

**CENTER FOR DRUG EVALUATION AND
RESEARCH**

APPLICATION NUMBER:

203684Orig1s000

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: October 31, 2013

Reviewer: Reasol S. Agustin, PharmD
Division of Medication Error Prevention and Analysis

Team Leader: Yelena Maslov, PharmD
Division of Medication Error Prevention and Analysis

Drug Name and Strength: Lumason (sulfur hexafluoride lipid microsphere),
for Injectable Suspension, 8 microliter per mL

Application Type/Number: NDA 203684

Applicant/Sponsor: Bracco Diagnostics

OSE RCM #: 2013-2105

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

CONTENTS

1	INTRODUCTION.....	1
1.1	Regulatory History	1
1.2	Product Information.....	1
2	RESULTS.....	1
2.1	Promotional Assessment	1
2.2	Safety Assessment.....	2
3	DISCUSSION	Error! Bookmark not defined.
4	CONCLUSIONS	3
4.1	Comments to the Applicant.....	4
5	REFERENCES	5
	APPENDICES.....	8

1 INTRODUCTION

This review evaluates the proposed proprietary name, Lumason, 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

This is the second proposed name for this product. The first name, Sonovue, was unacceptable [REDACTED] (b) (4)

[REDACTED] The Applicant submitted a request for reconsideration of the proposed proprietary name, Sonovue, on June 18, 2012 and we maintained our objection (OSE Review #2012-1428).

1.2 PRODUCT INFORMATION

The following product information is provided in the September 13, 2013 proprietary name submission.

- Active Ingredient: Sulfur hexafluoride lipid microsphere
- Indication: Indicated for use in patients with suboptimal echocardiograms to opacify the left ventricle and to improve the delineation of the left ventricular endocardial border.
- Route: Intravenous
- Dosage Form: Injectable suspension
- Strengths: 8 microliter per mL
- Dose and Frequency: The recommended dose of is 2 mL (16 microliters) administered as an intravenous bolus injection during echocardiography. During a single examination, a second injection of 2 mL may be administered to prolong contrast enhancement.
- How supplied: Kit for the preparation of sulfur hexafluoride. Kit contains a glass vial with Flipcap closure, Mini-Spike [REDACTED] (b) (4) transfer system, and 5 mL prefilled syringe of 0.9% NaCl.
- Storage: Store at 25°C (77°F) excursions permitted to 15-30°C (59-86°F) [see USP Controlled Room Temperature] Container and Closure Systems:

2 RESULTS

The following sections provide information obtained and considered in the overall 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 Medical

Imaging Products (DMIP) concurred with the findings of OPDP's promotional assessment of the proposed name.

2.2 SAFETY ASSESSMENT

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

2.2.1 *United States Adopted Names (USAN) SEARCH*

The October 3, 2013 search of the United States Adopted Name (USAN) stems did not identify that a USAN stem is present in the proposed proprietary name.

2.2.2 *Components of the Proposed Proprietary Name*

The Applicant indicated in their submission that the proposed name, Lumason, has a hypothetical definition. The "Lum" portion of the word is defined as the luminous intensity of a surface given direction per unit of projected areas and "Son" is defined as a diagnostic examination using ultrasound. 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*

Sixty-three practitioners participated in DMEPA's prescription studies. The interpretations did not overlap with any currently marketed products nor did the misinterpretations sound or look similar to any currently marketed products or any products in the pipeline. Three of the 20 inpatient participants responded correctly and a common misinterpretation occurred with 9 participants misinterpreting the letter 's' for 'n' (i.e. LumaSon misinterpreted as LumaNon, LumaNion, etc). Twelve of the 20 voice participants responded correctly and a common misinterpretation occurred with 2 participants misinterpreting the letter string 'so' for 'ci' (i.e. LumaSOn misinterpreted as LumaCIn). Five of the 23 outpatient participants responded correctly and a common misinterpretation occurred with 17 participants misinterpreting the letter 'o' for 'e' (i.e. LumaSOn misinterpreted as LumaEn). We have considered these variations in our look-alike and sound-alike searches (see Appendix B). Appendix C contains the interpretations from the verbal and written prescription studies.

