CENTER FOR DRUG EVALUATION AND RESEARCH

APPLICATION NUMBER:

021746Orig1s000

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
Office of Medication Error Prevention and Risk Management

Proprietary Name Review

Date:	January 23, 2012
Reviewer(s):	Reasol S. Agustin, PharmD, Safety Evaluator Division of Medication Error Prevention and Analysis
Team Leader:	Carlos Mena-Grillasca, RPh Division of Medication Error Prevention and Analysis
Division Director:	Carol Holquist, RPh Division of Medication Error Prevention and Analysis
Drug Name(s) and Strength(s):	Surfaxin (Lucinactant) Intratracheal Suspension, 30 mg/mL
Application Type/Number:	NDA 021746
Applicant/Sponsor:	Discovery Laboratories, Inc
OSE RCM #:	2011-4350

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

CONTENTS

1 INTRODUCTION

This review evaluates the proposed proprietary name, Surfaxin, from a safety and promotional perspective. The sources and methods used to evaluate the proposed name are outlined in the reference section and Appendix A respectively.

1.1 REGULATORY HISTORY

DMEPA previously reviewed the name "Surfaxin" (ODS Consult #04-0194, dated July 16, 2004 and ODS Consult #04-0194-1, dated October 5, 2005) and found the name unacceptable due to sound-alike similarities with the word "surfactant" and the possibility that confusion would increase the potential for delay in administration. However, DMEPA consulted with the Division of Pulmonary and Allergy Products (DPAP) and they indicated that a delay in administration would not be problematic because these products are ordered prior to delivery. Therefore, DMEPA reversed the original decision and found the use of the proprietary name "Surfaxin" acceptable in OSE RCM #2008-370, dated April 2, 2009. Subsequently, the application received an "Approvable" action on April 23, 2008, due to Chemistry, Manufacturing, and Controls (CMC) deficiencies that needed to be resolved and on April 17, 2009, the application received a Complete Response (CR) Letter to resolve CMC deficiencies. On November 11, 2011 the Sponsor resubmitted a request to review the proposed proprietary name, Surfaxin.

1.2 PRODUCT INFORMATION

The following product information is provided in the November 11, 2011 proprietary name submission.

- Established Name: Lucinactant
- Indication of Use: Prevention of Respiratory Distress Syndrome (RDS) in Premature Infants at High Risk for RDS.
- Route of Administration: Intratracheal
- Dosage Form: Suspension
- Strength: 30 mg/mL
- Dose: 5.8 mL/kg of birth weight
- How Supplied: Sterile, single-use, rubber-stoppered, clear glass vials containing 8.5 mL of white suspension. One vial per carton.
- Storage: Store in a refrigerator at 2° to 8°C (36° to 46°F) and protect from light until ready for use. Do not freeze.
- Intended pronunciation: Ser-'faks-en

2. RESULTS

The following sections provide the information obtained and considered in the evaluation of the proposed proprietary name.

2.1 PROMOTIONAL ASSESSMENT

The Office of Prescription Drug Promotion OPDP determined the proposed name is acceptable from a promotional perspective. DMEPA and the Division of Pulmonary, Allergy, and Rheumatology Products (DPARP) concurred with the findings of OPDP's promotional assessment of the proposed name.

2.2 SAFETY ASSESSMENT

The following aspects of the name were considered in the overall evaluation.

2.2.1 United States Adopted Names (USAN) SEARCH

On December 15, 2011 the United States Adopted Name (USAN) stem search, identified that a USAN stem is not present in the proposed proprietary name.

2.2.2 Components of the Proposed Proprietary Name

The Applicant stated that the proposed name, Surfaxin, was derived from Surf, which has been commonly incorporated into the trade name of commercialized exogenous pulmonary surfactants since the introduction of the first marketed exogenous pulmonary surfactant. "-axin" was added to "surf" in order to be distinctive from other currently marketed products such that there would be no potential confusion between Surfaxin and other currently marketed exogenous pulmonary surfactants.

This proprietary name is comprised of a single word that does not contain any components (i.e. a modifier, route of administration, dosage form, etc.) that are misleading or can contribute to medication error.

2.2.3 FDA Name Simulation Studies

Thirty-nine practitioners participated in DMEPA's prescription studies. The interpretations did not overlap with or appear or sound similar to any currently marketed products. All 17 inpatient participants responded correctly to Surfaxin. Six of the 11 voice participants responded correctly and a common misinterpretation was the consonant 'c' for 'x.' Ten of the 11 outpatient participants responded correctly to Surfaxin and there was no common misinterpretation. See Appendix C for the complete listing of interpretations from the verbal and written prescription studies.

2.2.5 Comments from Other Review Disciplines

In response to the OSE, December 7, 2011 e-mail, the Division of Pulmonary, Allergy, and Rheumatology Products (DPARP) has no objections to the proposed name at the initial phase of the proprietary name review.

2.2.6 Failure Mode and Effects Analysis of Similar Names

Appendix B lists possible orthographic and phonetic misinterpretations of the letters appearing in the proposed proprietary name, Surfaxin. Table 1 lists the names with orthographic, phonetic, or spelling similarity to the proposed proprietary name, Surfaxin identified by the primary reviewer, the Expert Panel Discussion (EPD), and other review disciplines. Table 1 also includes the names identified from the FDA Prescription Simulation not identified by DMEPA and requires further evaluation.

Table 1: Collective List of Potentially Similar Names (DMEPA, EPD, Other Disciplines, FDA Name Simulation Studies, and External Name Study if applicable)

Look Similar					
Name	***Source***	***Name***	***Source***	***Name***	***Source***
Suprax	FDA	Sertraline	FDA	Subutex	FDA
Surfak	FDA	Duraxin	FDA	Serpalan	FDA
Sorafenib	FDA	Gantrisin	FDA	Seromycin	FDA

Look Similar					
Delaxin	FDA	Sustiva	FDA	Serzone	FDA
Sufenta	FDA	Sodium	FDA	Mefoxin	FDA
Sirolimus	FDA	Surgicel	FDA	Zadaxin	FDA
Sarafem	FDA	Serophene	FDA	Guanfacine	FDA
Sorbsan	FDA	Syntaxin	FDA	Sulfalone	FDA
Skelaxin	FDA	Serentil	FDA	Sorbitol	FDA
Suramin	FDA	Salkera	FDA	Grifulvin V	FDA
Durahist	FDA	Sulsoxin	FDA	Serpasil	FDA
Surital	FDA	Suboxone	FDA	Serpate	FDA
Surfexa	FDA	Neutrexin	FDA	Sebutone	FDA
Surfacaine	FDA	Sulfamar	FDA	Serpivite	FDA
Seroquel	FDA	Selfemra	FDA	Surmontil	FDA
Sanctura Sanctura XR	FDA	Sulfazine Sulfazine EC	FDA	Senexon Senexon-S	FDA
Surbex-T, Surbex-C, Surbex-750	FDA	Guiafenex-PSE 60, PSE 85, PSE 120, GP	FDA		
Look and Sound Similar					
Forbaxin	FDA	Robaxin Robaxin-750	FDA	Surfaxin	FDA
Surfactant	FDA	Xifaxan	FDA	Survanta	FDA
Sumaxin, -CP, -TS, Wash	FDA				
Sound Similar					
Cefixime	FDA				

Our analysis of the 58 names contained in Table 1 considered the information obtained in the previous sections along with their product characteristics. We note that the names Suramin and Sumaxin are similar to Surfaxin as they only differ by two letters. We did not identify these names in our previous reviews, thus we evaluated the names for potential to confusion and after further analysis determined that none of the 58 names will not pose a risk for confusion as described in Appendices D and E.

2.2.7 Communication of DMEPA's Final Decision to Other Disciplines

DMEPA communicated our findings to the Division of Pulmonary, Allergy, and Rheumatology Products (DPARP) via e-mail on January 12, 2012. At that time we also requested additional information or concerns that could inform our review. Per e-mail correspondence from the Division of Pulmonary,

Allergy, and Rheumatology Products (DPARP) on January 23, 2012men , they stated no additional concerns with the proposed proprietary name, Surfaxin.

3. CONCLUSIONS

The proposed proprietary name is acceptable from both a promotional and safety perspective.

If you have further questions or need clarifications, please contact Nichelle Rashid, OSE project manager, at 301-796-3904

3.1 COMMENTS TO THE APPLICANT

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

The proposed proprietary name, Surfaxin, 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 as stated in your November 11, 2011 submission are altered, DMEPA rescinds this finding and the name must be resubmitted for review. The conclusions upon re-review are subject to change.

4 REFERENCES

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. This database also lists the orphan drugs.

4. ***FDA Document Archiving, Reporting & Regulatory Tracking System [DARRTS]***

   DARRTS is a government database used to organize Applicant and Sponsor submissions as well as to store and organize assignments, reviews, and communications from the 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. ***U.S. Patent and Trademark Office (http://www.uspto.gov)***

   USPTO provides information regarding patent and trademarks.

8. ***Clinical Pharmacology Online (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.

9. ***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 trade names that are used in about 50 countries worldwide. The data is provided under license by IMS HEALTH.

10. ***Natural Medicines Comprehensive Databases (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.

11. ***Access Medicine (www.accessmedicine.com)***

    Access Medicine® from McGraw-Hill contains full-text information from approximately 60 titles; it includes tables and references. Among the titles are: Harrison's Principles of Internal Medicine, Basic & Clinical Pharmacology, and Goodman and Gilman's The Pharmacologic Basis of Therapeutics.

12. ***USAN Stems (http://www.ama-assn.org/ama/pub/about-ama/our-people/coalitions-consortiums/united-states-adopted-names-council/naming-guidelines/approved-stems.shtml)***

    USAN Stems List contains all the recognized USAN stems.

13. ***Red Book (www.thomsonhc.com/home/dispatch)***

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

14. ***Lexi-Comp (www.lexi.com)***

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

15. ***Medical Abbreviations (www.medilexicon.com)***

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

16. ***CVS/Pharmacy (www.CVS.com)***

    This database contains commonly used over the counter products not usually identified in other databases.

17. ***Walgreens (www.walgreens.com)***

    This database contains commonly used over the counter products not usually identified in other databases.

18. ***Rx List (www.rxlist.com)***

    RxList is an online medical resource dedicated to offering detailed and current pharmaceutical information on brand and generic drugs.

19. ***Dogpile (www.dogpile.com)***

    Dogpile is a Metasearch engine that searches multiple search engines including Google, Yahoo! and Bing, and returns the most relevant results to the search.

APPENDICES

Appendix A

FDA's Proprietary Name Risk Assessment considers the promotional and safety aspects of a proposed proprietary name. The promotional review of the proposed name is conducted by OPDP. OPDP evaluates proposed proprietary names to determine if they are overly fanciful, so as to misleadingly imply unique effectiveness or composition, as well as to assess whether they contribute to overstatement of product efficacy, minimization of risk, broadening of product indications, or making of unsubstantiated superiority claims. OPDP provides their opinion to DMEPA for consideration in the overall acceptability of the proposed proprietary name.

The safety assessment is conducted by DMEPA. DMEPA staff search a standard set of databases and information sources to identify names that are similar in pronunciation, spelling, and orthographically similar when scripted to the proposed proprietary name. Additionally, we consider inclusion of USAN stems or other characteristics that when incorporated into a proprietary name may cause or contribute to medication errors (i.e., dosing interval, dosage form/route of administration, medical or product name abbreviations, names that include or suggest the composition of the drug product, etc.). 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]

Following the preliminary screening of the proposed proprietary name, DMEPA gathers to discuss their professional opinions on the safety of the proposed proprietary name. This meeting is commonly referred to the Center for Drug Evaluation and Research (CDER) Expert Panel discussion. DMEPA also considers other aspects of the name that may be misleading from a safety perspective. DMEPA staff conducts a prescription simulation studies using FDA health care professionals. When provided, DMEPA considers external proprietary name studies conducted by or for the Applicant/Sponsor and incorporates the findings of these studies into the overall risk assessment.

The DMEPA primary reviewer assigned to evaluate the proposed proprietary name 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 misleading nature of the proposed proprietary name with a focus on the avoidance of medication errors.

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. DMEPA considers the product characteristics associated with the proposed product 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. DMEPA considers how these product characteristics may or may not be present in communicating a product name throughout the medication use system. Because drug name confusion can occur at any point in the medication use process, DMEPA considers the potential for confusion throughout the entire U.S.

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

medication use process, including drug procurement, prescribing and ordering, dispensing, administration, and monitoring the impact of the medication.[2]

The DMEPA considers the spelling of the name, pronunciation of the name when spoken, and appearance of the name when scripted. DMEPA compares the proposed proprietary name with the proprietary and established name of existing and proposed drug products and names currently under review at the FDA. DMEPA 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. DMEPA examines the phonetic similarity using patterns of speech. 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. The orthographic appearance of the proposed name is evaluated using a number of different handwriting samples. DMEPA applies expertise gained from root-cause analysis of postmarketing 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).

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	• 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	Similar spelling Length of the name/Similar shape Upstrokes Down strokes Cross-strokes Dotted letters Ambiguity introduced by scripting letters Overlapping product characteristics	• Names may look similar when scripted, and lead to drug name confusion in written communication
Sound-	Phonetic	Identical prefix	• Names may sound similar

[2] Institute of Medicine. Preventing Medication Errors. The National Academies Press: Washington DC. 2006.

alike	similarity	Identical infix Identical suffix Number of syllables Stresses Placement of vowel sounds Placement of consonant sounds Overlapping product characteristics	when pronounced and lead to drug name confusion in verbal communication

Lastly, DMEPA 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 searches 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. A standard description of the databases used in the searches is provided in the reference section of this review. To complement the process, the DMEPA 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 reviews 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. DMEPA also evaluates if there are characteristics included in the composition that may render the name unacceptable from a safety perspective (abbreviation, dosing interval, etc.).

2. Expert Panel Discussion

DMEPA gathers gather CDER professional opinions on the safety of the proposed product and discussed the proposed proprietary name (Expert Panel Discussion). The Expert Panel is composed of Division of Medication Errors Prevention (DMEPA) staff and representatives from the Office of Prescription Drug Promotion (OPDP). We also consider input from other review disciplines (OND, ONDQA/OBP). 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 database and information searches to the Expert Panel for consideration. Based on the clinical and professional experiences of the Expert Panel members, the Panel may recommend additional 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 Simulation 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 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 record their interpretations of the orders which are recorded electronically.

4. Comments from Other Review Disciplines

DMEPA requests the Office of New Drugs (OND) and/or Office of Generic Drugs (OGD), ONDQA or OBP for their comments or concerns with the proposed proprietary name, ask for 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 OPDP's decision on the name. The primary Safety Evaluator addresses any comments or concerns in the safety evaluator's assessment.

The OND/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 provide any further information that might inform DMEPA's final decision on the proposed name.

Additionally, other review disciplines opinions such as ONDQA or OBP may be considered depending on the proposed proprietary name.

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, considers all aspects of the name that may be misleading or confusing, conducts a Failure Mode and Effects Analysis, and provides an overall decision on acceptability dependent on their 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.[3] 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 1.2 of this review. 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.

[3] Institute for Healthcare Improvement (IHI). Failure Mode and Effects Analysis. Boston. IHI:2004.

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? And are there any components of the name that may function as a source of error beyond sound/look-alike?"***

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 or because of some other component of the name. If the answer to the question is no, the Safety Evaluator is not convinced that the names posses 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 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.

Moreover, 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 Overall Risk Assessment:

a. OPDP finds the proposed proprietary name misleading from a promotional perspective, and the Review Division concurs with OPDP'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 but involve a naming characteristic that when incorporated into a proprietary name, may be confusing, misleading, cause or contribute to medication errors.

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 generally recommends that the Sponsor select an alternative proprietary name and submit the alternate name to the Agency for 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 Applicant/Sponsor. However, the safety concerns set forth in criteria a through e above 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, confusing, or misleading 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 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: Potential orthographic or phonetic misinterpretation of the letters in the name Surfaxin.

