprixx (Hand Sanitizer System)</p>	<p>Orthographic similarity: Both products share the identical spelling, with the exception of an additional letter 'x' at the end of 'Sprix'</p> <p>Phonetic similarity: Both products are identical phonetically</p>	<p>Differences in the product characteristics minimize the likelihood of medication errors in the usual practice settings</p> <p>Although these names are almost identical orthographically and are identical phonetically, the differences in product characteristics and their context of use, may help minimize confusion between the two products. Sprix is a non-steroidal anti-inflammatory medication indicated for the short term management of moderate to severe pain. Since this is a medication; a dose, route of administration and frequency of administration must be included on an order. However, Sprixx is a body-worn, single hand operated personal sanitizer device, which was developed to end hand transmitted infections in the workplace. Although Sprixx will also be used in hospitals, medication errors would be unlikely because Sprixx is a sanitation device used by healthcare providers and therefore would not appear as a medication order.</p>
<p>Apri (Desogestrel/ Ethinyl Estradiol) 0.15 mg/0.03 mg tablets</p>	<p>Orthographic similarity: Share the same letters 'pri' in the middle of the names; beginning letter 'A' can look like the beginning letter 'S' when scripted.</p> <p>Both single strength products</p>	<p>Differences in the product characteristics minimize the likelihood of medication errors in the usual practice setting.</p> <p>Although these names are orthographically similar, the letter 'x' at the end of Sprix may help provide distinction. Additionally, although Apri and Sprix are both single strength products, the usual dose and directions of use will help to distinguish the products. Apri is an oral contraceptive used only in women and is taken daily for 28 days, whereas Sprix is indicated for pain relief with a usual dose is 1 spray per nostril(s) every 6 to 8 hours for up to 5 days.</p>

<p>Serax (Oxazepam)</p> <p>(Discontinued with generics available)</p> <p>10 mg, 15, mg, 30 mg capsules 15 mg tablets</p>	<p>Orthographic similarity: Both drugs share the letters 'S', 'r', and 'x' in the same positions; drug names are the same length (5 letters)</p> <p>Share numerically similar strength (15 mg vs. 15.75 mg)</p> <p>Share similar frequency of administration (3 to 4 times daily vs. every 6 to 8 hours)</p>	<p>Product characteristics coupled with orthographic differences minimize the likelihood of medication errors in the usual practice settings</p> <p>The differences in product characteristics may help minimize confusion between the two products. Serax is available as a tablet and is given orally, whereas Sprix is a nasal spray and given intranasally. Additionally, Serax is available in multiple strengths and therefore a strength must be specified on an order form. Sprix is available in only one strength and thus the strength may be omitted. Although the product strengths overlap by beginning with the number 15, the 15.75 mg strength of Sprix helps to distinguish it from the 15 mg of Serax.</p> <p>Furthermore, orthographically, the downstroke letter 'p' in Sprix helps to provide a visual distinction.</p>
<p>Amrix (Cyclobenzaprine Hydrochloride)</p> <p>15 mg, 30 mg capsules</p>	<p>Orthographic similarity: Both drugs share the same ending (-rix); the beginning letters 'A' and 'S' may appear similar when scripted; drug names are the same length (5 letters)</p> <p>Share numerically similar strength (15 mg vs. 15.75 mg)</p>	<p>Product characteristics coupled with orthographic differences minimize the likelihood of medication errors in the usual practice settings</p> <p>The differences in product characteristics may help minimize confusion between the two products. Amrix is available as a capsule and is given orally once daily, whereas Sprix is a nasal spray and given intranasally every 6 to 8 hours. Additionally, Amrix is available in multiple strengths and therefore a strength must be specified on an order form. Sprix is available in only one strength and thus the strength may be omitted. Although the product strengths overlap by beginning with the number 15, the 15.75 mg strength of Sprix helps to distinguish it from the 15 mg of Amrix.</p> <p>Furthermore, orthographically, the downstroke letter 'p' in Sprix helps to provide a visual distinction.</p>

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