2.2.4 *Comments from Other Review Disciplines at Initial Review*

In response to the OSE, September 27, 2013 e-mail, the Division of Medical Imaging Products (DMIP) did not forward any comments or concerns relating to the proposed proprietary name at the initial phase of the review.

2.2.5 *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, Lumason. Table 1 lists the names with orthographic, phonetic, or spelling similarity to the proposed proprietary name, Lumason identified by the primary reviewer, the Expert Panel Discussion (EPD), and other review disciplines.

Table 1: Collective List of Potentially Similar Names (DMEPA, Expert Panel Discussion (EPD), and Other Disciplines)					
<i>Name</i>	<i>Source</i>	<i>Name</i>	<i>Source</i>	<i>Name</i>	<i>Source</i>
Look Similar (n=28)					
Lumigan	FDA	Luminex	FDA	Lanoxin	FDA
Sumadan	FDA	Zanosar	FDA	Zonalon	FDA
(b) (4)	FDA	Luminenz	FDA	(b) (4)	FDA
Coumadin	FDA	Lamisil	FDA	Lumicain	FDA
Sumycin	FDA	Canasa	FDA	Luminal	FDA
(b) (4)	FDA	Lumason	FDA	Lucassin	FDA
Lexiscan	FDA	Vumon	FDA	Lamictal	FDA
Fumasorb	FDA	Lovenox	FDA	Lexiva	FDA
Sumaxin	FDA	Lunesta	FDA	Tenivac	FDA
Lunivia	FDA	(b) (4)	FDA		
Sound Similar (n=1)					
Lodosyn	FDA				
Look and Sound Similar (n=3)					
Lumason	FDA	Unasyn	FDA	Loniten	FDA

Our analysis of the 32 names contained in Table 1 determined all 32 names will not pose a risk for confusion as described in Appendices D through E.

2.2.6 Communication of DMEPA's Analysis at Midpoint of Review

DMEPA communicated our findings to the Division of Medical Imaging (DMIP) via e-mail on October 23, 2013. At that time we also requested additional information or concerns that could inform our review. Per e-mail correspondence from the Division of Medical Imaging Products on October 31, 2013, they stated no additional concerns with the proposed proprietary name, Lumason.

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 Teena Thomas, OSE project manager, at 301-796-0549.

3.1 COMMENTS TO THE APPLICANT

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

If any of the proposed product characteristics as stated in your September 13, 2013 submission are altered, the name must be resubmitted for review.

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. *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.

10. *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.

11. *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.

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

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

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

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

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

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

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

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

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

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

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

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

18. 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.

19. Natural Standard (<http://www.naturalstandard.com>)

Natural Standard is a resource that aggregates and synthesizes data on complementary and alternative medicine.

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

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

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. 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).

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

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		
	<i>Potential Causes of Drug Name Similarity</i>	<i>Attributes Examined to Identify Similar Drug Names</i>	<i>Potential Effects</i>
Look-alike	Similar spelling	Identical prefix Identical infix Identical suffix Length of the name Overlapping product characteristics	<ul style="list-style-type: none"> Names may appear similar in print or electronic media and lead to drug name confusion in printed or electronic communication Names may look similar when scripted and lead to drug name confusion in written communication
	Orthographic similarity	Similar spelling Length of the name/Similar shape Upstrokes Down strokes Cross-strokes Dotted letters Ambiguity introduced by scripting letters Overlapping product characteristics	<ul style="list-style-type: none"> Names may look similar when scripted, and lead to drug name confusion in written communication
Sound-alike	Phonetic similarity	Identical prefix Identical infix Identical suffix Number of syllables Stresses Placement of vowel sounds Placement of consonant sounds Overlapping product characteristics	<ul style="list-style-type: none"> Names may sound similar 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 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

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

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.

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 possess similarity that would cause confusion at any point in the medication use system, thus the name is eliminated from further review.