Letters in Name, Surfaxin	Scripted may appear as	Spoken may be interpreted as
'S' or 's'	G, L, Z, 5 or G, 5, g, n,	X, Z, or C
lowercase 'u'	n, y, v, w, any vowel	Any vowel
lowercase 'r'	s, n, e, v	
lowercase 'f'	t	v
lowercase 'a'	el, ci, cl, d, o, u, any vowel	Any vowel
lowercase 'x'	a, d, skinny f, k, n, p, r, t, v, y	ks, kz, g
lowercase 'i'	e	Any vowel
lowercase 'n'	m, u, x, r, h, s	m

Appendix C: Prescription Simulation Samples and Results

Figure 1. Surfaxin Study (Conducted on December 12, 2011)

Handwritten Requisition Medication Order	Verbal Prescription
Medication Order: Surfaxin 5.8ml intratracheally now	Surfaxin Bring 2 vials to clinic for injection
Outpatient Prescription: Surfaxin Bring # 2 vials to Clinic	

FDA Prescription Simulation Responses (Aggregate 1 Rx Studies Report)

85 People Received Study

39 People Responded

INTERPRETATION	INPATIENT	VOICE	OUTPATIENT	TOTAL
CURFAXIN	0	1	0	1
SERFAXIN	0	1	0	1
SURFACCIN	0	1	0	1
SURFACTIN	0	1	0	1
SURFAXIN	17	6	10	33
SURFAXIN TWO VIALS TO CLINIC	0	1	0	1
SURGAXIN	0	0	1	1
TOTAL	**17**	**11**	**11**	**39**

Appendix D: Proprietary names not likely to be confused or not used in usual practice settings for the reasons described.

Proprietary Name	Active Ingredient	Similarity to Surfaxin	Failure preventions
Nexavar	*Sorafenib*	Look	Lacks sufficient orthographic similarity to result in name confusion
Surmontil	Trimipramine Maleate	Look	Lacks sufficient orthographic similarity to result in name confusion
Seroquel	Quetiapine Fumarate	Look	Lacks sufficient orthographic similarity to result in name confusion
Serophene	Clomiphene Citrate	Look	Lacks sufficient orthographic similarity to result in name confusion
Rapamune	*Sirolimus*	Look	Lacks sufficient orthographic similarity to result in name confusion.
Seromycin	Cycloserine	Look	Lacks sufficient orthographic similarity to result in name confusion
Senexon Senexon-S	Senna Docusate and Senna	Look	Lacks sufficient orthographic similarity to result in name confusion
Intuniv Tenex	*Guanfacine*	Look	Lacks sufficient orthographic similarity to result in name confusion
Grifulvin V	Griseofulvin	Look	Lacks sufficient orthographic similarity to result in name confusion
Surgicel	Oxidized cellulose	Look	Lacks sufficient orthographic similarity to result in name confusion
Serzone	Nefazodone	Look	Lacks sufficient orthographic similarity to result in name confusion
Mefoxin	Cefoxitin Sodium	Look	Lacks sufficient orthographic similarity to result in name confusion
NA	Sorbitol	Look	Lacks sufficient orthographic similarity to result in name confusion
Salkera	Aloe, edetate disodium dihydrate, cetostearyl alcohol, glycerin, parabens, white petrolatum	Look	Lacks sufficient orthographic similarity to result in name confusion
Zoloft	*Sertraline*	Look	Lacks sufficient orthographic similarity to result in name confusion

Proprietary Name	Active Ingredient	Similarity to Surfaxin	Failure preventions
Sulfolane	Tetramethylene sulfone	Look	Lacks sufficient orthographic similarity to result in name confusion
Surbex-T Surbex-C Surbex-750	Multivitamin Multivitamin/ Ascorbic acid Multivitamin/Zinc	Look	Over the counter product that is no longer available. Preliminary usage data shows that Surbex is not used during prescription writing.
Durahist Durahist D Durahist PE	Dexchlorpheniramine, Methscopolamine, and Pseudoephedrine	Look	Lacks sufficient orthographic similarity to result in name confusion. Over the counter product. Discontinued July 1, 2009. Preliminary usage data shows the proprietary name Durahist D, Durahist PE, and Durahist is rarely used is prescription writing.
Metaret	*Suramin*	Look	Suramin is an orphan drug with a proposed use for the treatment of hormone refractory prostate cancer and a designation date of May 6, 1997. The product characteristics cannot be retrieved from any of the pharmaceutical databases. Preliminary usage data shows that Suramin is not used during prescription writing.
NA	*Sodium*	Look	Sodium is an element or component of a salt or drug moiety. By itself, it is not a drug name now will it be written on a prescription order. Preliminary usage data shows that Sodium is not used during prescription writing.
Surfexa	Pharmaceutical preparations and substances for treatment of respiratory conditions.	Look	Surfexa could not be retrieved in other databases except Saegis and USPTO and the product characteristic is not available. It is owned by Discovery Laboratory, which is the sponsor of Surfaxin.
Syntaxin	Chemical preparations, substances, and reagents used in science and industry.	Look and Sound	Syntaxin could not be retrieved in other databases except Saegis and USPTO. Dead Indicator; Abandonment date: July 7, 2007
Zadaxin	Thymalfasin	Look	International drug name (commonly in Asia)
Surfacaine	Cyclomethycaine	Look	International drug name (Canada)
Serpasil	Reserpine	Look	International brand name (Ethiopia and Indonesia)
Sebutone	Sulfur	Look	International drug name (Singapore and Canada)

Proprietary Name	Active Ingredient	Similarity to Surfaxin	Failure preventions
Delaxin	Methocarbamol	Look	Application withdrawn with FR effective dated May 26, 1993. Generics are still available but preliminary usage data shows that the proprietary name, Delaxin is no longer used in prescription writing.
Sulsoxin	Sulfisoxazole	Look	Application withdrawn with FR effective dated December 22, 1993. Generics are still available but preliminary usage data shows that the proprietary name, Sulsoxin is no longer used in prescription writing.
Neutrexin	Trimetrexate and Trimetrexate glucoronate	Look	Application withdrawn with FR effective dated March 13, 2009. Preliminary usage data shows that the proprietary name, Neutrexin is no longer used in prescription writing.
Gantrisin	Sulfisoxazole	Look	Application withdrawn with FR effective dated July 8, 2011. Generics are still available but preliminary usage data shows that the proprietary name, Gantrisin is rarely used in prescription writing.
Serpate	Reserpine	Look	Application withdrawn with FR effective dated March 20, 1992. Generics are still available but preliminary usage data shows that the proprietary name, Serpate is no longer used in prescription writing.
Serpivite	Reserpine	Look	Application Integrity Policy dated 1/1/1900, Under Fraud Investigation dated November 29, 1991 and FR effective dated April 1, 1994. Generics are still available but preliminary usage data shows that the proprietary name, Serpivite is no longer used in prescription writing.
Forbaxin	Methocarbamol	Look and Sound	Application withdrawn with FR effective dated July 9, 1998. Generics are still available but preliminary usage data shows that the proprietary name, Forbaxin is no longer used in prescription writing.
Serentil	Mesoridazine Besylate	Look	Application withdrawn with FR Notice dated September 9, 2008. Preliminary usage data shows that the proprietary name, Serentil is rarely used in prescription writing.

Proprietary Name	Active Ingredient	Similarity to Surfaxin	Failure preventions
Surital	Thiamylal Sodium	Look	Application withdrawn with FR effective dated September 17, 2001. Preliminary usage data shows that the proprietary name, Surital is no longer used in prescription writing.

Appendix E: Potentially confusing names with orthographic and/or phonetic differences and differentiating product characteristics that decrease the risk of medication errors.

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Sumaxin, Sumaxin CP, Sumaxin TS, Sumaxin Wash (Sulfur and Sulfacetamide) Strength: Topical Pads: 4 %/10% Usual dose: Apply to wet skin and massage gently into skin working into full lather; rinse thoroughly and pat dry.	**Orthographic similarity:** Both names begin with the letter string 'Su' and the letters 'r' and 'm' appear orthographically similar when scripted. **Phonetic similarity**: Both names contain three syllables and the last syllables 'axin' sound similar when spoken. **Strength**: Both are available as single strengths and may be omitted from a prescription.	**Orthographic difference:** Surfaxin contains an upstroke 'f' which is absent in Sumaxin giving the names different shapes. Also, Sumaxin is available in multiple formulations and will require a modifier for a complete prescription. **Phonetic difference:** The first syllable 'Sur' vs. 'Su' and the second syllable 'fa' vs. 'ma' sound different when spoken. **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered.

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Survanta (Beractant in Sodium Chloride) Strength: Inhalation suspension- 25 mg/mL in 0.9% Usual dose: 100 mg/kg of phospholipids birth weight (4 mL/kg), as soon as possible, preferably within 15 minutes of birth (for prevention of respiratory distress syndrome) or 8 hours of age (for treatment of respiratory distress syndrome). Four doses can be administered in the first 48 hours of life, no more frequently than every 6 hours	**Orthographic similarity:** Both names begin with the letter string 'Sur'' and contain 8 letters. **Phonetic similarity**: Both names contain three syllables and the first syllable 'Sur' sound similar when spoken. **Strength and dose:** Both are available as single strengths and may be omitted from a prescription. And the possibility of overlapping dose exists. **Dosage form and route of administration:** Both are inhalation suspension given intratracheally. **Frequency:** Both are administered in the first 48 hours of birth. **Indication:** Both are indicated for respiratory distress syndrome **Prescription orders and setting of use:** Both are commonly ordered before birth and are used in the delivery room or neonatal intensive care unit where the baby is delivered.	**Orthographic difference:** Surfaxin contains an upstroke 'f' and a cross stroke 'x' which is absent in Survanta. Survanta also contains an additional upstroke 't' at the end of the name which is absent in Surfaxin giving the names different shapes. **Phonetic difference:** The second syllable 'fa' vs. 'van' and the third syllable 'xin' vs. 'ta' sound different when spoken.

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Sorbsan Topical: sterile pads and sterile wound packing fibers Usual dose: Clean and prepare the wound site before application. See package labeling for wound management and application/removal instructions for the dressing and granules. Dressings are designed to remain in place from 1 to 7 days.	**Orthographic similarity:** The letter string 'Sur' and 'Sor' appear orthographically similar when scripted. Both names contain an upstroke in the same position. **Strength**: Surfaxin is available as single strength so it may be omitted from a prescription and Sorbsan does not have strength.	**Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered. Sorbsan is ordered during wound dressing Preliminary usage data shows that Sorbsan is no longer used during prescription writing.

<u>Proposed name:</u> **Surfaxin** **(Lucinactant) Intratracheal suspension** **<u>Strength:</u> 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **<u>Usual dose:</u> 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Surfak (Docusate Calcium) Strength: Capsules: 240 mg Usual dose: One capsule by mouth once daily	**Orthographic similarity:** Both names begin with the letter string 'Surf'' and the letters 'x' and 'k' appear orthographically similar when scripted. **Strength**: Both are available as single strengths and may be omitted from a prescription.	**Orthographic difference:** Surfaxin (8 letters) appear longer than Surfak (6 letters) when scripted. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Surfak is given once daily. **Dose:** Surfaxin is dosed as 'xx' mL vs. Sarafem is dosed as one capsule **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered

<u>Proposed name:</u> **Surfaxin** **(Lucinactant) Intratracheal suspension** **<u>Strength:</u> 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **<u>Usual dose:</u> 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Suprax (Cefixime) Strength: Tablets: 400 mg; Oral suspension: 100 mg/5 mL, 200 mg/5 mL Usual dose: Adults and children greater than 12 years old: 400 mg by mouth once daily; Children 6 months to 12 years old: 8 mg/kg/day. Usual dose for children- 3 mL to 14 mL	**Orthographic similarity:** Both names begin with the letter string 'Su'	**Orthographic difference:** Surfaxin (8 letters) appear longer than Suprax (6 letters) when scripted. Surfaxin contains an upstroke 'f' and the letter 'r' preceding the letter 'f' which is absent in Suprax giving the names different shapes when scripted. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Suprax will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Suprax is given once daily. **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Cefixime Strength: Tablets: 400 mg; Oral suspension: 100 mg/5 mL, 200 mg/5 mL Usual dose: Adults and children greater than 12 years old: 400 mg by mouth once daily; Children 6 months to 12 years old: 8 mg/kg/day. Usual dose for children- 3 mL to 14 mL	**Phonetic similarity:** Both names contain three syllables. The second syllable 'fa' and 'fi' and the third syllable 'xin' and 'xime' sound similar when spoken.	**Phonetic difference:** The first syllable 'Sur' vs. 'Ce' sound different when spoken. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Suprax will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Cefixime is given once daily. **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Sufenta (Sufentanil Citrate) Strength: Intravenous solution: 50 mcg/mL, 100 mcg/mL Usual dose: Analgesic: 1 to 8 mcg/kg (using birth weight -usual dose range in mL using the 50 mcg/mL vial= 0.012 mL to 0.2 mL) Anesthetic: 8 to 30 mcg/kg (using birth weight- usual dose range in mL using the 50 mcg/mL vial= 0.012 mL to 0.2 mL) Epidural analgesic: 10 to 15 mcg (using birth weight- usual dose range in mL using the 50 mcg/mL vial= 0.2 mL to 0.3 mL) administered with 10 mL bupivacaine 0.125% 10 mL with or without epinephrine by slow injection; Children- Anesthesia: 10 to 25 mcg/kg	**Orthographic similarity:** Both names begin with the letter string 'Su'	**Orthographic difference:** Surfaxin contains the letter 'r' preceding the letter 'f' which is absent in Sufenta giving the names different shapes when scripted. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Sufenta will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Dose:** Calculating the dose using birth weight of premature infants, there is no dose overlap that can occur between the two drugs. **Drug schedule:** Sufenta is a Schedule II drug which is monitored closely and will require a strength and dose for a complete prescription.

<u>Proposed name:</u> **Surfaxin** **(Lucinactant) Intratracheal suspension** **<u>Strength:</u> 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **<u>Usual dose:</u> 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Sarafem (Fluoxetine) Strength: Oral Tablets: 10 mg, 15 mg, 20 mg Usual dose: 20 mg by mouth once daily during menstrual cycle or 14 days prior to the anticipated onset of menstruation through the first full day of menses.	**Orthographic similarity:** Both names begin with 'S'	**Orthographic difference:** Sarafem contains an extra letter 'a' between the letters 'r' and 'f' which is absent in Surfaxin giving the names different shapes. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Sarafem will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Dose:** Surfaxin is dosed as 'xx' mL vs. Sarafem is dosed as one tablet **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Suprax is given once daily. **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Skelaxin (Metaxalone) Strength: Oral Tablet: 800 mg Usual dose: One tablet by mouth 3 to 4 times daily	**Orthographic similarity:** Both names end in the letter string 'axin' and 'f' and 'l' appear orthographically similar when scripted **Strength**: Both are available as single strengths and may be omitted from a prescription.	**Orthographic difference:** Skelaxin contains an additional upstroke 'k' in the second position which is absent in Surfaxin giving the names different shapes. Also, the letter 'f' in Surfaxin can be scripted with a downstroke which will further differentiate the two names. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Skelaxin is given 3 to 4 times daily. **Dose:** Surfaxin is dosed as 'xx' mL vs. Skelaxin is dosed as one tablet **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Duraxin (Acetaminophen 325 mg, Phenyltoloxamine citrate 25 mg Salicylamide 200 mg) Strength: Single-strength Usual dose: 1 to 2 capsules every 2 to 6 hours as needed for pain	**Orthographic similarity:** Both names contain the letter string 'ur' and end in the letter string 'axin' **Strength**: Both are available as single strengths and may be omitted from a prescription.	**Orthographic difference:** Surfaxin contains an upstroke 'f' which is absent in Duraxin giving the names different shapes. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Duraxin is given every 2 to 6 hours as needed. **Dose:** Surfaxin is dosed as 'xx' mL vs. Duraxin is dosed as 1 to 2 capsules **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered

<u>Proposed name:</u> **Surfaxin** **(Lucinactant) Intratracheal suspension** **<u>Strength:</u> 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **<u>Usual dose:</u> 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Sustiva (Efavirenz) Strength: Tablet: 600 mg; Capsules: 50 mg, 200 mg Usual dose: One tablet (600 mg) by mouth at bedtime	**Orthographic similarity:** Both names begin with the letter string 'Su'	**Orthographic difference:** Surfaxin contains a cross stroke 'x' which is absent in Sustiva. Also, the letter 'f' in Surfaxin can be scripted with a downstroke which further differentiate the two names. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Sustiva will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Sustiva is given at bedtime **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered