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

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

The answer to this question is a central component of the Safety Evaluator’s overall risk assessment of the proprietary name. If the Safety Evaluator determines through FMEA that the name similarity would not ultimately be a source of medication errors in the usual practice setting, the primary Safety Evaluator eliminates the name from further analysis. However, if the Safety Evaluator determines through FMEA that 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: Letters and Letter Strings with Possible Orthographic or Phonetic Misinterpretation

Letters in Name, Lumason	Scripted May Appear as	Spoken May Be Interpreted as
‘L’	Z, S, T, V, C, F	W, D, Fl, N
lower case ‘l’	b, e, a, i, A, P	W, D, fl
lower case ‘u’	n, y, v, w, a, e, i, o, er	Oo
lower case ‘m’	m, mm, n, v, w, wi, vi, onc, z	
lower case ‘a’	el, ci, cl, d, o, u, c, e	Any vowel, ay
lower case ‘s’	g, n, c, r, v	c
lower case ‘o’	a, c, e, u, i	Oh, i
lower case ‘n’	m, u, x, r, h, s, v	k, j
Letter strings		
Lu	Ur	
so	W	

Appendix C: Prescription Simulation Samples and Results

Figure 1. Lumason Study (Conducted on October 3, 2013)

Handwritten Requisition Medication Order	Verbal Prescription
<p><u>Medication Order:</u></p> <p><i>Lumason VAD #1</i></p>	<p>Lumason</p> <p>Use as directed</p> <p>#1</p>
<p><u>Outpatient Prescription:</u></p> <p><i>Lumason</i></p> <p><i>VAD</i></p> <p><i>#1</i></p>	

FDA Prescription Simulation Responses (Aggregate 1 Rx Studies Report)

Study Name: Lumason

As of Date 10/22/2013

192 People Received Study
63 People Responded

	Total	23	20	20	
INTERPRETATION	OUTPATIENT	VOICE	INPATIENT	TOTAL	
DUMASON	0	1	0	1	
FLUMASON	0	1	0	1	
LERMANON	0	0	1	1	
LUMACIN	0	2	0	2	
LUMANION	0	0	1	1	
LUMANIR	0	0	1	1	
LUMANN	0	0	2	2	
LUMANON	0	0	3	3	
LUMARIN	0	0	1	1	
LUMARON	0	0	3	3	
LUMASEN	17	0	0	17	

LUMASIN	1	0	0	1
LUMASION	0	0	1	1
LUMASON	5	12	2	19
LUMASON UAD	0	0	1	1
LUMAWN UAD	0	0	1	1
LUMAYSIN	0	1	0	1
LUMAYSON	0	1	0	1
LUMESEN	0	1	0	1
NUMASON	0	1	0	1
URMANN	0	0	1	1
URMANON	0	0	1	1
URMAVON	0	0	1	1

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 Lumason	Failure preventions
1	Lumason	Sulfur hexafluoride lipid microsphere	Look and Sound alike	This name is the subject of this review.
2	(b) (4)			
3	Luminenz	Pancreatin	Look alike	Proposed Proprietary Name found unacceptable by DMEPA (b) (4) No new proprietary name submitted for review.

4	(b) (4)			
5	(b) (4)			
6	(b) (4)			
7	Lucassin	Terlipressin for Injection	Look like	Proposed Proprietary Name found unacceptable by DMEPA <div style="background-color: #cccccc; width: 100px; height: 1em; margin: 2px 0;"></div> ^{(b) (4)} Proprietary name withdrawn by Applicant
8	Tenivac	Diphtheria and Tetanus Toxoid	Look alike	The pair have sufficient orthographic differences
9	Luminex		Look alike	Product is not drug (It is an assay)
10	Lamictal	Lamotrigen	Look alike	The pair have sufficient orthographic differences
11	Lexiva	Fosamprenavir	Look alike	The pair have sufficient orthographic differences
12	Lodosyn	Carbidopa	Sound alike	The pair have sufficient phonetic differences
13	(b) (4)			
14	Loniten	Minoxidil	Look alike	International product marketed in Asia and Europe
15	Lexiscan	Regadenoson	Look alike	The pair have sufficient phonetic differences

Appendix E: Risk of medication errors due to product confusion minimized by dissimilarity of the names and/ or use in clinical practice for the reasons described.

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere) Dosage form and Strength(s): Injectable suspension: 8 mL per mL Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)</p>	<p>Prevention of Failure Mode In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
1	<p>Lumigan (Bimatoprost) Dosage form and Strength(s): Ophthalmic solution: 0.01% and 0.03% Usual dose: One drop into affected eye daily in the evening.</p>	<p>Orthographic similarity: Both names begin with the letter string ‘Lum’ and end with the letter ‘n.’ In addition, the letter strings ‘so’ and ‘ga’ appear orthographically similar when scripted.</p>	<p>Orthographic difference: The letters ‘a’ and ‘i’ appear orthographically different when scripted. Strength: Single vs. Multiple. Lumason is available as a single strength which can be omitted vs. Lumigan is available in multiple strengths and need to be specified for a complete prescription. There is no numerical overlap or similarity between the strengths. Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere)</p> <p>Dosage form and Strength(s): Injectable suspension: 8 mL per mL</p> <p>Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion</p> <p>Causes (could be multiple)</p>	<p>Prevention of Failure Mode</p> <p>In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
2	<p>Sumadan (Sulfur and Sulfacetamide)</p> <p>Dosage form and Strength(s): Topical wash (emulsion-based): 4.5%/9%</p> <p>Usual dose: Use 1 to 2 times daily</p>	<p>Orthographic similarity: The beginning letters ‘L’ / ‘S’ and ending letter strings ‘on’ and ‘an’ appear orthographically similar when scripted. In addition, both names contain the letter string ‘uma’ in the same position.</p> <p>Strength: Both are available as single strength and may be omitted.</p>	<p>Orthographic difference: Sumadan contains an upstroke ‘d’ in position 5 which is absent in Lumason, giving the names different shapes.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>
3	<p>Coumadin (Warfarin)</p> <p>Dosage form and Strength(s): Oral tablet: 1 mg, 2 mg, 2.5 mg, 3 mg, 4 mg, 5 mg, 6 mg, 7.5 mg, 10 mg; Intravenous solution (reconstituted): 5 mg</p> <p>Usual dose: 1 mg to 10 mg by mouth daily or 2 mg to 5 mg intravenously daily.</p>	<p>Orthographic similarity: The letters ‘L’ / ‘C’ appear orthographically similar when scripted. In addition, both names contain the letter string ‘uma’ in similar positions and end with the letter ‘n.’</p> <p>Strength and Dose: There is numerical overlap or similarity between the strength and dose (i.e., 2 mL vs. 2 mg, 8 mL vs. 8 mg)</p> <p>Dosage form and route of administration: Both are available as a solution/suspension given intravenously.</p>	<p>Orthographic difference: Coumadin contains an additional letter ‘o’ in position 2 and an upstroke ‘d’ in position 6, which is absent in Lumason. In addition, the letter strings ‘so’ and ‘di’ appear orthographically different when scripted.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere)</p> <p>Dosage form and Strength(s): Injectable suspension: 8 mL per mL</p> <p>Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion</p> <p>Causes (could be multiple)</p>	<p>Prevention of Failure Mode</p> <p>In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
4	<p>Sumycin (Tetracycline HCl)</p> <p>Dosage form and Strength(s): Oral capsule: 250 mg and 500 mg</p> <p>Usual dose: 1 to 2 grams daily in 2 or 4 divided doses (250 mg or 500 mg 4 times a day)</p>	<p>Orthographic similarity: The letters ‘L’ / ‘S’ and ‘s’ / ‘c’ appear orthographically similar when scripted. In addition, both names contain the letter string ‘um’ in similar positions and end with the letter ‘n.’</p>	<p>Orthographic difference: Sumycin contains a downstroke ‘y’ in position 4 which is absent in Lumason, giving the names different shapes.</p> <p>Strength: Single vs. Multiple. Lumason is available as a single strength which can be omitted vs. Sumycin is available in multiple strengths and need to be specified for a complete prescription. There is no numerical overlap or similarity between the strengths.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere)</p> <p>Dosage form and Strength(s): Injectable suspension: 8 mL per mL</p> <p>Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion</p> <p>Causes (could be multiple)</p>	<p>Prevention of Failure Mode</p> <p>In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
5	<p>Fumasorb* (Ferrous fumarate)</p> <p>Dosage form and Strength(s): Oral tablet: 29 mg, 90 mg, 324 mg</p> <p>Usual dose: 1 to 2 tablets daily</p> <p><i>*Product discontinued with generic available.</i></p>	<p>Orthographic similarity: The beginning letters ‘L’ / ‘F’ and ending letters ‘n’ / ‘r’ appear orthographically similar when scripted. In addition, both names contain the letter string ‘umaso’ in similar positions.</p>	<p>Orthographic difference: Fumasorb ends with an additional upstroke ‘b’ which is absent in Lumason, giving the names different shapes.</p> <p>Strength: Single vs. Multiple. Lumason is available as a single strength which can be omitted vs. Fumasorb is available in multiple strengths and need to be specified for a complete prescription. There is no numerical overlap or similarity between the strengths.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere)</p> <p>Dosage form and Strength(s): Injectable suspension: 8 mL per mL</p> <p>Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion</p> <p>Causes (could be multiple)</p>	<p>Prevention of Failure Mode</p> <p>In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