<u>Proposed name:</u> **Surfaxin** **(Lucinactant) Intratracheal suspension** **<u>Strength:</u> 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **<u>Usual dose:</u> 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Suboxone (Buprenorphine and Naloxone) Strength: Film and tablets, sublingual: Buprenorphine 2 mg and naloxone 0.5 mg and Buprenorphine 8 mg and naloxone 2 mg; Usual dose: Tablets: 12 to 16 mg sublingually as a single daily dose. The recommended target dose is 16 mg per day; Film: Target dosage is buprenorphine 16 mg and naloxone 4 mg as a single daily dose. The maintenance dose is generally in the range of buprenorphine 4 mg and naloxone 1 mg to buprenorphine 24 mg and naloxone 6 mg per day depending on the individual patient	**Orthographic similarity:** Both names begin with the letter string 'Su'	**Orthographic difference:** Surfaxin contains the letter 'r' which is absent in Suboxone giving the names different shapes when scripted. Also, the letter 'f' in Surfaxin can be scripted with a downstoke which will further differentiate the two names. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Suboxone will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Dosage form and route of administration:** Surfaxin is a suspension given intratracheally vs. Suboxone is available as a sublingual film or sublingual tablet. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Suboxone is given once daily **Dose:** Surfaxin is dosed as 'xx' mL vs. Suboxone is dosed as tablets **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Sulfazine and Sulfazine EC (Sulfazine) Strength: Tablets: 500 mg; Delayed-release tablets: 500 mg Usual dose: Adults: 2 gm per day in 2 evenly divided doses; Children 6 years of age and older: 2 gm per day for the treatment of juvenile rheumatoid arthritis	**Orthographic similarity:** Both names begin 'Su'	**Orthographic difference:** Sulfazine contains an additional upstroke 'l' which is absent in Surfaxin giving the names different shapes. Also, the letter 'z' in Sulfazine can be scripted as a downstroke which can further differentiate the names. Sulfazine is available in two formulations and will require the use of the modifier for a complete prescription. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Sulfazine which is twice daily **Dose:** Surfaxin is dosed as 'xx' mL vs. Sulfazine is dosed as tablets **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Guiafenex PSE 60- (Pseudoephedrine 60 mg and Guaifenesin 600 mg) Tablets. Usual dose: age 12- 1 or 2 tablets every 12 hours , up to 4 per day; age 6 to 12- 1 tablet every 12 hours, up to 2 per day; age 2 to 6- ½ tablet q 12 h, up to 1 per day PSE 85- (Pseudoephedrine 85 mg and Guaifenesin 795 mg) Tablets. Usual dose: age 12- tablets every 12 hours , up to 3 per day; age 6 to 12- ½ tablet every 12 hours, up to 1 per day PSE 120- (Pseudoephedrine 120 mg and Guaifenesin 1200 mg) Tablets. Usual dose: greater than age 12- 1 tablet every 12 hours; age 6 to 12- ½ tablet every 12 hours GP- (Pseudoephedrine 120 mg and Guaifenesin 1200 mg) Tablets. Usual dose: greater than age 12- 1 tablet every 12 hours, up to 2 per day	**Orthographic similarity:** 'S' and 'G' appear orthographically similar when scripted and both names contain the letter 'f'	**Orthographic difference:** Surfaxin contains the cross stroke 'x' in the sixth position vs. Guiafenex contains the cross stoke 'x' in the last position. In addition, Guiafenex is available in multiple formulations and will require a modifier for a complete prescription. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Guiafenex will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. S Guiafenex is given every 12 hours **Dose:** Surfaxin is dosed as 'xx' mL vs. Guiafenex is dosed as tablets **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered

<u>Proposed name:</u> **Surfaxin** **(Lucinactant) Intratracheal suspension** **<u>Strength:</u> 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **<u>Usual dose:</u> 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Sulfamar (Sulfamethoxazole/Trimethoprim) Strength: Tablets: 400 mg/80 mg; Double Strength- 800 mg/160 mg Usual dose: Bronchitis and UTI: Take one tablet by mouth every 12 hours for 14 days; Enteritis: 1 tablet every 24 hours for 5 days	**Orthographic similarity:** Both names begin with the letter string 'Su.' Both names contain the letter 'f' in the same position.	**Orthographic difference:** Sulfamar contains an additional upstroke 'l' which is absent in Surfaxin giving the names different shapes. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Sulfamar will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. S Sulfamar is given every 12 hours **Dose:** Surfaxin is dosed as 'xx' mL vs. Sulfamar is dosed as tablets **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Subutex (Buprenorphine) Strength: Sublingual tablets- 2 mg, 8 mg Usual dose: Initial: 8mg on day 1 and 16 mg on day 2 onward. Maintenance: 12 to 16 mg per day	**Orthographic similarity:** Both names begin with the letter string 'Su' and contains 'x' and 't' which appear orthographically similar when scripted	**Orthographic difference:** Surfaxin contains an additional letter 'r' preceding the upstroke 'f' giving the names different shapes. Also, and Subutex contains a cross stroke 'x' in the last position and the letter 'f' in Surfaxin can be scripted with a downstoke which further differentiates the two names. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Subutex will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. S Subutex is given once daily. **Dose:** Surfaxin is dosed as 'xx' mL vs. Subutex is dosed as tablets **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered.

<u>Proposed name:</u> **Surfaxin** **(Lucinactant) Intratracheal suspension** **<u>Strength:</u> 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **<u>Usual dose:</u> 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Serpalan (Reserpine) Strength: Tablets- 0.1 mg, 0.25 mg Usual dose: Hypertension: Initial: 0.5 mg daily for 1 to 2 weeks then reduce to 0.1 mg to 0.25 mg daily; Psychiatric disorder: 0.5 mg daily	**Orthographic similarity:** 'Sur' and 'Ser' appear orthographically similar when scripted.	**Orthographic difference:** Serpalan contains an additional upstroke 'l' in the same position where Surfaxin contains a cross stroke 'x' giving the names different shapes. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Serpalan will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. S Serpalan is given once daily. **Dose:** Surfaxin is dosed as 'xx' mL vs. Serpalan is dosed as tablets **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered.

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Sanctura and Sanctura XR (Trospium Chloride) Strength: Tablets 20 mg; Extended-release Capsules: 60 mg Usual dose: Immediate-release: 20 mg twice daily; Extended-release: 60 mg daily	**Orthographic similarity:** "Sur' and 'San' appear orthographically similar when scripted.	**Orthographic difference:** Sanctura contains an additional letter 'c' and the letter 'f' in Surfaxin can be scripted with a downstroke giving the names different shapes. Also, Sanctura is available in multiple formulations and will require a modifier for a complete prescription. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Sanctura will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Sanctura which can be given once or twice daily, depending on formulation. **Dose:** Surfaxin is dosed as 'xx' mL vs. Sanctura is dosed as tablets or capsules **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered.

<u>Proposed name:</u> **Surfaxin** **(Lucinactant) Intratracheal suspension** **<u>Strength:</u> 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **<u>Usual dose:</u> 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Xifaxan (Rifaximin) Strength: Tablets- 200 mg, 550 mg Usual dose: Traveler's diarrhea: 200 mg by mouth three times daily for 3 days; Hepatic encephalopathy: 550 mg by mouth once daily	**Orthographic similarity:** The ending in both names 'axin' and 'axan' appear orthographically similar when scripted. **Phonetic similarity**: Both names contain three syllables and the syllables 'Xi' and 'Su' and 'fa-xan' and 'fa-xin' sound similar when spoken	**Orthographic difference:** The letter 'S' and 'X' appear orthographically different when scripted. Also, Surfaxin contains an additional letter 'r' preceding the letter 'f' which is absent in Xifaxan giving the names different shapes. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Xifaxan will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Xifaxan which can be given once or twice daily, depending on formulation. **Dose:** Surfaxin is dosed as 'xx' mL vs. Xifaxan is dosed as tablets or capsules. **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered.

Proposed name: **Surfaxin** **(Lucinactant) Intratracheal suspension** **Strength: 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **Usual dose: 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Robaxin and Robaxin-750 (Methocarbamol) Strength: Tablets- 500 mg, 750 mg; Injection solution: 100 mg/mL Usual dose: 1,000 mg 4 times a day, 750 mg every 4 hours, or 1,500 mg 3 times a day.	**Orthographic similarity:** Both names end in the letter string 'axin' **Phonetic similarity**: Both names contain three syllables and the last syllables 'axin' sound similar when spoken.	**Orthographic difference:** The letter 'S' and 'R' appear orthographically different when scripted. Also, Surfaxin contains an additional letter 'r' preceding the letter 'f' which is absent in Robaxin giving the names different shapes. **Phonetic similarity**: The first syllable 'Ro' and 'Sur' and the second syllable 'ba' and 'fa' sound different when spoken. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Robaxin will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Dosage form and route of administration:** Surfaxin is a suspension given intratracheally vs. Robaxin is available as a tablet given orally and injection solution given intravenously or intramuscularly. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. S Robaxin which can be given every 4 hours, three or four times daily. **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery

<u>Proposed name:</u> **Surfaxin** **(Lucinactant) Intratracheal suspension** **<u>Strength:</u> 30 mg/mL of phospholipids (DPPC and POPG), 0.862 mg synthetic peptide (sinapultide) and 4.05 mg palmitic acid** **<u>Usual dose:</u> 5.8 mL/kg of birth weight given by intratracheal administration (3.5 ml to 7 mL)**		**Other failures to consider with this product:** *How supplied: 8.5 mL single-use vial* *A prescription for Surfaxin requires the birth weight or the amount in mL in order to be considered a complete prescription.*
Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of name confusion	**Causes (could be multiple)**	**Prevention of Failure Mode; (name confusion)**
Selfemra (Fluoxetine) Strength: Oral capsules: 10 mg, 20 mg Usual dose: 20 mg once given continuously (every day of the menstrual cycle) or intermittently (defined as starting a daily dose 14 days prior to the anticipated onset of menstruation through the first full day of menses and repeating with each new cycle).	**Orthographic similarity:** The letter string 'Su' and 'Se' appear orthographically similar when scripted. Both names contain the letter 'f' in the same position.	**Orthographic difference:** Selfemra contains an additional upstroke 'l' which is absent in Surfaxin giving the names different shapes. **Strength:** Single vs. multiple. Surfaxin is available in single strength and may be omitted from a prescription vs. an order for Selfemra will require strength as it is available in multiple strengths. There is no numerical overlap between the two strengths during prescription writing. **Frequency:** Surfaxin is administered once, for up to 4 doses in the first 48 hours of life vs. Selfemra which is once daily **Dose:** Surfaxin is dosed as 'xx' mL vs. Selfemra is dosed as capsules **Prescription orders and setting of use:** Surfaxin is commonly ordered before birth and is used in the delivery room or neonatal intensive care unit where the baby is delivered.

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

/s/

REASOL AGUSTIN
01/23/2012

CARLOS M MENA-GRILLASCA
01/23/2012

CAROL A HOLQUIST
01/23/2012

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:	April 2, 2009
To:	Badrul Chowdhury, MD Director, Division of Pulmonary and Allergy Products
Thru:	Kellie Taylor, PharmD, MPH, Team Leader Denise Toyer, PharmD, Deputy Director Carol Holquist, RPh, Director Division of Medication Error Prevention and Analysis
From:	Jinhee J. Lee, PharmD Division of Medication Error Prevention and Analysis
Subject:	Proprietary Name Review
Drug Name:	Surfaxin (Lucinactant) Intratracheal Suspension 30 mg/mL
Application Type/Number:	NDA # 21-746
Applicant:	Discovery Laboratories, Inc
OSE RCM #:	2008-370

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

CONTENTS

EXECUTIVE SUMMARY

In two previous proprietary name reviews, DMEPA objected to the proposed proprietary name, Surfaxin, for NDA 21-746 because we believed that the sound-alike similarities with the word "surfactant" increased the potential for delay in administration of other lung surfactants. During this re-review of the proposed proprietary name, Surfaxin, we consulted the Division of Pulmonary and Allergy Products (DPAP) and they indicated that Surfactants are usually ordered before birth so that they are available in the delivery room/NICU when the baby is delivered or arrives. Thus, DPAP believed a delay in administration would not be problematic. Therefore, DMEPA reverses our original decision, and finds the use of the proprietary name, Surfaxin, acceptable.

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

1 BACKGROUND

1.1 INTRODUCTION

This review is written in response to a request from the Division of Pulmonary and Allergy Products, for re-review of the proprietary name "Surfaxin" in regard to potential name confusion with other proprietary and established drug names. On both occasions, the Applicant submitted container labels, carton and insert labeling for evaluation of their potential to contribute to medication errors. Revised container labels, carton and insert labeling were provided for review and comment at this time. Labeling comments will be provided under a separate cover in a forthcoming review managed under the same review number (OSE 2008-370).

1.2 REGULATORY HISTORY

DMEPA previously reviewed the name "Surfaxin" (ODS consult #'s 04-0194 and 04-0194-1, dated October 2004 and November 2005, respectively) and found the name unacceptable due to potential confusion with the word "surfactant". The Applicant received an "Approvable" action on April 23, 2008, due to Chemistry, Manufacturing and Controls (CMC) deficiencies that needed to be resolved.

1.3 PRODUCT INFORMATION

Surfaxin is a sterile pulmonary surfactant indicated for intratracheal use only. Surfaxin is indicated for the prevention of Respiratory Distress Syndrome (RDS) in premature infants at high risk for RDS. Surfaxin reduces the incidence of RDS at 24 hours and reduces mortality due to RDS. Surfaxin will be supplied in a sterile, single-use rubber stoppered, clear glass vial containing 8 mL of Surfaxin. There will be one vial per carton. Surfaxin should be stored in a refrigerator at 2°C to 8°C and protected from light until ready for use.

The recommended dose of Surfaxin is 175 mg/kg (5.8 mL/kg) birth weight. Four doses of Surfaxin can be administered in the first 48 hours of life. Doses should be given no more frequently than every 6 hours. Dosage may be determined as noted in the Applicant's table below.

Table 1. Dosing Chart (5.8 mL/kg) Birth Weight

Birth Weight (g)	Total Dose (mL)	Birth Weight (g)	Total Dose (mL)
600-649	3.5	950-999	5.5
650-699	3.8	1000-1049	5.8
700-749	4.1	1050-1099	6.1
750-799	4.4	1100-1149	6.4
800-849	4.6	1150-1199	6.7
850-899	4.9	1200-1250	7.0
900-949	5.2		

General

The initial dose of Surfaxin should be administered as soon as possible after birth, preferably within 30 minutes. The infant should receive positive pressure ventilation before and during dosing. Immediately before Surfaxin administration, the infant's ventilator delivery rate should be maintained at 30 breaths/minute, the inspiratory time should be maintained at 0.3 to 0.35 seconds, and supplemental oxygen should be delivered sufficient to maintain oxyhemoglobin saturation by pulse oximetry (SpO_2) of greater than 90%.

Preparation

Before use, warm the vial for 15 minutes in a preheated dry block heater set at 44°C. Do not use a water bath. After warming, shake the vial vigorously until Surfaxin is uniform and free-flowing suspension. The product temperature will be ≤ 37°C after the product is drawn into a syringe for administration.

For each vial of Surfaxin that is warmed, record the date and time of warming in the space provided on the carton. If not used immediately after warming, Surfaxin can be stored protected from light (i.e., in the carton) at room temperature for up to 2 hours. Do not return Surfaxin to the refrigerator after warming. Discard the product if not used within 2 hours of warming. Vials are for single use only and any unused portion should be discarded.

Administration

Visually inspect Surfaxin before use, ensuring that it is free-flowing and opaque white to off-white. Using aseptic technique, slowly draw up the appropriate amount of Surfaxin into a single sized syringe using a 16- or 18- gauge needle.

Before administering Surfaxin, assure proper placement and patency of the endotracheal tube. At the discretion of the clinician, the endotracheal tube may be suctioned before administering Surfaxin. The infant should be allowed to stabilize before proceeding with dosing.

Position the infant in the right lateral decubitus position with head and thorax inclined upward 30°. Attach the syringe containing Surfaxin to a 5-French end-hole catheter threaded through a Bodai valve or equivalent device that allows maintenance of PEEP and then advance the tip of the catheter into the endotracheal tube. Position the catheter such that its tip is slightly distal to the end of the endotracheal tube.

Each Surfaxin dose should be delivered in four aliquots. Instill the first aliquot of the dose (one-quarter of the total volume) as a bolus while continuing positive pressure mechanical ventilation and maintaining PEEP of 4 to 5 cm H_2O. Ventilator settings may be adjusted at the discretion of the clinician to maintain appropriate oxygenation and ventilation. Ventilate until the infant is

stable, that is, has an oxygen saturation of 90% and a heart rate greater than 120 beats per minute. Repeat the procedure with the infant in the left decubitus position while maintaining adequate positive ventilation. Repeat the procedure with the infant in the right, then left decubitus position to deliver a total of four aliquots. A pause should separate administration of the aliquots to allow for an evaluation of the patient's respiratory status.

After instillation of the last aliquot, remove the catheter and resume usual ventilator management and critical care. Do not suction the infant for 1 hour after dosing unless signs of significant airway obstruction occur.

Use the same technique for additional doses, if indicated.

2 METHODS AND MATERIALS

This section describes the methods and materials used by the DMEPA staff conducting a proprietary name risk assessment (see 2.1 Proprietary Name Risk Assessment). The primary focus for the 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, Surfaxin, 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, Surfaxin, the DMEPA staff search a standard set of databases and information sources to identify names with orthographic and phonetic similarity (see Sections 2.1.1 for detail) and held an CDER Expert Panel discussion to gather professional opinions on the safety of the proposed proprietary name (see 2.1.1.2). DMEPA also conducts internal CDER prescription analysis studies (see 2.1.2), and, when provided, external prescription analysis studies results are considered and incorporated into the overall risk assessment (see detail 2.1.4).

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 detail 2.1.4). 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 uses the clinical expertise of the DMEPA 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,

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[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 Mode and Effects Analysis. Boston. IHI:2004.

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 entire U.S. medication use process, including drug procurement, prescribing and ordering, dispensing, administration, and monitoring the impact of the medication.[3]

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 USP-ISMP Medication Error Reporting Program involve pairs beginning with the same letter.[4][5]

To identify drug names that may look similar to Surfaxin, 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 (eight letters), upstrokes (one, capital letter 'S'), downstrokes (one, lowercase 'f', if scripted), cross-strokes (one, 'x'), and dotted letters (one, 'i'). Additionally, several letters in Surfaxin may be vulnerable to ambiguity when scripted, including the letter 'S' may appear as 'T' or 'L'; lower case 'x' appear as a lower case 'y', and the letters '-in' as '-ia'. As such, the staff also considers these alternate appearances when identifying drug names that may look similar to Surfaxin.

When searching to identify potential names that may sound similar to Surfaxin, the DMEPA staff search for names with similar number of syllables (three), stresses (sir/ser-FAX-in or SIR/SER-fax-in or sir/ser-fax-IN), consonant sound pronunciations ('S' versus 'X' or 'Z'), and placement of vowel and consonant sounds. In addition, several letters in Surfaxin may be subject to misinterpretation when spoken, including the letter "S" may be interpreted as 'X', 'Z', or 'C', 'x' as 's', 'c', 'z', and 'n' as 'm'. As such, the staff also considers these alternate pronunciations when identifying drug names that may sound similar to Surfaxin. The Applicant's intended pronunciation of the proprietary name could not be expressly taken into consideration, as this was not provided with the proposed name submission.

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[3] Institute of Medicine. Preventing Medication Errors. The National Academies Press: Washington DC. 2006.

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

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

The 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 (Surfaxin), the established name (lucinactant), proposed indication (prevention of RDS in premature infants), strength (30 mg/mL), dose (175 mg/kg birth weight up to three subsequent doses), frequency of administration (as often as every 6 hours), route (intratracheal) and dosage form of the product (suspension). Appendix A provides a more detailed listing of the product characteristics the DMEPA staff general 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 DMEPA staff provides additional comments related to the safety of the proposed name or product based on their professional experience with medication errors.

2.1.1.1 Database and Information Sources

The proposed proprietary name, Surfaxin, 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 Surfaxin using the criteria outlined in 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, the DMEPA staff reviews the 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, Surfaxin. Potential concerns regarding drug marketing and promotion related to the proposed names are also discussed. This group is composed of the DMEPA staff and representatives from the Division of Drug Marketing, Advertising, and Communications (DDMAC).

The pooled results of the 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.

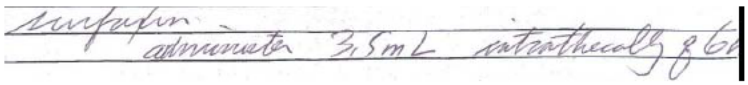
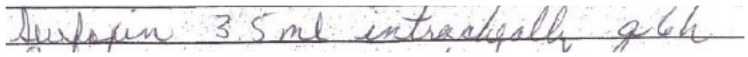
2.1.2 FDA Prescription Analysis Studies

Three separate studies are conducted within the Centers of the FDA for the proposed proprietary name to determine the degree of confusion of Surfaxin 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 Surfaxin in handwriting and verbal communication of the name, two 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. Surfaxin Study (conducted on April 3, 2008)

HANDWRITTEN PRESCRIPITON AND MEDICATION ORDER	VERBAL PRESCRIPTION
Inpatient Prescription Order 1: 	Surfaxin 3.5 mL Administer intrathecally every 6 hours
Inpatient Medication Order 2: 	

2.1.3 Comments from the Division of Pulmonary and Allergy Products

DMEPA contacts the regulatory division in the Office of New Drugs responsible for the application 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.

2.1.4 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.[6] When applying FMEA to assess the risk of a proposed proprietary name, DMEPA 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 then remedies available in the post-approval phase.

[6] Institute for Healthcare Improvement (IHI). Failure Mode and Effects Analysis. Boston. IHI:2004.

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 Surfaxin 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 Surfaxin 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 posses 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. 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)].
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 an 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 on the Accreditation of Healthcare Organizations (JCAHO), and Institute for Safe Medication Practices (ISMP), 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 Applicant's 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 Applicant 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

In total, 16 names were identified as having some similarity to the name Surfaxin.

Ten of the 16 names that were thought to look like Surfaxin, which include: Sulsoxin, Forbaxin, Zadaxin, Relaxin, Surital, Serophene, Survanta, Feromoxsil, Sarafem, and Sufenta. Two names, Robaxin and Afaxin, were thought to sound like Surfaxin. Three additional names (Surfaz, Skelaxin, Surfak) were thought to look and sound similar to Surfaxin. The medical term, Surfactant, was found to also look and sound similar to Surfaxin.

A search of the United States Adopted Name (USAN) stem list on October 29, 2008 identified no USAN stems within the proposed name, Surfaxin.

3.1.2 Expert Panel Discussion

The Expert Panel reviewed the pool of names identified by the DMEPA staff (see section 3.1.1. above). They had no additional names but they did ask if this product packaging was similar to an intravenous product. However, the product packaging is similar to those of existing surfactant products; thus, we did not find the packaging to be problematic.

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 31 practitioners responded, but none of the responses overlapped with any existing or proposed drug names. About three-quarters of the participants (n=24) interpreted the name correctly as "Surfaxin," with correct interpretation occurring more frequently in the written studies. The remainder of the responses misinterpreted the drug name. The majority of misinterpretations occurred in the phonetic prescription study, with the shortening of the name Surfaxin to 'Faxin' in two instances. One respondent in the phonetic prescription study interpreted the proposed name as 'Surfactant'. In the written prescription studies, the letter 'a' was misinterpreted as an 'o' by four respondents. See Appendix B for the complete listing of interpretations from the verbal and written prescription studies.

3.1.4 Comments from the Division of Pulmonary and Allergy Products

On January 13, 2009, DMEPA notified Division of Pulmonary and Allergy Products (DPAP) via e-mail that we had some clinical concerns about the proposed proprietary name, Surfaxin. We were particularly concerned that the proposed name, Surfaxin, may be confused for an unspecified surfactant product and lead to a delay in administration of Surfaxin. We asked DPAP whether they thought this would be a clinical issue.

We received an e-mail correspondence from DPAP on February 5, 2009, and they indicated that they did not believe there would be a delay in administration because of name confusion. They stated that surfactant products are typically ordered before birth, so the drug would be available in the delivery room/NICU before the baby is delivered and most likely used for prophylactic treatment. Thus, they indicated that they did not believe the proposed name, Surfaxin, would be problematic because of its similarity to the word surfactant.

3.1.5 Safety Evaluator Risk Assessment

Independent searches by the primary Safety Evaluator identified an additional four names thought to look similar to Surfaxin and represent a potential source of drug name confusion. The names are: Surfaxin LS, Xifaxan, Surfaz-SN[***], and Soduxin. Careful evaluation was afforded to drug names beginning with the letters 'X' and Z' because of its similarity to the consonant sound 'S', but no additional drug names beginning with the 'Z' letter was thought to have the potential for confusion with Surfaxin. As such, a total of 20 names were analyzed to determine if the drug names could be confused with Surfaxin and if the drug name confusion would likely result in a medication error.

All of the identified names were determined to have some orthographic and/or phonetic similarity to Surfaxin, and thus determined to present some risk for confusion. Failure mode and effects analysis (FMEA) was then applied to determine if the proposed name, Surfaxin, could potentially be confused with any of the 20 names and lead to medication error.

This analysis determined that the name similarity between Surfaxin and the identified names were unlikely to result in medication errors for 19 of the 20 products for the reasons outline in Appendices C through H.

However, the FMEA determined that "Surfaxin" is vulnerable to confusion and medication errors due to orthographic and/or phonetic similarities and the potential for confusion with the word "surfactant" (see section 4.1.1).

4 DISCUSSION

4.1 PROPRIETARY NAME RISK ASSESSMENT

DMEPA reviewed and objected to the proprietary name, Surfaxin, on two occasions, 2004 and 2005. The objection was based on sound-alike similarities with the word "surfactant" and its potential to be confused with other lung surfactants. We were concerned that the potential confusion could result in a delay of therapy. Appendix I contains our concerns as outlined in the ODS Consult #04-0194-1.

During this review we consulted with DPAP about whether our safety concerns were valid in the clinical setting. DPAP informed us that they did not find the proposed name to be problematic because of the very specific way and conditions under which the drug is administered i.e. via an endotracheal tube in either the delivery room or in a neonatal intensive care unit (NICU) by the healthcare provider who ordered it. Moreover, they stated that surfactant products are typically ordered before birth so that it would be available in the delivery room/NICU when the baby is delivered. Thus, a delay in administration would most likely not be problematic. Since there is unlikely to be a delay in treatment because of phonetic similarities of the word surfactant and the proposed name Surfaxin, we reverse our original objection to the use of the proprietary name, Surfaxin, for this product.

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

5 CONCLUSIONS AND RECOMMENDATIONS

The Proprietary Name Risk Assessment findings indicate that the proposed name, Surfaxin, is not vulnerable to name confusion that could lead to medication errors. As such, DMEPA does not object to the use of the proprietary name, Surfaxin, for this product at this time. However, if **any** of the proposed product characteristics as stated in this review are altered prior to submission of the NDA or approval of the product, DMEPA rescinds this Risk Assessment finding. If the product approval is delayed beyond 90 days from the date of this review, the proposed name must be resubmitted for evaluation. If the product approval is delayed beyond 90 days from the date of this review, the proposed name must be resubmitted for evaluation.

5.1 COMMENTS TO THE DIVISION

We would be willing to meet with the Division for further discussion, if needed. Please copy DMEPA any communication to the Applicant with regard to this review. If you have any questions or need clarification, contact Sean Bradley, Project Manager, at 301-796-1332.

5.2 COMMENTS TO THE APPLICANT

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

Surfaxin 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 should be resubmitted for review.

6 REFERENCES

6.1 REVIEWS

1. ODS Consult 04-0194, Proprietary Name Review for Surfaxin (Lucinactant Intratracheal Suspension), Dallas, S; October 4, 2004.
2. ODS Consult 04-0194-1, Proprietary Name Review for Surfaxin (Lucinactant Intratracheal Suspension), Pedersen, K; November 8, 2005.

6.2 DATABASES

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

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 the Division of Medication Error Prevention and Analysis, FDA.

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

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 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)

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

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

Provides information regarding patent and trademarks.

9. Clinical Pharmacology Online (www.clinicalpharmacology-ip.com)

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 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)

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)

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.lexi.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 DMEPA 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 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* 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 DMEPA 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 DMEPA staff compares the pronunciation of the proposed proprietary name with the pronunciation of other drug names. If provided, DMEPA will consider the Applicant's intended pronunciation of the proprietary name. However, because the Applicant 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	• 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	Similar spelling Length of the name Upstrokes Downstrokes Cross-stokes Dotted letters Ambiguity introduced by scripting letters Overlapping product characteristics	• Names may look similar when scripted, and lead to drug name confusion in written communication
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	• Names may sound similar when pronounced and lead to drug name confusion in verbal communication

Appendix B:

FDA Prescription Study Responses

Inpatient Medication Order 1	Voice Prescription	Inpatient Medication Order 2
Surfaxin	Surfaxin	Sufaxin
Surfaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfaxin
surfaxin	Faxin	Surfoxin
Surfaxin	Faxin	Surfoxin
Surfaxin	Surfactant	Surfaxin
Surfaxin		Surfaxin
Surfaxin		Surfaxin
		Surfaxin
		Surfaxin
		Surfaxin
		Surfaxin
		Surfoxin
		Surfoxin
		Surfaxin
		Surfaxin
		Surfoxin

Appendix C: Proprietary names used only in Foreign Countries

Proprietary Name	Similarity to Surfaxin	Country
Surfaz	Look and Sound	India
Surfaz-SN	Look and Sound	India

Appendix D: Proprietary names identified that are no longer marketed

Proprietary Name	Similarity to Surfaxin
Surital	Look
Afaxin	Sound
Sulsoxin	Look
Surfak	Look and Sound

Appendix E: Proprietary names identified that have since been withdrawn from DSS

Proprietary Name	Similarity to Surfaxin
(b) (4)	

Appendix F: Proprietary names identified in the United States Patent and Trademark Office

Proprietary Name	Similarity to Surfaxin
Surfaxin LS	Look and Sound

Appendix G: Products with no numerical overlap in strength and dose.

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)
Surfaxin (lucinactant)		**30 mg/mL**	**Usual dose: 175 mg/kg (5.8 mL/kg) birth weight, up to three subsequent doses.**
Gastromark (Ferumoxsil)	Look	0.175 mg Iron/mL	600 mL at a rate of 300 mL over 15 minutes.
Relaxin	Look	100 mg/mL	Adjunct to rest, physical therapy, etc for relief of muscle spasm associated

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

(Methocarbamol)			with painful musculoskeletal conditions: 1 gm to 3 gm IV or IM once daily for 3 days. For treatment of tetanus: 1 gm to 2 gm by direct IV injection, at 300 mg/min. Additional 1 gm to 2 gm may be given IV infusion so that initial dosage of up to 3 gm given. Maintenance doses of 1 gm to 2 gm should be repeated every 6 hours until NG tube can be inserted.
Robaxin (Methocarbamol)	Sound	100 mg/mL Injection 500 mg Tablet	10 – 20 mL (1000 mg to 2000 mg) intravenously for mod to severe symptoms; may require additional 10 mL to 20 mL every 8 hours (max dose 3000 mg/day for 3 days. Up to 10 mL (1000 mg) (5 mL into each gluteal region) intramuscularly every 8 hours as needed (max dose 3000 mg/day for 3 days) 1500 mg by mouth four times daily for 48-72 hour, then 750 every 4 hours or 1500 mg three times daily or 1000 mg four times daily
Sarafem (Fluoxetine HCl)	Look	10 mg, 15 mg, 20 mg	20 mg to 80 mg once daily.
Serophene (Clomiphene citrate)	Look	50 mg	50 mg to 100 mg QD depending on indication.
Skelaxin (Metaxalone)	Look and Sound	800 mg	800 mg three to four times a day.
Zadaxin (Thymalfasin)	Look	1.6 mg	900 mcg/m^2 to 1200 mcg/m^2 twice weekly.