6	<p>Sumaxin (Sulfur and Sulfacetamide)</p> <p>Dosage form and Strength(s): Topical pad: 4%/8% Topical suspension (TS):4%/8% Topical wash: 4%/9%</p> <p>Usual dose: Use as directed 1 to 3 times daily</p>	<p>Orthographic similarity: The beginning letters ‘L’ / ‘S’ orthographically similar when scripted. In addition, both names contain the letter string ‘uma’ in the same position and end with the letter ‘n’</p> <p>Strength: Both are available as single strength and may be omitted.</p>	<p>Orthographic difference: The letter strings ‘so’ and ‘xi’ appear orthographically different when scripted.</p> <p>Dosage form and route of administration: Sumaxin is available in multiple formulations (i.e. pad, wash, or suspension) which need to be specified for a complete prescription vs. Lumason is available as a suspension given intravenously.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere)</p> <p>Dosage form and Strength(s): Injectable suspension: 8 mL per mL</p> <p>Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion</p> <p>Causes (could be multiple)</p>	<p>Prevention of Failure Mode</p> <p>In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
7	<p>Zanosar (Streptozocin)</p> <p>Dosage form and Strength(s): Intravenous solution (reconstituted): 1 gm</p> <p>Usual dose: 500 mg/m² (860 mg) intravenously for 5 consecutive days every 6 weeks until maximum benefit or until treatment-limiting toxicity is observed</p>	<p>Orthographic similarity: The letters in ‘Lumason’ and ‘Zanosar’ appear orthographically similar when scripted.</p> <p>Strength: Both are available as single strength which may be omitted</p> <p>Dosage form and route of administration: Both are available as a suspension/solution given intravenously.</p>	<p>Dose: The usual dose for Lumason is 2 mL (or 16 microliter) vs. Zanosar is dosed based on body surface area (i.e. 860 mg based on average BSA of 1.7 m²). There is no numerical overlap or similarity between the doses.</p> <p>Frequency: Lumason is prescribed as now or daily vs. Zanosar is prescribed as a regimen (i.e. for 5 days every 6 weeks).</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere)</p> <p>Dosage form and Strength(s): Injectable suspension: 8 mL per mL</p> <p>Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion</p> <p>Causes (could be multiple)</p>	<p>Prevention of Failure Mode</p> <p>In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
8	<p>Lamisil (Terbinafine)</p> <p>Dosage form and Strength(s): Oral tablet: 250 mg Oral packet: 125 mg and 187.5 mg</p> <p>Usual dose: 250 mg once daily</p>	<p>Orthographic similarity: Both names begin with the letter ‘L’ and the beginning letter strings ‘um’ and ‘am’ appear orthographically similar when scripted.</p>	<p>Orthographic difference: Lamisil ends with an upstroke ‘l’ which is absent in Lumason, giving the names different shapes. In addition, the letter strings ‘aso’ and ‘isi’ appear</p> <p>Strength: Single vs. Multiple. Lumason is available as a single strength which can be omitted vs. Lamisil is available in multiple strengths and need to be specified for a complete prescription. There is no numerical overlap or similarity between the strengths.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>
9	<p>Canasa (Mesalamine)</p> <p>Dosage form and Strength(s): Rectal suppository: 1000 mg</p> <p>Usual dose: One suppository once daily at bedtime</p>	<p>Orthographic similarity: The beginning letter strings ‘Lum’ / ‘Can’ and the letter string ‘aso’ / ‘asa’ appear orthographically similar when scripted.</p> <p>Strength: Both are available as single strength which may be omitted.</p>	<p>Orthographic difference: Lumason contains an additional letter ‘n’ at the end of the name, making it appear orthographically longer when scripted.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere)</p> <p>Dosage form and Strength(s): Injectable suspension: 8 mL per mL</p> <p>Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion</p> <p>Causes (could be multiple)</p>	<p>Prevention of Failure Mode</p> <p>In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
10	<p>Vumon (Teniposide)</p> <p>Dosage form and Strength(s): Intravenous solution: 10 mg/mL</p> <p>Usual dose: 165 mg/m²/dose (180 mg) intravenously on days 1, 4, 8, and 11 of alternating consolidation cycles</p>	<p>Orthographic similarity: The beginning letters ‘L’ / ‘V’ and letter strings ‘as’ / ‘on’ appear orthographically similar when scripted. In addition, both names contain the letter string ‘um’ in similar positions.</p> <p>Strength: Both are available as single strength and may be omitted.</p> <p>Dosage form and route of administration: Both are available as a suspension/solution given intravenously.</p>	<p>Orthographic difference: Lumason contains an additional letters ‘on’ at the end of the name, making it orthographically longer than Vumon when scripted.</p> <p>Dose: The usual dose for Lumason is 2 mL (or 16 microliter) vs. Vumon is dosed based on body surface area (i.e. 180 mg based on average BSA of 1.7 m²). There is no numerical overlap or similarity between the doses.</p> <p>Frequency: Lumason is prescribed as now or daily vs. Vumon is prescribed as a regimen (i.e. days 1, 4, 8, and 11 of alternating consolidation cycles).</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere)</p> <p>Dosage form and Strength(s): Injectable suspension: 8 mL per mL</p> <p>Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion</p> <p>Causes (could be multiple)</p>	<p>Prevention of Failure Mode</p> <p>In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
<p>11</p>	<p>Lovenox (Enoxaparin)</p> <p>Dosage form and Strength(s): Subcutaneous solution: 30 mg, 40 mg, 60 mg, 80 mg, 100 mg, 120 mg, 150 mg, 300 mg</p> <p>Usual dose: 1 mg/kg every 12 hours</p>	<p>Orthographic similarity: The letters in ‘Lumason’ and ‘Lovenox’ appear orthographically similar when scripted.</p> <p>Dosage form and route of administration: Both are available as suspension/solution given parenterally (intravenous vs. subcutaneous)</p>	<p>Strength: Single vs. Multiple. Lumason is available as a single strength which can be omitted vs. Lovenox is available in multiple strengths and need to be specified for a complete prescription. There is no numerical overlap or similarity between the strengths.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>
<p>12</p>	<p>Lunesta (Eszopiclone)</p> <p>Dosage form and Strength(s): Oral tablet: 1 mg, 2 mg, 3 mg</p> <p>Usual dose: One tablet by mouth immediately before bedtime</p>	<p>Orthographic similarity: Both names begin with the letter string ‘Lu’ and contains the letter ‘s’ in similar positions. In addition, the letter strings ‘ma’ and ‘ne’ appear orthographically similar when scripted.</p> <p>Strength and Dose: There is numerical overlap or similarity between the strength and dose (2 mL vs. 2 mg)</p>	<p>Orthographic difference: Lunesta contains an upstroke ‘t’ which is absent in Lumason, making the ending letter strings ‘on’ and ‘ta’ appear orthographically different when scripted.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere)</p> <p>Dosage form and Strength(s): Injectable suspension: 8 mL per mL</p> <p>Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion</p> <p>Causes (could be multiple)</p>	<p>Prevention of Failure Mode</p> <p>In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
13	<p>Lanoxin (Digoxin)</p> <p>Dosage form and Strength(s): Oral tablet: 0.125 mg, 0.25 mg Injection solution: 0.25 mg/mL and 0.1 mg/mL</p> <p>Usual dose: 0.125 to 0.5 mg by mouth once daily or 0.1 to 0.4 mg intravenously or intramuscularly once daily</p>	<p>Orthographic similarity: Both names begin with the letter ‘L’ and end with the letter ‘n.’ In addition, the letter strings ‘uma’ and ‘ano’ appear orthographically similar when scripted.</p> <p>Dosage form and route of administration: Both are available as a suspension/solution given intravenously</p>	<p>Orthographic difference: The letter strings ‘so’ and ‘xi’ appear orthographically different when scripted.</p> <p>Strength: Single vs. Multiple. Lumason is available as a single strength which can be omitted vs. Lanoxin is available in multiple strengths and need to be specified for a complete prescription. There is no numerical overlap or similarity between the strengths.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>
14	<p>Zonalon (Doxepin)</p> <p>Dosage form and Strength(s): External cream: 5%</p> <p>Usual dose: Apply 3 to 4 times daily</p>	<p>Orthographic similarity: Then beginning letter strings ‘Luma’ and ‘Zona’ appear orthographically similar when scripted. In addition, both names end with the letter string ‘on’</p> <p>Strength: Both are available as single strength and may be omitted.</p>	<p>Orthographic difference: Zonalon contains an upstroke ‘l’ in position 5 which is absent in Lumason, giving the names different shapes.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere)</p> <p>Dosage form and Strength(s): Injectable suspension: 8 mL per mL</p> <p>Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion</p> <p>Causes (could be multiple)</p>	<p>Prevention of Failure Mode</p> <p>In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
15	<p>Lumicain (Aluminum Chloride Hexahydrate)</p> <p>Dosage form and Strength(s): External solution: 250 mg</p> <p>Usual dose: Apply solution to area gauze, cotton swab or qtip.</p>	<p>Orthographic similarity: Both names begin with the letter string ‘Lum’ and end with the letter ‘n’</p> <p>Strength: Both are available as single strength and may be omitted.</p> <p>Dose: Both may be prescribed as “use as directed”</p>	<p>Orthographic difference: The ending letter strings ‘ason’ and ‘icain’ appear orthographically different when scripted.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>
16	<p>Luminal (Phenobarbital)</p> <p>Dosage form and Strength(s): Injection solution given intramuscularly: 130 mg/mL</p> <p>Usual dose: 30 to 120 mg daily in 2 to 3 divided doses or 100 to 200 mg 1 to 1.5 hours before procedure</p>	<p>Orthographic similarity: Both names begin with the letter string ‘Lum’ and the letter strings ‘so’ and ‘na’ appear orthographically similar when scripted.</p> <p>Dosage form and route of administration: Both are available as a suspension/solution given parenterally (i.e. intravenous vs. intramuscular)</p>	<p>Orthographic difference: Luminal ends with an upstroke ‘l’ which is absent in Lumason giving the names different shapes.</p> <p>Dose: There is no numerical similarity or overlap in dose.</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