Appendix H: Potential confusing names available in only one strength and a convincing overlap in orthographic/phonetic characteristics

Failure Mode: Name confusion	Causes (could be multiple)	Effects
Surfaxin® (Lucinactant)	**30 mg/mL**	**Usual dose: 175 mg/kg (5.8 mL/kg) birth weight, up to three subsequent doses.**
Forbaxin (Methocarbamol)	Identical endings (-axin) and length of name. Orthographic similarity when scripted (lowercase 'b' vs. 'f' and 'or-' vs. 'ur-'). Both products are available in only one strength.	Orthographic and product characteristic differences in the names minimize the likelihood of medication error in the usual practice setting. *Rationale:* Forbaxin is a discontinued product according to Drugs@FDA and although the generic is still available, it appears the proprietary name was cancelled in 1980 according to the records available in the Thomson and Thomson database[***]. Also, the product would most likely be ordered as the reference listed product (RLD), Robaxin, or by established name. Because both drugs are available in only one strength, it precludes the prescriber from having to specify which strength he wants when the drug is ordered, increasingly likelihood of name confusion. However, their differences with respect to route of administration, dosage form, frequency, and indication, help to minimize the potential for medication error. Although the names share some look-alike similarities, the differences in their product characteristics help to minimize the potential for confusion.
Sufenta (Sufentanil citrate)	Orthographic similarity (Both names begin with 'Su-' and have the letter 'f' embedded in the name. Both products are available in only one strength.	Orthographic and product characteristic differences in the names minimize the likelihood of medication error in the usual practice setting. *Rationale:* The risk of medication error is minimized by the orthographic differences in the names. Sufenta is one letter shorter in length than Surfaxin and Sufenta has an upstroke letter, 't' which helps to differentiate this name from Surfaxin. While both products may be written without the prescriber

[***] This document contains proprietary drug use data obtained by FDA under contract. The drug use data/information cannot be released to the public/non-FDA personnel without contractor approval obtained through the FDA/CDER Office of Surveillance and Epidemiology.

		specifying the strength, they differ with respect to route of administration, frequency of administration, and controlled substance schedule (CII vs. non-controlled). Also, because the inventory of Sufenta is monitored more closely it is unlikely that it would be prescribed without a dose, further minimizing the potential for a medication error. Thus, despite the orthographic similarity of the name, the product characteristic differences minimize the potential for confusion.
Xifaxan (Rifaximin)	Phonetic similarity ('X and 'S' sound-alike; names have the same number of syllables; share faxan/faxin sound) Both products are available in only one strength.	Differences in the product characteristics minimize the likelihood of medication error in the usual practice setting. *Rationale:* Because both drugs are available in only one strength, it precludes the prescriber from having to specify which strength he wants when the drug is ordered, increasingly likelihood of name confusion. However, their differences with respect to route of administration, dosage form, frequency, and indication, help to minimize the potential for medication error Thus, despite some phonetic similarities, we believe the products have varying characteristics that will help to distinguish one name from another.
Survanta (Beractant)	Orthographic similarity (Both names begin with 'Sur-' and are eight letters long). Both products are available in only one strength Both share the same indication for use (prevention of respiratory distress syndrome (RDS) in premature infants), patient and prescriber population, route of administration (intratracheal), dosage form (injectable), and storage location in the pharmacy (refrigerator).	Orthographic and product characteristic differences in the names minimize the likelihood of medication error in the usual practice setting. *Rationale:* The risk of medication error is minimized by the orthographic differences in the names. Survanta has an upstroke letter, 't', and a dotter letter, 'i', towards the end of the name, while Surfaxin has an upstroke letter, 'f', in the prefix and across-stroke letter, 'x' in the suffix. These differences help to differentiate Survanta from Surfaxin. The dose for Survanta differs from Surfaxin, however, the possibility exists that their dosing ranges may overlap. Both are indicated for respiratory distress syndrome in newborns and have the same dosage form and route of administration. However, despite some similarities in appearance and product characteristics, we believe the names look different enough that they will be distinguishable form each other.

Appendix I: Concerns for Surfactant as outlined in ODS Consult #04-0194-1

"Surfactant was noted in the previous review and remains of concern to the Division of Medication Error Prevention as having potential for confusion with the proposed name "Surfaxin." Furthermore, the current verbal prescription study noted two participants interpreted the name as "Surfactant". Thus, the Division of Medication Error Prevention is primarily concerned with confusion and medication errors due to the phonetic similarities between the name "Surfaxin" and the term "surfactant." This concern routes in the possibility for practitioners to call for (verbal order in the Neonate Intensive Care Unit) surfactant that relates to the class of medications used for respiratory distress syndrome in premature infants. This would be problematic especially if only one preparation of the available surfactants is carried on the formulary. This is also applicable for the converse, in which a prescriber calls for "Surfaxin" that is interpreted as surfactant when only one drug product is carried on formulary (e.g. Survanta). These potential scenarios could result in the neonate receiving the incorrect medication and the incorrect milliliter dose. Due to the timing (preferred administration within 30 minutes of birth) and nature of the clinical environment of a premature infant, a written order that would undergo multiple checks is unlikely. The outcome of such an event could result in surfactant overdose, which may culminate in acute airway obstruction or problem with fluids and/or electrolyte balance. Thus, DMEPA continues to be concerned with potential confusion with the proposed name "Surfaxin" and the term "surfactant.""

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/s/

Kellie Taylor
4/2/2009 03:08:26 PM
DRUG SAFETY OFFICE REVIEWER

Denise Toyer
4/2/2009 04:17:04 PM
DRUG SAFETY OFFICE REVIEWER

Carol Holquist
4/2/2009 04:48:31 PM
DRUG SAFETY OFFICE REVIEWER

CONSULTATION RESPONSE

DIVISION OF MEDICATION ERRORS AND TECHNICAL SUPPORT
OFFICE OF DRUG SAFETY
(DMETS; White Oak 22, Mail Stop 4447)

DATE RECEIVED: October 31, 2005 **DATE OF DOCUMENT**: October 5, 2005	**DESIRED COMPLETION DATE:** February 13, 2006 **PDUFA DATE:** April 6, 2006	**ODS CONSULT #:** 04-0194-1

TO: Badrul Chowdhury, MD
Director, Division of Pulmonary and Allergy Products
HFD-570

THROUGH: Alina Mahmud, RPH, MS
Denise Toyer, Pharm D, Deputy Director
Carol Holquist, RPh, Director
Division of Medication Errors and Technical Support, HFD-420

FROM: Kimberly C. Pedersen, RPh
Division of Medication Errors and Technical Support, HFD-420

PRODUCT NAME: **Surfaxin** (Lucinactant Intratrachael Suspension) 30 mg/mL (8 mL) **NDA #:** 21-746	**NDA SPONSOR:** Discovery Laboratories, Inc

SAFETY EVALUATOR: Kimberly C. Pedersen, RPh

RECOMMENDATIONS:

1. DMETS continues to not recommend the use of the proprietary name, Surfaxin. The sound-alike similarities with the word "surfactant" increase the risk of confusion and medication errors involving the drug product of Surfaxin and other lung surfactants. This is considered a final decision. However, if the approval of this application is delayed beyond 90 days from the signature date of this document, the name must be re-evaluated. A re-review of the name will rule out any objections based upon approval of other proprietary or established names from the signature date of this document.

2. DMETS recommends implementation of the label and labeling revisions outlined in Section III that might lead to safer use of this product.

3. DDMAC finds the proprietary name of Surfaxin acceptable from a promotional perspective.

Denise P. Toyer, PharmD
Deputy Director
Division of Medication Errors and Technical Support
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Division of Medication Errors and Technical Support (DMETS)
Office of Drug Safety
HFD-420; WO 22 Stop 4447
Center for Drug Evaluation and Research

PROPRIETARY NAME REVIEW

DATE OF REVIEW: November 8, 2005

NDA #: 21-746

NAME OF DRUG: **Surfaxin** (Lucinactant Intratracheal Suspension) 30 mg/mL
8 mL

NDA HOLDER: Discovery Laboratories, Inc.

I. INTRODUCTION:

This consult was written in response to a request from the Division of Pulmonary and Allergy Products (HFD-570) for re-review of the proprietary name "Surfaxin" in regard to potential name confusion with other proprietary or established drug names.

DMETS previously reviewed the name "Surfaxin" (ODS consult # 04-0194, October 2004) and found this name unacceptable due to potential confusion with the word "surfactant." At that time, DMETS had multiple recommendations for labels and labeling. The sponsor has submitted revised container labels, carton and insert labeling for review and comment.

PRODUCT INFORMATION

Surfaxin is a non-animal derived pulmonary surfactant indicated for the prevention of respiratory distress syndrome (RDS) in premature infants. The product may be administered as often as every 6 hours and up to 48 hours of age to treat neonates who subsequently develop RDS and require continued mechanical ventilation or fail to improve after initial dosing. The initial dose should be administered as soon as possible after birth, preferably within 30 minutes. It is favored that the infant be placed on mechanical ventilation before dosing. Each dose may be administered in either two or four aliquots. Surfaxin is administered intratracheally, by instillation, through a 5-French end-hole catheter passed through a Bodai or equivalent valve to maintain adequate positive end-expiratory pressure and inserted into the infant's endotracheal tube. The recommended dose of Surfaxin is 5.8 mL/kg (175 mg/kg) birthweight. The product should be stored in a refrigerator and protected from light. Before use, the vial should be warmed at 44°C for at least 15 minutes, but not to exceed 8 hours. The administration temperature should be ≤ 37°C. The medication should be used within 8 hours of warming and any warmed, unused medication must be discarded. As marked improvement in oxygenation and lung compliance may occur rapidly after administration, the infant should receive frequent clinical assessments such that oxygen and ventilatory support may be modified. Surfaxin is available as an 8 mL vial.

II. RISK ASSESSMENT:

The medication error staff of DMETS conducted a search of several standard published drug product reference texts[1,2,] as well as several FDA databases[3] for existing drug names which sound-alike or look-alike to Surfaxin to a degree where potential confusion between drug names could occur under the usual clinical practice settings. A search of the electronic online version of the U.S. Patent and Trademark Office's Text and Image Database was also conducted[4]. An expert panel discussion was conducted to review all findings from the searches. In addition, DMETS conducted three prescription analysis studies consisting of two written prescription studies (inpatient and outpatient) and one verbal prescription study that involved health care practitioners within FDA. This exercise was conducted to simulate the prescription ordering process in order to evaluate potential errors in handwriting and verbal communication of the name.

A. EXPERT PANEL DISCUSSION (EPD)

An Expert Panel discussion was held by DMETS to gather professional opinions on the safety of the proprietary name "Surfaxin." Potential concerns regarding drug marketing and promotion related to the proposed name were also discussed. This group is composed of DMETS Medication Errors Prevention Staff with representation from the Division of Drug Marketing, Advertising, and Communications (DDMAC). The group relies on their clinical and professional experiences in addition to a number of standard references when making a decision on the acceptability of a proprietary name.

1. DDMAC finds the name Surfaxin acceptable from a promotional perspective.

2. The Expert Panel and independent analysis identified six proprietary names that were thought to have the potential for confusion with Surfaxin. These products are listed in table 1 (see below), along with the dosage forms available and FDA approved usual dosage.

Table 1: Potential Sound-Alike/Look-Alike Names for Surfaxin Identified by DMETS Expert Panel and Independent Review

Product Name	Established name, Dosage Form(s), Strength(s)	Usual adult dose*	Other**
Surfaxin	**Lucinactant Intratracheal Suspension, 30 mg/mL**	**Administer 5.8 mL/kg (175 mg/kg) intratracheally by instillation through a 5-French end-hole catheter as soon as possible after birth, preferably within 30 minutes. Three additional doses may be administered through 48 hours of age and as often as every 6 hours to infants who subsequently develop RDS. Average doses range from 3.5 mL to 7 mL**	
Cefazolin	Cefazolin for Injection, 1 gram/10 mL, 1 mg/100 mL, 10 gram/mL	Adults: 250 mg to 1.5 grams every 6 to 12 hours. Children: 25 to 50 mg/kg, divided into three or four equal doses.	SA
Suboxone®	Buprenorphone HCl/Naloxone HCl Dihydrate Sublingual Tablets, 2 mg/0.5 mg, 8 mg/2 mg	Sublingual single daily dose ranging from 12 to 16 mg/day.	LA

[1] MICROMEDEX Integrated Index, 2005 MICROMEDEX, Inc., 6200 South Syracuse Way, Suite 300, Englewood, Colorado 80111-4740, which includes all products/databases within ChemKnowledge, DrugKnowledge, and RegsKnowledge Systems.
[2] Facts and Comparisons, online version, Facts and Comparisons, St. Louis, MO.
[3] AMF Decision Support System [DSS], the Division of Medication Errors and Technical Support [DMETS] database of Proprietary name consultation requests, New Drug Approvals 98-05 and the electronic online version of the FDA Orange Book.
[4] WWW location http://www.uspto.gov/tmdb/index html.

Product Name	Established name, Dosage Form(s), Strength(s)	Usual adult dose*	Other**
Surfaxin	**Lucinactant Intratracheal Suspension, 30 mg/mL**	**Administer 5.8 mL/kg (175 mg/kg) intratracheally by instillation through a 5-French end-hole catheter as soon as possible after birth, preferably within 30 minutes. Three additional doses may be administered through 48 hours of age and as often as every 6 hours to infants who subsequently develop RDS. Average doses range from 3.5 mL to 7 mL**	
Naproxen	Tablets: 250 mg, 375 mg, 500 mg Delayed Release: 375 mg, 500 mg Suspension: 125 mg/5 mL Naproxen Sodium Tablets OTC: 200 mg, Rx: 250 mg, 500 mg	OTC: 200 mg every 8 to 12 hours RX: 250 to 500 mg twice/day. Other indications: Juvenile arthritis: 10 mg/kg in 2 divided doses. Acute gout: 750 mg, followed by 250 mg every 8 hours until the attack subsides. Naproxen sodium: 825 mg, then 275 mg every 8 hours until attack subsides.	LA
Serpalan	Reserpine Tablets, 0.1 mg and 0.25 mg	Hypertension: 0.5 mg daily for 1 or 2 weeks. For maintenance, reduce to 0.1 to 0.25 mg daily. Psychiatric disorders: 0.5 mg daily, but may range from 0.1 to 1 mg.	LA
Sulfatrim® Sulfatrim SS (discontinued) Sulfatrim DS (discontinued)	Trimethoprim/Sulfamethoxazole Oral Suspension 40 mg/200 mg per 5 ml 80 mg/400 mg per tablet 160 mg/800 mg per tablet	UTI: (Adults) 160 mg TMP/800 mg SMZ every 12 hours for 10 to 14 days. Shigellosis and Travelers' diarrhea: 5 days therapy. Chronic Bronchitis: 14 days therapy. UTI: (Children): 8 mg/kg TMP/40 mg/kg SMZ per day given in 2 divided doses every 12 hours for 10 days (5 days for shigellosis). Pneumocystis carinii pneumonia: *Treatment:* 15 to 20 mg/kg TMP/100 mg/kg SMZ per day in divided doses every 6 hours for 14 to 21 days. Prophylaxis: (Adults): 160 mg TMP/800 mg SMZ given orally every 24 hours. (Children): 150 mg/m ^{2} TMP/ 750 mg/m ^{2} SMZ per day given orally in equally divided doses twice a day, on 3 consecutive days per week.	LA
Robaxin® Robaxin®-750	Methocarbamol Tablets: 500 mg, 750 Injection: 100 mg/mL	Oral: (Initial): 1.5 g 4 times daily. (Maintenance): 1 g 4 times daily; 750 mg every 4 hours; or 1.5 g 3 times daily. Parenteral (For IV and IM use only): Do not exceed total adult dosage of 3 g for > 3 consecutive days except in the treatment of tetanus. For the relief of symptoms of moderate degree, 1 g may be adequate- 2 to 3 g may be required. Adults: Inject 1 or 2 g directly into the IV tubing. An additional 1 or 2 g may be added to the infusion bottle so that a total of ≤ 3 g is given as the initial dose. Repeat procedure every 6 hours until conditions allow for the insertion of a nasogastric tube. Children: A minimum initial dose of 15 mg/kg is recommended. Repeat every 6 hours as indicated.	LA

*Frequently used, not all-inclusive.
**L/A (look-alike), S/A (sound-alike)

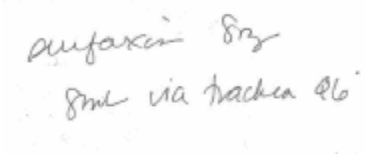
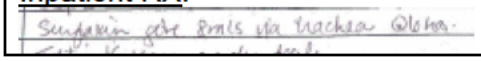
B. PHONETIC and ORTHOGRAPHIC COMPUTER ANALYSIS (POCA)

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. The phonetic search module returns a numeric score to the search engine based on the phonetic similarity to the input text. Likewise, an orthographic algorithm exists which operates in a similar fashion. All names considered to have significant phonetic or orthographic similarities to Surfaxin were discussed by the Expert Panel (EPD).

C. PRESCRIPTION ANALYSIS STUDIES

1. Methodology:

Three separate studies were conducted within the Centers of the FDA for the proposed proprietary name to determine the degree of confusion with Surfaxin and other marketed U.S. drug names (proprietary and established) due to similarity in visual appearance with handwritten prescriptions or verbal pronunciation of the drug name. These studies employed a total of 119 health care professionals (pharmacists, physicians, and nurses). This exercise was conducted in an attempt to simulate the prescription ordering process. An inpatient order and outpatient prescriptions were written, each consisting of a combination of marketed and unapproved drug products and a prescription for Surfaxin (see below). These prescriptions were optically scanned and delivered to a random sample of the participating health professionals via e-mail. In addition, an outpatient order was recorded on voice mail, which was sent to a random sample of the participating health professionals for their interpretation and review. After receiving either a written or verbal prescription order, the participants sent their interpretation of the order via e-mail to the medication error staff.

HANDWRITTEN PRESCRIPTION	VERBAL PRESCRIPTION
Outpatient RX: 	Surfaxin Give 8 milliliters via trachea every 6 hours Dispense 8 ounces
Inpatient RX: 	

2. Results:

None of the interpretations of the proposed name overlap, sound similar, or look similar to any currently marketed U.S. product. However, two participants in the voice prescription study interpreted the name as “surfactan” and “surfactant.” By definition, a surfactant is a surface-active substance. See Attachment A for the complete listing of interpretations from the verbal and written prescription studies.