	<p>Proposed name: <i>Lumason</i> (Sulfur hexafluoride lipid microsphere)</p> <p>Dosage form and Strength(s): Injectable suspension: 8 mL per mL</p> <p>Usual dose: 2 mL (16 microliter) administered as an intravenous bolus injection during echocardiography</p>	<p>Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion</p> <p>Causes (could be multiple)</p>	<p>Prevention of Failure Mode</p> <p>In the conditions outlined below, the following combination of factors, are expected to minimize the risk of confusion between these two names</p>
17	<p>Unasyn (Ampicillin and Sulbactam)</p> <p>Dosage form and Strength(s): Injection powder for reconstitution: 1.5 gm, 3 gm, 15 gm</p> <p>Usual dose: 1 to 2 gm ampicillin (1.5 to 3 gm Unasyn®) every 6 hours (maximum: 8 g ampicillin daily, 12 g Unasyn®)</p>	<p>Orthographic similarity: The beginning letter strings ‘Lum’ and ‘Un’ appear orthographically similar when scripted. In addition, both names contain the letter string ‘as’ in similar positions and end with the letter ‘n’</p> <p>Phonetic similarity: Both names contain 3 syllable and each syllable, ‘Lu’ / ‘U,’ ‘ma’ / ‘na’ and ‘son’ / ‘syn’ sound phonetically similar when spoken</p> <p>Dose: There is numerical overlap or similarity between the doses (2 mL vs. 2 gm)</p> <p>Dosage form and route of administration: Both are available as a suspension given intravenously</p>	<p>Orthographic difference: Unasyn contains a downstroke ‘y’ in position 5 which is absent in Lumason, giving the names different shapes.</p> <p>Frequency: Lumason is prescribed as now or daily vs. Unasyn is prescribed every 6 hours</p> <p>Setting of Use: Lumason is administered by a trained diagnostic medical sonographer.</p>