D. AERS SEARCH

A search of the FDA Adverse Event Reporting System (AERS) database was conducted in order to determine if any post-marketing safety reports of medication errors were associated with other surfactant drug products, including Exosurf®, Infasurf®, Curosurf®, and Survanta®. The following search criteria were utilized: Surv%, Infa%, Cur%, Exo%, Colf%, Berac%, Calfac% and Pora% for active ingredients, trade names, and verbatim substance names with no specific reactions chosen. This search did not identify any new case reports pertaining to the nomenclature, labeling or packaging that were not discussed in the initial consult.

E. SAFETY EVALUATOR RISK ASSESSMENT

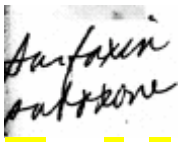
In reviewing the proposed proprietary name "Surfaxin", the primary concerns related to look-alike and sound-alike confusion with Cefazolin, Suboxone, Naproxen, Serpalan, Sulfatrim, and Robaxin. In addition, as noted in our previous reviewed dated October 2004, DMETS has concern with potential confusion with the word "surfactant" and the associated category of drug products (i.e. Exosurf, Infasurf, Curosurf, and Survanta).

Upon further review of the names gathered from EPD and independent analysis, the names cefazolin and Serpalan were not reviewed further due to a lack of convincing look-alike/sound-alike similarities with Surfaxin. The products also differ in numerous product characteristics such as the product strength, indication of use, frequency of administration, route of administration and context of use. In addition, Serpalan does not appear to be available in the marketplace as the sponsor, Lannett, does not list it on their website and the drug product is not in the 2005 RedBook or on major pharmacy websites (e.g., CVS, Walgreens).

Additionally, DMETS conducted prescription studies to simulate the prescription ordering process. In this case, there was no confirmation that the proposed name could be confused with any of the aforementioned names. However, negative findings are not predicative as to what may occur once the drug is widely prescribed, as these studies have limitations primarily due to a small sample size. The majority of misinterpretations were misspelled/phonetic variations of the proposed name, Surfaxin. However, two participants in the voice prescription study interpreted the name as "surfactan" and "surfactant." Additionally, the prescription studies indicate the proprietary name Surfaxin could infer that the product is a surfactant. In this case the inference would be correct, because the product is a lung surfactant containing a mixture of phospholipids for use in pulmonary medicine.

1. Surfactant was noted in the previous review and remains of concern to DMETS as having potential for confusion with the proposed name "Surfaxin." Furthermore, the current verbal prescription study noted two participants interpreted the name as "surfactan" and "surfactant." Thus, DMETS is primarily concerned with confusion and medication errors due to the phonetic similarities between the name "Surfaxin" and the term "surfactant." This concern routes in the possibility for practitioners to call for (verbal order in the Neonate Intensive Care Unit) surfactant that relates to the class of medications used for respiratory distress syndrome in premature infants. This would be problematic especially if only one preparation of the available surfactants is carried on the formulary. This is also applicable for the converse, in which a prescriber calls for "Surfaxin" that is interpreted as surfactant when only one drug product is carried on formulary (e.g. Survanta). These potential scenarios could result in the neonate receiving the incorrect medication and the incorrect milliliter dose. Due to the timing (preferred administration within 30 minutes of birth) and nature of the clinical environment of a premature infant, a written order that would undergo multiple checks is unlikely. The outcome of such an event could result in surfactant overdose, which may culminate in acute airway obstruction or problem with fluids and/or electrolyte balance. Thus, DMETS continues to be concerned with potential confusion with the proposed name "Surfaxin" and the term "surfactant."

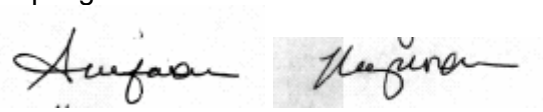
2. Suboxone was identified to have look-alike similarities to the proposed name of Surfaxin. Suboxone contains buprenorphine and naloxone for the treatment of opioid dependence. The drug product is available in two sublingual tablet strengths, 2 mg buprenorphine with 0.5 mg naloxone and 8 mg buprenorphine with 2 mg naloxone. The recommended dose is 12 to 16 mg daily as a single dose. Buprenorphine is categorized as a schedule III under the controlled substance act. The orthographic similarities stem from the shared leading “Su”, central upstroke of “b” of Suboxone and “f” of Surfaxin, and shared “n” and “x” with similar placement in the names.



SURFAXI N
SUBO XONE

Although the scripting similarities may be strong, the drug products share no overlapping characteristics. The products differ in strength (2 mg/0.5 mg or 8 mg/2 mg compared to 240 mg/8 mL or 30 mg/mL), usual dose (varying number of tablets compared to 5.8 mL per kilogram), indication of use (opioid dependence compared to respiratory distress syndrome), dosage form (tablet compared to suspension), route of administration (sublingual compared to per endotracheal tube), drug packaging presentation (bottle/tablets compared to vial), patient population (adults and children over 16 years compared to neonates), context of use (maintenance therapy for addiction compared to emergency use hours after birth with neonate specialty units) and storage condition (room temperature compared to refrigeration). Although these names possess look-alike similarities, the many aforementioned product differences decrease the likelihood of confusion or medication errors between the two products.

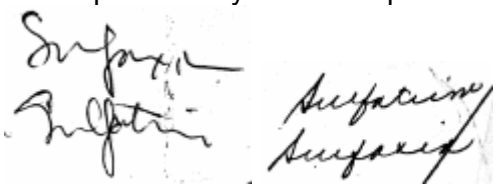
3. Naproxen was identified to have look-alike similarities to the proposed name of Surfaxin. Naproxen is available as multiple strengths that are both over-the-counter and by prescription only. In addition, it is available as “naproxen” and “naproxen sodium.” The orthographic similarities stem from the shared central downstroke (“p” of naproxen and “f” of Surfaxin) and shared concluding ending of “xen” and “xin” (of which, the “e” and “i” appear identical when scripted). However, the leading “N” of naproxen and “S” of Surfaxin should help to differentiate the two names upon scripting.



As Surfaxin is used only in neonates, on neonate intensive care unit or obstetrics, under “emergency” circumstances and regularly stocked in the neonate intensive care unit/obstetrics units, DMETS will only review and compare the suspension dosage form of naproxen as this could be seen/used on pediatric floors and the dosage form overlaps (suspension). The context of use and differing product characteristics will help to alleviate confusion between other dosage forms of naproxen and Surfaxin. The usual dosage could potentially cause confusion as naproxen is dosed as 5 mg/kg twice daily and Surfaxin is 5.8 mL per kilogram, but Surfaxin will likely be called for in total milliliters with no notation of milligram. However, even the likelihood for confusion between the shared “suspension” formulated products should be limited due to a lack of other overlapping characteristics such as strength (125 mg/5 mL compared to 240 mg/8 mL or 30 mg/mL), packaging (bottle compared to vial), indication of use (juvenile arthritis compared to respiratory distress syndrome), route of administration (oral ingestion compared to administration through an endotracheal tube), patient population (children over 2 years of age compared to neonates), context of use (maintenance therapy for arthritis compared to emergency use hours after birth with neonate specialty units), and

storage condition (room temperature compared to refrigeration). In light of the weak look-alike similarities and aforementioned product differences, DMETS believes the possibility for confusion to be minimal.

4. Sulfatrim was identified to have look-alike similarities to the proposed name of Surfaxin. Sulfatrim is an oral suspension that contains trimethoprim (40 mg) and sulfamethoxazole (200 mg) per 5 milliliter. The product was previously available in two tablet strengths (80 mg of trimethoprim/400 mg sulfamethoxazole and 160 mg trimethoprim/800 mg sulfamethoxazole) with the modifiers SS and DS, which have since been discontinued. The recommended dose for treatment of urinary tract infections or acute otitis media is 8 mg/kg trimethoprim and 40 mg/kg sulfamethoxazole per 24 hours, given in two divided doses every 12 hours for 10 days. For Pneumocystis Carinii Pneumonia, the recommended dose is 150 mg/m ^{2}/day trimethoprim with 750 mg/m ^{2}/day sulfamethoxazole given orally in equally divided doses twice a day for three consecutive days per week. Usual dose ranges from 2.5 mL to 10 mL every 12 hours. The orthographic similarities stem from the shared leading “S”, central “f” and concluding “n/m” (which appear identical upon scripting). However, the upstroke of the “l” and “t” is Sulfatrim and the “x” of Surfaxin, if written prominently should help to differentiate the two names.



As Surfaxin is used only in neonates, on neonate intensive care unit or obstetrics, under “emergency” circumstances and regularly stocked on the neonate intensive care unit/obstetrics, DMETS will only review and compare the available suspension form of Sulfatrim as the products overlap in dosage form of suspension and pediatric patient population. The context of use and differing product characteristics will help to alleviate confusion between other dosage forms of Sulfatrim and Surfaxin. Although the actual dose could overlap as Sulfatrim can be ordered per milliliter dose with no reference to milligram dose, the dosing frequency is different (twice daily) and Sulfatrim is contraindicated in children under age two months. In addition, the products differ in indication of use (infection compared to respiratory distress syndrome), packaging (bottle compared to vial), context of use (regular hospital floor use and outpatient use compared to emergency use hours after birth with neonate specialty units) and storage condition (room temperature compared to refrigeration). Although these names have the potential to look similar when scripted, the context of use and aforementioned product differences will limit the likelihood of confusion or medication errors between the two products.

5. Robaxin was identified to have look-alike similarities to the proposed name of Surfaxin. Robaxin contains methocarbamol for the relief of discomfort associated with acute, painful musculoskeletal conditions and possible control of neuromuscular manifestations of tetanus. Recommended dosage for Robaxin injection is 1 gram (10 mL), which may be repeated in severe cases or postoperative conditions every 8 hours (maximum of 3 gram per day) by intravenous injection (undiluted or per drip) or intramuscular use. The tablets are dosed at 1.5 grams four times daily for initial dosing and 1 gram four times daily for maintenance. The orthographic similarities stem from the shared central downstroke (of “b” in Robaxin and “f” of Surfaxin, followed by the identical “axin.” However, the initiating letters of “R” and “S” should help to differentiate the two names.

As Surfaxin is used only in neonates, on neonate intensive care unit or obstetrics, under "emergency" circumstances and regularly stocked on the neonate intensive care unit/obstetrics, DMETS will only review and compare the available injectable form of Robaxin as the two drug products overlap in method of order (per milliliters) and dosage form (vial). Although, the context of use and differing product characteristics should help to alleviate confusion between all dosage forms of Sulfatrim and Surfaxin. The drug products differ in strength (100 mg/mL compared to 240 mg/8 mL or 30 mg/mL), usual dose (1 gram/10 mL compared to 5.8 mL per kilogram), indication of use (muscular conditions compared to respiratory distress syndrome), dosage formulation (tablet compared to suspension), route of administration (intravenous/intramuscular compared to per endotracheal tube), patient population (adults compared to neonates), context of use (primary use on the regular hospital floor compared to emergency use hours after birth with neonate specialty units), and storage condition (room temperature compared to refrigeration). Due to the limited orthographic similarities and the product differences, the likelihood of confusion or medication errors between the two products is minimal.

III. COMMENTS TO THE SPONSOR:

DMETS continues to not recommend the use of the proprietary name, Surfaxin due to potential confusion with the word "surfactant" (see ODS consult 04-0194).

Additionally, in the review of the container labels, carton and insert labeling of Surfaxin, DMETS has attempted to focus on safety issues relating to possible medication errors. DMETS has identified the following areas of possible improvement, which might minimize potential user error.

1. General Comments

   After a review of the AERS database found no cases of dosing confusion, DMETS questions if the sponsor's presentation of drug content by milligram of phospholipids per milliliter may result in error; given that all the currently marketed surfactant drug products (e.g., Infasurf, Survanta, Curosurf) use the milliliter content as the principal method of identification. As practitioners are familiar with this presentation and there appears to be no confusion per the AERS database, DMETS recommends the sponsor adjust their presentation to the accepted standard. Thus, the labels and labeling would require revisions, which are detailed below.

2. Container Label:

   a. DMETS recommends the primary reference be the milliliter content, due to the standard practice and dosing guidelines. The milligram phospholipid content per milliliter should be added in a smaller font below the milliliter content as shown below. Thus, the sponsor would relocate "30 mg/mL total phospholipids."

   8 mL
   (Each mL contains 30 mg of total phospholipids)

   b. DMETS recommends that the usual dosage information, (b) (4) (b) (4) be removed from the label. The side panel references to the package insert for complete dosing instructions should be sufficient. The inclusion of this data, especially on the principal display panel, leads to crowding and does not allow for the ease of reading of pertinent information.

   c. Add a dosing guidance of 5.8 mL/kg to the Dosing Instructions on the side panel, which will provide a quick reference for practitioners.

d. DMETS suggests that the dosage formulation appear in the same type size and format as "Lucinactant". The preferred presentation of the established name would be to include the dosage formulation in the parenthesis as "(Lucinactant Intratracheal Suspension)".

e. Please ensure that the entire established name, "Lucinactant Intratracheal Suspension", appear with at least half the prominence as the proprietary name after accounting for differences such as font style, size, and print color.

f. DMETS recommends increasing the prominence of the route of administration statement "For Intratracheal Administration Only". The product may look like a medication for intravenous administration. Therefore increasing the prominence of this statement should alert healthcare professionals of the correct route of administration, and prevent administration errors.

g. The "Dosing Instructions" reads in part "warm to 44° C before using". In addition to this, DMETS recommends that a statement be included for healthcare professionals to cool the product to ≤37° C before administration of the product. However, DMETS questions how healthcare providers are to verify the product is ≤37° or 44° C since most hospitals use electronic thermometers which would probably not be as useful in measuring the temperature in the vial.

h. (b) (4)

3. Carton Labeling:

a. See comments 2 a through h.

b. DMETS recommends the addition of a key on the carton (and/or container if space permits) for entry and inclusion of critical information regarding the time from removal from refrigeration to usage. See example below:

Removed from refrigeration
Date: _____ Time: _____
Warm at 44°C for at least 15 minutes,
but not to exceed 8 hours
Starting Time: _____ Ending Time: _____
Discard Time: _____
Administration temperature should be ≤37° C (98.6° F)
Record Actual Administration Temperature _____° C??/Guidance on how to determine this? (vial feels warm to touch)
Shake vigorously until Surfaxin is uniform and free flowing.
Use within 8 hours or discard, DO NOT re-refrigerate.

c. DMETS also recommends bolding the statement "Once warmed, Surfaxin should not be returned to the refrigerator", since this differs from the currently marketed surfactants.

d. DMETS suggests the "Rx Only" statement be placed on the principal display panel, at the top portion across from the NDC number.

4. Insert Labeling:

   a. General Comments

      DMETS suggests the entire established name appear on the same line directly below the proprietary name. See comment 2e on the presentation of the established name.

   b. Description Section

      Add a final paragraph that describes how Surfaxin is available (i.e. 30 mg of phospholipids per milliliter, single-use, clear glass 8 mL vial. This assures that the information is available here and in the How Supplied Section for practitioners' reference.

   c. Dosage and Administration Section

      i. (b) (4)

         "The recommended dose of Surfaxin is 5.8 mL/kg birthweight. Up to three subsequent doses of 5 .8 mL/kg…."

      ii. Consider the addition of the second paragraph from the Precautions Section that reads "No information is available on the effects of more than four doses….." This will notify the practitioner of the maximum number of doses administered in clinical trials, which will provide a guideline.

      iii. (b) (4)

      iv. In reference to the table, there is a trailing zero in the final total dose (7.0). Please delete this trailing zero. Trailing zeros often result in error as the decimal is overlooked. As evidenced by our post-marketing surveillance, the use of trailing zeros could potentially result in a ten-fold medication dose error. Although, it is unlikely that a ten-fold medication dosing error would occur, since the product is packaged in the required size and volume for administration, the use of terminal zero in the expression of strength or volume is not in accordance with the General Notices (page 12) of 2000 USP, which states, "…to minimize the possibility of errors in the dispensing and administration of the drugs…the quantity of active ingredient when expressed in whole numbers shall be shown WITHOUT a decimal point that is followed by a terminal zero." In addition, the use of trailing zeros is specifically listed as in the list of dangerous abbreviations, acronyms, and symbols in the National Patient Safety Goal 2 of The Joint Commission of Accreditation of Healthcare Organizations (2006). Lastly, safety groups such as ISMP, also list this on their dangerous abbreviations and dose designations.

      v. Provide the Fahrenheit conversions in parentheses [e.g., warmed at 44°C (XX°F)].

      vi. DMETS recommends that detailed instructions be provided on acceptable and any unacceptable methods for warming the product to 44°C (e.g., water bath vs. microwave vs. etc…).

vii. DMETS recommends that detailed instructions be provided to healthcare professionals concerning how to verify that the product is ≤37° C before the product is administered without compromising the sterility of the product. DMETS is concerned if healthcare professionals are not instructed to verify and document the temperature of the medication, then the medication may be an unsafe temperature, > 37°C to 44°C, when administered and result in additional trauma to the infant.

viii. DMETS suggests that the healthcare professionals be reminded to record the date and times of each step required to prepare the product for administration on the carton labeling. This should help ensure the product is prepared and administered in the safest possible manner.

ix. (b) (4)

Attachment A

Inpatient	Outpatient	Voice
Surfaxin	Surfaxin	Zirfaxin
Surfaxin	Surfaxin	Surfaxen
Surfaxin	Surfaxin	surfactant
Surfarin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfaxin
Sulfarin	Surfaxin	Surfactsan
Surfaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfacsin
Surfaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Zerfaxin
Surtaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfacsin/Sufaxin
Surfaxin	Surfaxin	Surfactan
Surfaxin	Surfaxin	
Sufaxin	Surfaxin	
Surfaxin	Surfaxin	
Surfaxin	Surfaxin	
Surfaxin	Surfaxin	
Surfaxin	Surfaxin	
Surfaxin	Surfaxin	
Surfaxin	Surfaxin	
Surfaxin	Surfaxin	
	Surfaxin	
	Surfaxin	

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

/s/

Denise Toyer
3/1/2006 02:51:30 PM
DRUG SAFETY OFFICE REVIEWER

Carol Holquist
3/1/2006 03:03:44 PM
DRUG SAFETY OFFICE REVIEWER

CONSULTATION RESPONSE
Division of Medication Errors and Technical Support
Office of Drug Safety
(DMETS; HFD-420)

DATE RECEIVED:	**DESIRED COMPLETION DATE:**	**ODS CONSULT #:**
July 16, 2004	September 15, 2004 **PDUFA DATE:** February 13, 2005	04-0194

TO: Badrul Chowdhury, M.D.
Director, Division of Pulmonary and Allergy Drug Products
HFD-570

THROUGH: Christine Yu, R.Ph.
Project Manager, Division of Pulmonary and Allergy Drug Products
HFD-570

PRODUCT NAME:	**NDA SPONSOR:**
Surfaxin (Lucinactant Intratracheal Suspension) 30 mg/mL **NDA#:** 21-746	Discovery Laboratories, Inc.

SAFETY EVALUATOR: Scott Dallas, R.Ph.

RECOMMENDATIONS:

1. DMETS does not recommend the use of the proprietary name, "Surfaxin". DMETS believes that the sound-alike similarities between the name, Surfaxin, and the word, surfactant, increases the risk of confusion and medication errors involving the product, Surfaxin, and other lung surfactants.

2. DMETS recommends implementation of the labeling revisions outlined in Section III of this review to minimize potential errors with the use of this product.

3. DDMAC finds the proprietary name, "Surfaxin" acceptable from a promotional perspective.

Denise Toyer, Pharm.D.
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Division of Medication Errors and Technical Support
Office of Drug Safety
HFD-420; Parklawn Building Room 6-34
Center for Drug Evaluation and Research

PROPRIETARY NAME REVIEW

DATE OF REVIEW: **October 4, 2004**

NDA NUMBER: **21-746**

NAME OF PRODUCT: **Surfaxin**
(Lucinactant Intratracheal Suspension)
30 mg/mL

NDA SPONSOR: **Discovery Laboratories, Inc.**

I. INTRODUCTION:

This consult was written in response to a request from the Division of Pulmonary and Allergy Drug Products for an assessment of the proposed proprietary name, Surfaxin, regarding potential name confusion with other proprietary or established drug names. Container label, carton and insert labeling were provided for review and comment.

PRODUCT INFORMATION

Surfaxin is a non-animal-derived pulmonary surfactant intended for intratracheal use only. The product is indicated for the prevention of Respiratory Distress Syndrome (RDS) in premature infants. The product may be administered as often as every 6 hours and up to 48 hours of age to treat neonates who subsequently develop RDS, and require continued mechanical ventilation. The initial dose should be administered as soon as possible after birth, preferably within 30 minutes. The product should be administered under the direct supervision of clinicians experienced in intubation, ventilatory management, and general care of premature infants. The recommended dose of Surfaxin is 175 mg/kg (5.8 mL/kg) birthweight. The product should be stored in a refrigerator and protected from light. Before use, the vial should be warmed at 44°C for at least 15 minutes, but not to exceed 120 minutes. The administration temperature should be ≤ 37°C. The medication should be used within 6 hours of warming and any unused medication cannot be returned to refrigeration, but must be discarded.

II. RISK ASSESSMENT:

The medication error staff of DMETS conducted a search of several standard published drug product reference texts[1, 2] as well as several FDA databases[3] for existing drug names which sound-alike or look-alike to "Surfaxin" to a degree where potential confusion between drug names could occur under the usual clinical practice settings. A search of the electronic online version of the U.S. Patent and Trademark Office's trademark electronic search system (TESS) was conducted[4]. The Saegis[5] Pharma-In-Use database was searched for drug names with potential for confusion. An expert panel discussion was conducted to review all findings from the searches. In addition, DMETS conducted prescription analysis studies, involving health care practitioners within FDA. These exercises were conducted to simulate the prescription ordering process in order to evaluate potential errors in handwriting and verbal communication of the names.

A. EXPERT PANEL DISCUSSION (EPD)

An Expert Panel discussion was held by DMETS to gather professional opinions on the safety of the proprietary name "Surfaxin". Potential concerns regarding drug marketing and promotion related to the proposed name were also discussed. This group is composed of DMETS Medication Errors Prevention Staff and representation from the Division of Drug Marketing, Advertising, and Communications (DDMAC). The group relies on their clinical and other professional experiences and a number of standard references when making a decision on the acceptability of a proprietary name.

1. DDMAC finds the proprietary name, "Surfaxin", acceptable from a promotional perspective.

2. The Expert Panel identified four proprietary names that were thought to have the potential for confusion with "Surfaxin". These products are listed in Table 1 (see page 4), along with the dosage form available and usual dosage.

[1] MICROMEDEX Integrated Index, 2004, MICROMEDEX, Inc., 6200 South Syracuse Way, Suite 300, Englewood, Colorado 80111-4740, which includes all products/databases within ChemKnowledge, DrugKnowledge, and RegsKnowledge Systems.
[2] Facts and Comparisons, 2004, Facts and Comparisons, St. Louis, MO.
[3] AMF Decision Support System [DSS], the DMETS database of proprietary name consultation requests, New Drug Approvals 98-04, and the electronic online version of the FDA Orange Book.
[4] WWW location http://www.uspto.gov/main/trademarks htm
[5] Data provided by Thomson & Thomson's SAEGIS(tm) Online Service, available at www.thomson-thomson.com.

Table 1: Potential Sound-Alike/Look-Alike Names Identified by DMETS Expert Panel

Product Name	**Established name, Dosage form(s), and Strength(s)**	**Usual adult dose***	**Other****
Surfaxin	**Lucinactant, Intratracheal Suspension, 30 mg/mL**	**Administer 175 mg/kg (5.8 mL/kg) intratracheally by instillation through a 5-French end-hole catheter as soon as possible after birth, preferably within 30 minutes. Three additional doses may be administered every 6 hours.**	
Skelaxin	Metaxalone, Tablet, 400 mg and 800 mg	For adults and children over 12 years of age: Take 800 mg 3 to 4 times a day.	SA
Xifaxan	Rifaximin, Tablet, 200 mg	For adults and children over 12 years of age: Take 200 mg 3 times a day for 3 days.	SA
Surfak Liquigels	Docusate Calcium, Capsules, soft gel, 240 mg	For adults and children over 12 years of age: Take 1 capsule daily until bowel movements are normal.	SA
Sulforcin	Sulfur and Resorcinol, Lotion, 5%/2%	Over-the-counter acne product: Apply to the affected area as directed.	LA
*Frequently used, not all-inclusive. **L/A (look-alike), S/A (sound-alike)			

B. PHONETIC and ORTHOGRAPHIC COMPUTER ANALYSIS (POCA)

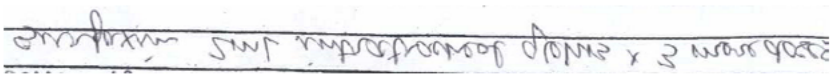
As part of the name similarity assessment, proposed names are evaluated via a phonetic/orthographic algorithm. The proposed proprietary name is converted into its phonemic representation before it runs through the phonetic algorithm. The phonetic search module returns a numeric score to the search engine based on the phonetic similarity to the input text. Likewise, an orthographic algorithm exists which operates in a similar fashion. The Expert Panel discussed all names identified in POCA that were considered to have significant phonetic or orthographic similarities to Surfaxin.

C. PRESCRIPTION ANALYSIS STUDIES

1. Methodology:

Two studies were conducted within the Centers of the FDA for the proposed proprietary name to determine the degree of confusion of "Surfaxin" 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. These studies employed a total of 124 health care professionals (pharmacists, physicians, and nurses) for each proposed proprietary name. These exercises were conducted in an attempt to simulate the prescription ordering process. An inpatient order was written consisting of a combination of marketed and unapproved drug products and an order for "Surfaxin". These orders were optically scanned and delivered to two different random samples of the participating health professionals via email. In addition, inpatient orders were recorded on voice mail and included an order for "Surfaxin". The voice mail messages were then sent to a third random sample of the participating health professionals for their interpretations and review. After receiving

either the written or verbal prescription orders, the participants sent their interpretations of the orders via e-mail to the medication error staff.

HANDWRITTEN PRESCRIPTION	VERBAL PRESCRIPTION
Inpatient: 	Inpatient: Surfaxin 2 mL Intratracheally every 6 hours for 3 more doses

2. Results:

None of the interpretations of the proposed name overlap, sound similar, or look similar to any currently marketed U.S. product. However, one participant in the written prescription study interpreted the name as "surfactant", and another participant commented that the name Surfaxin "could be confused with 'surfactant' verbally". A third participant in the verbal prescription study interpreted the name as "surfaxant", which phonetically is very similar to the word surfactant. By definition, a surfactant is a surface-active agent. In pulmonary physiology, a surfactant refers to a mixture of phospholipids that reduces the surface tension of pulmonary fluids and thus increases the elastic properties of pulmonary tissue. See Attachment A for the complete listing of interpretations from the verbal and written prescription studies.

D. SAFETY EVALUATOR RISK ASSESSMENT

In reviewing the proposed proprietary name "Surfaxin", the primary concerns related to look-alike and sound-alike confusion with Surfaxin are Skelaxin, Xifaxan, Surfak, and Sulforcin. No additional names of concern were identified using POCA or through independent review.

Additionally, DMETS conducted prescription studies to simulate the prescription ordering process. In this case, there was no confirmation that the proposed name could be confused with any of the aforementioned names. However, negative findings are not predicative as to what may occur once the drug is widely prescribed, as these studies have limitations primarily due to a small sample size. The majority of misinterpretations were misspelled/phonetic variations of the proposed name, Surfaxin. However, one participant in the written prescription study interpreted the name as "surfactant", and another participant commented that the name Surfaxin "could be confused with 'surfactant' verbally". A third participant in the verbal prescription study interpreted the name as "surfaxant", which phonetically is very similar to the word surfactant. The prescription studies indicate the proprietary name Surfaxin could be confused with the word "surfactant". Additionally, the prescription studies indicate the proprietary name Surfaxin could infer that the product is a surfactant. In this case the inference would be correct, because the product is a lung surfactant containing a mixture of phospholipids for use in pulmonary medicine.

Look-alike and Sound-alike Concerns:

1. Skelaxin was identified to have sound-alike similarities to the proposed name, Surfaxin. Skelaxin is indicated for the treatment of acute, painful musculoskeletal conditions. Both names consist of three syllables and the second and third syllables can sound very similar when enunciated, “laxin” vs. “faxin”. Therefore, when spoken the first syllable of each name, “Ske” vs. “Sur”, must be clearly enunciated in order to differentiate the names. However, these products differ in their product strength (400 mg and 800 mg vs. 30 mg/mL), usual dose (1 or 2 tablets vs. 5.8 mL/kg or xx mL), indication of use (musculoskeletal conditions vs. Respiratory Distress Syndrome), dosage formulation (tablet vs. suspension), patient population (adults and children over 12 years of age vs. premature infants) and storage condition (room temperature vs. refrigeration). Although these names possess some sound-alike similarities, the many aforementioned product differences decrease the likelihood of confusion or medication errors between the two products.

2. Xifaxan was identified to have sound-alike similarities to the proposed name, Surfaxin. Xifaxan is indicated for the treatment of traveler’s diarrhea caused by noninvasive strains of *Escherichia coli.* Both names consist of three syllables and the second and third syllables can sound very similar when enunciated, “faxan” vs. “faxin”. Therefore, when spoken the first syllable of each name, “Xi” vs. “Sur”, must be clearly enunciated in order to differentiate the names. However, these products differ in their product strength (200 mg vs. 30 mg/mL), usual dose (1 tablet vs. 5.8 mL/kg or xx mL), indication of use (traveler’s diarrhea vs. Respiratory Distress Syndrome), dosage formulation (tablet vs. suspension), patient population (adults and children over 12 years of age vs. premature infants) and storage condition (room temperature vs. refrigeration). Although these names possess some sound-alike similarities, the many aforementioned product differences decrease the likelihood of confusion or medication errors between the two products.

3. Surfak Liquigels commonly referred to as Surfak was identified to have sound-alike similarities to the proposed name, Surfaxin. Surfak is used to prevent the formation of hard, dry stools. The name Surfak only consists of two syllables, but these syllables can be enunciated very similar to the first two syllables of the name Surfaxin, “Sur-fak” vs. “Sur-fax”. Therefore, when spoken the last syllable, “in”, of the name, Surfaxin, must be clearly enunciated in order to differentiate the names. However, these products differ in their product strength (240 mg vs. 30 mg/mL), usual dose (1 capsule vs. 5.8 mL/kg or xx mL), indication of use (prevent hard, dry stools vs. Respiratory Distress Syndrome), frequency of administration (once a day vs. may repeat every 6 hours), dosage formulation (capsule vs. suspension), patient population (adults and children over 12 years of age vs. premature infants) and storage condition (room temperature vs. refrigeration). Although these names possess some sound-alike similarities, the many aforementioned product differences decrease the likelihood of confusion or medication errors between the two products.

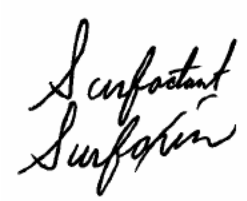
4. Sulforcin was identified to have look-alike similarities to the proposed name, Surfaxin. Sulforcin is indicated for the treatment of acne. Both names begin and end with the same two letters, “Su” and “in”, and the letter “f” appears in the fourth position in each name. These features contribute to the look-alike similarities of the names when scripted. However, these products differ in their product strength (5%/2% vs.

30 mg/mL), usual dose (thin layer vs. 5.8 mL/kg or xx mL), indication of use (acne vs. Respiratory Distress Syndrome), route of administration (topical vs. intratracheal), dosage formulation (lotion vs. suspension), patient population (adolescents and adults vs. premature infants), storage condition (room temperature vs. refrigeration), classification (OTC vs. prescription), and package configuration (120 mL bottle vs. 8 mL vial). Although the names possess some look-alike similarities, the many aforementioned product differences decrease the likelihood of confusion or medication errors between the two products.