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
10/31/2013

YELENA L MASLOV
10/31/2013

**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: August 26, 2013

Reviewer: Kevin Wright, PharmD
Division of Medication Error Prevention and Analysis

Team Leader: Yelena Maslov, PharmD
Division of Medication Error Prevention and Analysis

Deputy Director: Kellie Taylor, PharmD, MPH
Division of Medication Error Prevention and Analysis

Drug Name and Strength: (b) (4) (Kit for Preparation of Sulfur Hexafluoride Lipid
Microspheres) for Injectable Suspension

Application Type/Number: NDA 203684

Applicant/Sponsor: Bracco Diagnostics, Inc.

OSE RCM #: 2013-1327

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

23 Pages have been Withheld in Full as b4 (CCI/TS) immediately following this page.

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

/s/

KEVIN WRIGHT
08/26/2013

YELENA L MASLOV
08/26/2013

KELLIE A TAYLOR
08/26/2013

**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 Reconsideration

Date: September 17, 2012

Reviewer: Kevin Wright, PharmD, Safety Evaluator
Division of Medication Error and Prevention Analysis

Acting Team Leader: Yelena Maslov, PharmD
Division of Medication Error and Prevention Analysis

Deputy Director: Kellie Taylor, PharmD, MPH
Division of Medication Error and Prevention Analysis

Division Director: Carol Holquist, RPh.
Division of Medication Error and Prevention Analysis

Drug Name and Strength: Sonovue (Kit for Preparation of Sulfur Hexafluoride Lipid
Microspheres) for Injectable Suspension
8 microliter per milliliter

Application Type/Number: NDA 203684

Applicant/Sponsor: Bracco Diagnostics, Inc.

OSE RCM #: 2012-1428

** This document contains proprietary data from the Institute for Safe Medication Practices (ISMP) which cannot be shared outside of the FDA. Users wanting this information must contact a designated individual in the Division of Medication Error Prevention who will gain approval from ISMP.**

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

4 Pages have been Withheld in Full as b4 (CCI/TS) immediately following this page.

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

/s/

KEVIN WRIGHT
09/17/2012

YELENA L MASLOV
09/17/2012

CAROL A HOLQUIST on behalf of KELLIE A TAYLOR
09/17/2012

CAROL A HOLQUIST
09/17/2012

**Department of Health and Human Services
Public Health Service
Food and Drug Administration
Center for Drug Evaluation and Research
Office of Surveillance and Epidemiology
Office of Medication Error Prevention and Risk Management**

Proprietary Name Review

Date: April 23, 2012

Reviewer: Kevin Wright, PharmD., Safety Evaluator
Division of Medication Error and Prevention Analysis

Acting Team Leader: Yelena Maslov, PharmD
Division of Medication Error and Prevention Analysis

Deputy Director: Kellie Taylor, PharmD, MPH
Division of Medication Error and Prevention Analysis

Division Director: Carol Holquist, RPh.
Division of Medication Error and Prevention Analysis

Drug Name and Strength: Sonovue (Kit for Preparation of Sulfur Hexafluoride Lipid
Microspheres) for Injectable Suspension,
8 microliter per milliliter

Application Type/Number: NDA 203684

Applicant/Sponsor: Bracco Diagnostics, Inc.

OSE RCM #: 2012-211

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

39 Pages have been Withheld in Full as b4 (CCI/TS) immediately following this page.

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

/s/

KEVIN WRIGHT
04/23/2012

YELENA L MASLOV
04/23/2012

KELLIE A TAYLOR
04/24/2012

CAROL A HOLQUIST
04/24/2012