Sulforcin
Surfaxin

5. DMETS in-house prescription studies have indicated that the proposed name, Surfaxin, possesses look and sound-alike similarities to the word, "surfactant". The potential look-alike similarity can be partially explained by the fact that first five letters, "surfa", in the word, surfactant, and the name, Surfaxin, are exactly the same. However, when scripted the remaining letters that follow the first five letters are different and can aid in differentiating the word and name. Thus, DMETS feels that the prescription study participant who included a response of the word "surfactant" for the name Surfaxin might have actually recorded their interpretation as if the name was spoken. The potential sound-alike similarity is aided due to the enunciation of the word, surfactant, and the name, Surfaxin, with three syllables of similar phonetic length, and that the first syllable, "sur" is exactly the same in each name. When spoken the second syllable, "act" vs. "ax", can also sound very similar. Therefore, when spoken the third syllable, "ant" vs. "in", must be clearly enunciated to aid in differentiating the word, surfactant, and the name, Surfaxin. However, if the third syllable is not clearly enunciated, then DMETS is concerned with confusion and medication errors due to the phonetic similarities between the name, Surfaxin, and the word, surfactant. DMETS concern for confusion and medication errors is partially based on the presumption that neonatal intensive care (NICU) healthcare professionals may use the word, "surfacant" to refer to the entire therapeutic class of lung surfactants, a specific lung surfactant on formulary, or the surfactant most commonly administered in the NICU. For example, if a neonatologist verbally communicates an order "to prepare a dose of surfactant", then a NICU nurse could unknowingly misinterpret the order. The NICU nurse could interpret the word as "surfactant" a medical term and prepare a dose of the most commonly administered surfactant (e.g., Survanta) on formulary or the NICU nurse could interpret the word for the medication, "Surfaxin", and prepare a dose of the new surfactant, Surfaxin. The risk of misinterpreting a verbal order increases if the order is communicated among multiple individuals in the NICU, such as from one NICU nurse to another NICU nurse. DMETS is concerned that the practice setting increases the risk of confusion and a medication error. Many healthcare professionals would normally be present in a delivery room to provide care to both the mother and premature infant. Physicians may rely heavily on the training and experience of the staff to support them in providing care to both the mother and infant. A positive outcome for a premature

infant can be directly related to the time required to provide treatment. Thus, within a short time period neonatologists may give multiple verbal orders to NICU personnel to hasten the treatment of a premature infant. An experienced NICU nurse may know how to calculate and prepare the usual dose of each surfactant on formulary, which is based on the infant's body weight, and therefore may not ask the physician for an exact dose. The risk of an error is increased in this environment, because physicians may not have the time to script orders immediately after the delivery of a premature infant. Therefore a NICU nurse may not be able to review a written order to verify that the medication and dose are correct. The official documentation of orders may not occur until after the infant has been stabilized and has been admitted into the hospital's computerized system. The efficacy of a lung surfactant increases if it is administered as soon as possible after birth, preferably within 30 minutes of birth. Thus physicians and other NICU personnel are pressured to administer a lung surfactant as soon as possible. However, the phonetic similarities between the word, surfactant, and the medication, Surfaxin, may not only cause an error in the administration of the initial dose of medication, but could also contribute to errors in the transcription of orders. If a physician states that the infant received "x.x mL of surfactant", then a NICU nurse could misinterpret the word, surfactant, for the drug, Surfaxin, and transcribe "x.x mL of Surfaxin". Conversely, if physician states that the infant received "x.x mL of Surfaxin", then a NICU nurse could misinterpret the name, Surfaxin, as the word, surfactant, and transcribe that "x.x mL of another surfactant". If an error occurs in the transcription of an order then the risk increases that an error may occur with any subsequent doses. Each lung surfactant has a different usual dose, x mL/kg, and a premature infant may not be reweighed to recalculate the dosing of medications in the first 24 hours after birth. Thus, a transcription error or a misinterpretation of the initial order of 4.4 mL Surfaxin for a 750 g infant may cause a NICU nurse to prepare the second dose with 4.4 mL Survanta. However, the dose of Survanta for a 750 g infant should be only 3 mL. Thus, DMETS believes that the phonetic similarities between the name, Surfaxin, and the medical term, surfactant, increases the risk of confusion and medication errors involving the product, Surfaxin, and the other approved lung surfactants.



Another likely scenario for confusion arises with computer order entry. DMETS is concerned that orders for Surfaxin and Survanta could be entered incorrectly, especially in hospitals with computerized order entry systems. The first three letters in each name are exactly the same. This increases the probability that both names may appear next to each other in a medication index, or the names could propagate a field of possible medications to select if the first three letters, "Sur" are typed into the computerized system. Therefore, DMETS is concerned that healthcare personnel could select the wrong medication while performing a computerized order entry procedure, if both lung surfactants Survanta and Surfaxin are on the formulary. An error in order entry could lead to subsequent dosing errors, because the usual dosage of these two medications is different, 4 mL/kg vs. 5.8 mL/kg. However, the actual dose of these medications would appear to be similar, x mL. Thus, an error in preparing a dose of medication may be difficult to detect, because a syringe filled with 3 mL of Surfaxin for a 750 g infant

may not appear much different than a syringe filled with the correct dose of 4.4 mL of Surfaxin. If the difference in the volume of medication within a syringe does not alert the NICU staff to the initial error, then the error could result in the premature infant receiving either the wrong medication or dose.

III. COMMENTS TO THE SPONSOR:

DMETS does not recommend the use of the proprietary name Surfaxin. In reviewing the proprietary name, the primary concerns related to look-alike and sound-alike confusion with the word, surfactant, resulting in an increased risk of a medication error involving the product, Surfaxin, and other approved lung surfactants. DMETS is also concerned that the proposed name, Surfaxin, increases the risk of a product selection error involving the proposed name, Surfaxin, and the proprietary name, Survanta, by healthcare personnel performing a computerized order entry procedure.

DMETS in-house prescription studies have indicated that the proposed name, Surfaxin, possesses look and sound-alike similarities to the word, “surfactant”. The potential look-alike similarity can be partially explained by the fact that first five letters, “surfa”, in the word, surfactant, and the name, Surfaxin, are exactly the same. However, when scripted the remaining letters that follow the first five letters are different and can aid in differentiating the word and name. Thus, DMETS feels that the prescription study participant who included a response of the word “surfactant” for the name Surfaxin might have actually recorded their interpretation as if the name was spoken. The potential sound-alike similarity is aided due to the enunciation of the word, surfactant, and the name, Surfaxin, with three syllables of similar phonetic length, and that the first syllable, “sur” is exactly the same in each name. When spoken the second syllable, “act” vs. “ax”, can also sound very similar. Therefore, when spoken the third syllable, “ant” vs. ”in”, must be clearly enunciated to aid in differentiating the word, surfactant, and the name, Surfaxin. However, if the third syllable is not clearly enunciated, then DMETS is concerned with confusion and medication errors due to the phonetic similarities between the name, Surfaxin, and the word, surfactant. DMETS concern for confusion and medication errors is partially based on the presumption that neonatal intensive care (NICU) healthcare professionals may use the word, “surfacant” to refer to the entire therapeutic class of lung surfactants, a specific lung surfactant on formulary, or the surfactant most commonly administered in the NICU. For example, if a neonatologist verbally communicates an order “to prepare a dose of surfactant”, then a NICU nurse could unknowingly misinterpret the order. The NICU nurse could interpret the word as “surfactant” a medical term and prepare a dose of the most commonly administered surfactant (e.g., Survanta) on formulary or the NICU nurse could interpret the word for the medication, “Surfaxin”, and prepare a dose of the new surfactant, Surfaxin. The risk of misinterpreting a verbal order increases if the order is communicated among multiple individuals in the NICU, such as from one NICU nurse to another NICU nurse. DMETS is concerned that the practice setting increases the risk of confusion and a medication error. Many healthcare professionals would normally be present in a delivery room to provide care to both the mother and premature infant. Physicians may rely heavily on the training and experience of the staff to support them in providing care to both the mother and infant. A positive outcome for a premature infant can be directly related to the time required to provide treatment. Thus, within a short time period neonatologists may give multiple verbal orders to NICU personnel to hasten the treatment of a premature infant. An experienced NICU nurse may know how to calculate and prepare the usual dose of each surfactant on formulary, which is based on the infant’s body weight, and therefore may not ask the physician for an exact dose. The risk of an error is increased in this environment, because physicians may not have the time to script orders immediately after the

delivery of a premature infant. Therefore a NICU nurse may not be able to review a written order to verify that the medication and dose are correct. The official documentation of orders may not occur until after the infant has been stabilized and has been admitted into the hospital's computerized system. The efficacy of a lung surfactant increases if it is administered as soon as possible after birth, preferably within 30 minutes of birth. Thus physicians and other NICU personnel are pressured to administer a lung surfactant as soon as possible. However, the phonetic similarities between the word, surfactant, and the medication, Surfaxin, may not only cause an error in the administration of the initial dose of medication, but could also contribute to errors in the transcription of orders. If a physician states that the infant received "x.x mL of surfactant", then a NICU nurse could misinterpret the word, surfactant, for the drug, Surfaxin, and transcribe "x.x mL of Surfaxin". Conversely, if physician states that the infant received "x.x mL of Surfaxin", then a NICU nurse could misinterpret the name, Surfaxin, as the word, surfactant, and transcribe that "x.x mL of another surfactant". If an error occurs in the transcription of an order then the risk increases that an error may occur with any subsequent doses. Each lung surfactant has a different usual dose, x mL/kg, and a premature infant may not be reweighed to recalculate the dosing of medications in the first 24 hours after birth. Thus, a transcription error or a misinterpretation of the initial order of 4.4 mL Surfaxin for a 750 g infant may cause a NICU nurse to prepare the second dose with 4.4 mL Survanta. However, the dose of Survanta for a 750 g infant should be only 3 mL. Thus, DMETS believes that the phonetic similarities between the name, Surfaxin, and the medical term, surfactant, increases the risk of confusion and medication errors involving the product, Surfaxin, and the other approved lung surfactants.

Another likely scenario for confusion arises with computer order entry. DMETS is concerned that orders for Surfaxin and Survanta could be entered incorrectly, especially in hospitals with computerized order entry systems. The first three letters in each name are exactly the same. This increases the probability that both names may appear next to each other in a medication index, or the names could propagate a field of possible medications to select if the first three letters, "Sur" are typed into the computerized system. Therefore, DMETS is concerned that healthcare personnel could select the wrong medication while performing a computerized order entry procedure, if both lung surfactants Survanta and Surfaxin are on the formulary. An error in order entry could lead to subsequent dosing errors, because the usual dosage of these two medications is different, 4 mL/kg vs. 5.8 mL/kg. However, the actual dose of these medications would appear to be similar, x mL. Thus, an error in preparing a dose of medication may be difficult to detect, because a syringe filled with 3 mL of Surfaxin for a 750 g infant may not appear much different than a syringe filled with the correct dose of 4.4 mL of Surfaxin. If the difference in the volume of medication within a syringe does not alert the NICU staff to the initial error, then the error could result in the premature infant receiving either the wrong medication or dose.

In the review of the container label, carton and insert labeling of Surfaxin, DMETS has attempted to focus on safety issues relating to possible medication errors. DMETS has identified the following areas of possible improvement, which might minimize potential user error.

1. General Comment:

   DMETS notes that the container label and carton labeling provided to the Agency to review were in black and white print. Surfaxin should be stored under refrigerated conditions, and therefore may be located in close proximity to the other approved lung surfactants such as Curosurf, Infasurf, and Survanta. Therefore, to aid in the prevention of a selection error, DMETS recommends that any color scheme chosen for the container label and carton labeling should differentiate Surfaxin in appearance from the other approved lung surfactants.

2. Container Label:

   a. DMETS suggests that the dosage formulation appear in the same type size and format as "Lucinactant". The preferred presentation of the established name would be to include the dosage formulation in the parenthesis as "(Lucinactant Intratracheal Suspension)".

   b. Please ensure that the entire established name, "Lucinactant Intratracheal Suspension", appears with at least half the prominence as the proprietary name after accounting for differences such as font style, size, and print color.

   c. DMETS suggests that the total drug quantity and the product strength should be presented directly under the established name utilizing two different lines and within a box or border with the same color background. DMETS suggests the total drug quantity be the primary expression of strength followed immediately by the concentration per mL. For example,

240 mg/8 mL
30 mg/mL

   Presenting the total drug quantity and product strength in this manner should help avert dosing and miscalculation errors.

   d. DMETS recommends that the usual dosage information, "175 mg (5.8 mL) phospholipids per kg bodyweight" should be relocated off the principal display panel and if possible incorporated into the Dosing Instructions. DMETS notes that other phospholipid products indicated for RDS are dosed as xx mL/kg. Therefore, DMETS questions if it would be more appropriate to reference the dosing as 5.8 mL/kg and only include the dosing reference 175 mg/kg in parenthesis when appropriate.

   e. DMETS recommends increasing the prominence of the statement "For Intratracheal Administration Only". The product may look like a medication for intravenous administration. Therefore increasing the prominence of this statement should alert healthcare professionals of the correct route of administration, and prevent administration errors.

   f. The "Dosing Instructions" reads in part "warm to 44° C before using". DMETS recommends that a statement should be included for healthcare professionals to cool the product to ≤37° C before administration of the product. However, DMETS also questions how healthcare providers are suppose to verify the product is ≤37° C.

g. DMETS suggests the “Special Instructions” statement inform the healthcare professionals that once the product is warmed, it should be used within 6 hours or discarded.

3. Carton Labeling:

   a. See comments 2a. through e.

   b. DMETS recommends that the graphic design and sponsor’s name be relocated away from and have less prominence than the proprietary name.

   c. DMETS recommends relocating the statement “Not for Injection” from the side panel and prominently displaying the statement on the principal display panel.

   d. DMETS recommends that the statement, “175 mg (5.8 mL) phospholipids per kg of bodyweight”, should be relocated to the usual dosage statement on the side panel. Dosing information on the principal display panel could interfere with a healthcare provider’s interpretation of the total drug quantity and product strength statements. DMETS also suggests the usual dosage statement should omit referencing 175 mg and only reference 5.8 mL per kg of bodyweight. This would provide continuity with the presentation of the appropriate dosage displayed in Table 4 of the Dosage and Administration section.

   e. DMETS recommends including a location that healthcare professionals can record the time for each step that must be performed to prepare the product for administration or affects the stability of the product. For example,

      Removed from refrigeration
      Date: _____ Time: _____
      Warm at 44°C for at least 15 minutes,
      but not to exceed 120 minutes
      Starting Time: _____ Ending Time: _____
      Administration temperature should be ≤37° C
      Record Actual Administration Temperature _____° C
      Use within 6 hours of warming
      Discard Time: _____

   f. DMETS recommends stating how long the product can remain at room temperature and then be returned to refrigerated storage. This would be important information for practitioners in situations in which the product is removed from refrigeration but not warmed, and not used.

   g. DMETS suggests relocating the “Rx only” statement to the principal display panel.

4. Insert Labeling:

   a. Refer to comment 2.d.

   b. DMETS suggests the entire established name appear on the same line directly below the proprietary name.

c. The following comments pertain to the "Dosage and Administration" section:

i. DMETS recommends that detailed instructions be provided on acceptable and any unacceptable methods for warming the product to 44°C (e.g., water bath vs. microwave vs. etc…).

ii. DMETS recommends that detailed instructions be provided to healthcare professionals concerning how to verify that the product is ≤37° C before the product is administered without compromising the sterility of the product. DMETS is concerned if healthcare professionals are not instructed to verify and document the temperature of the medication, then the medication may be an unsafe temperature, > 37°C to 44°C, when administered and result in additional trauma to the infant.

iii. DMETS suggests that the healthcare professionals be reminded to record the date and times of each step required to prepare the product for administration on the carton labeling. This should help ensure the product is prepared and administered in the safest possible manner.

IV. RECOMMENDATIONS:

1. DMETS does not recommend the use of the proprietary name "Surfaxin". DMETS believes that the sound-alike similarities between the name, Surfaxin, and the word, surfactant, increases the risk of confusion and medication errors involving the product, Surfaxin, and other lung surfactants.

2. DMETS recommends implementation of the labeling revisions outlined in Section III of this review to minimize potential errors with the use of this product.

3. DDMAC finds the proprietary name, "Surfaxin" acceptable from a promotional perspective.

DMETS would appreciate feedback of the final outcome of this consult. We are willing to meet with the Division for further discussion as well. If you have any questions concerning this review, please contact Sammie Beam at 301-827-3242.

_____

Scott Dallas, R.Ph.
Safety Evaluator
Division of Medication Errors and Technical Support
Office of Drug Safety (DMETS)

Attachment A:

Prescription Study Results for the proposed name “Surfaxin”

Scripted Inpatient Prescription Sample #1	Scripted Inpatient Prescription Sample #2	Verbal Prescription Sample #3
Surfactant	Surfaxin	Surfacsin
Surfaxim	Surfaxin	Surfactson
Surfaxin	Surfaxin	Surfaxant
Surfaxin	Surfaxin	Surfaxcin
Surfaxin	Surfaxin	Surfaxen
Surfaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfaxin
Surfaxin	Surfaxin	Surfaxin or Surfacsin
Surfaxin	Surfaxin	Zurfacsin
Surfoxin	Surfaxin	
	Surfaxin	
	Surfaxin	
	Surfaxin	

One participant in the written inpatient prescription study commented that Surfaxin “could be confused with surfactant verbally”.

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/s/

Scott Dallas
11/5/04 08:24:21 AM
DRUG SAFETY OFFICE REVIEWER

Denise Toyer
11/8/04 03:34:33 PM
DRUG SAFETY OFFICE REVIEWER

Carol Holquist
11/8/04 03:57:07 PM
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