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RESEARCH**

APPLICATION NUMBER:

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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 10, 2012

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Drug Name and Strength: Sirturo (Bedaquiline) Tablets, 100 mg

Application Type/Number: NDA 204384

Applicant/Sponsor: Janssen

OSE RCM #: 2012-1624

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

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1 INTRODUCTION

This review evaluates the proposed proprietary name, Sirturo, 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

Sirturo is the first name submitted for this NDA. Under the IND (069600) the names (b) (4) and (b) (4) (OSE reviews 2012-57 and 2011-1170) were found unacceptable.

1.2 PRODUCT INFORMATION

The following product information is provided in the July 20, 2012 proprietary name submission.

- Active Ingredient: Bedaquiline
- Indication of Use: Multi-Drug Resistant Pulmonary Tuberculosis
- Route of Administration: Oral
- Dosage Form: Tablet
- Strength: 100 mg
- Dose and Frequency: 400 mg daily for 14 days, then 200 mg three time per week for 22 weeks
- How Supplied: Bottle containing 188 tablets
- Storage: Room temperature in original container
- Container and Closure Systems: HDPE bottle with child-resistant polypropylene closure with induction seal liner

2. RESULTS

The following sections provide the 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 Anti-Infective Products 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 September 28, 2012 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 did not indicate in their submission the intended meaning or derivation of the proprietary name. 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

Eighty-four practitioners participated in DMEPA's prescription studies. The interpretations did not overlap with or appear or sound similar to any currently marketed products.

In the inpatient studies only one participant interpreted the name correctly and more than half of the participants (14 of 25) made one letter errors or misinterpreted a two letter string for one letter, with 10 of those 14 confusing the letter string 'ir' for the letter 'u' and 4 of 14 misinterpreting the letter 'i' for the letter 'e', which was expected from the provided sample.

In the voice studies, no participants interpreted the name correctly, however most of the errors occurred in misinterpreting vowels 'i' and 'u' for other vowels, or the letter 's' for the letters 'c' or 'z', which was expected based on the sample voice order.

For the outpatient studies, no participants interpreted the name correctly, however 22 of 32 participants misinterpreted only one letter, confusing the letter 'i' for the letter 'o', which was expected based on the provided sample. See Appendix C for the complete listing of interpretations from the verbal and written prescription studies.

2.2.4 Comments from Other Review Disciplines at Initial Phase of Name Review

In response to the OSE August 3, 2012 e-mail, the Division of Anti-Infective Products (DAIP) did not forward any comments or concerns relating to the proposed name at the initial phase of the proprietary name 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, Sirturo. Table 1 lists the names with orthographic, phonetic, or spelling similarity to the proposed proprietary name, Sirturo identified by the primary reviewer, and the Expert Panel Discussion (EPD).

Table 1: Collective List of Potentially Similar Names (DMEPA, EPD, Other and Disciplines)					
Look Similar					
<i>Name</i>	<i>Source</i>	<i>Name</i>	<i>Source</i>	<i>Name</i>	<i>Source</i>
Sirolimus	EPD	Sarafem	EPD	Gestiva ***2010- 2117	EPD
Surfaxin	EPD	Sertraline	EPD	(b) (4) *** 2008-1463	EPD
Sanctura	EPD	Serostim	EPD	Silenor	EPD
Cardura	EPD	Sitrex	EPD	Sorbilis	EPD
Santura	EPD	Sancuso	EPD	Lindane	EPD
Servira	EPD	Gentasol	EPD	Lintox	EPD
Sustiva	EPD	Sectral	EPD	Sorbitol	EPD
Lutera	EPD	Gesticare DHA	EPD	(b) (4) ***2010- 2316	EPD
Sutent	EPD	Restora	EPD	Fentora	EPD
Sutan	EPD	Victoza	EPD	Vidaza	EPD
Sound Similar					
Seroquel	EPD	Centrum	EPD	Certiva	EPD

Our analysis of the 33 names contained in Table 1 considered the information obtained in the previous sections along with their product characteristics. We determined 33 names will not pose a risk for confusion as described in Appendices D through E.

2.2.6 Communication of DMEPA's Final Decision to Other Disciplines Following the Promotional and Safety Review

DMEPA communicated our findings to the Division of Anti-Infective Products via e-mail on October 2, 2012. At that time we also requested additional information or concerns that could inform our review. Per e-mail correspondence from the Division of Anti-Infective Products on October 10, 2012, they stated no additional concerns with the proposed proprietary name, Sirturo.

3 CONCLUSIONS

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

If you have questions or need clarifications, please contact Karen Townsend, OSE project manager, at 301-796-5413.

3.1 COMMENTS TO THE APPLICANT

We have completed our review of the proposed proprietary name, Sirturo, and have concluded that this name is acceptable. However, if any of the proposed product characteristics as stated in your July 20, 2012 submission are altered, the name must be resubmitted for review.

Additionally, the proposed proprietary name must be re-reviewed 90 days prior to approval of the NDA. 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.

20. 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/aboutMedErrors.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

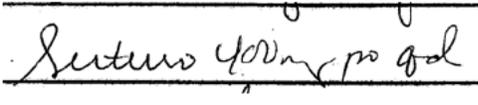
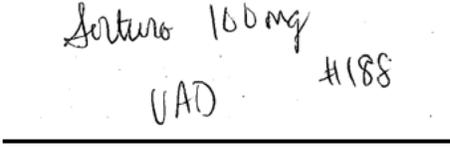
past but at great financial cost to the Sponsor and at the expense of the public welfare, not to mention the Agency's credibility as the authority responsible for approving the error-prone proprietary name. Moreover, even after Sponsors' have changed a product's proprietary name in the post-approval 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 with Possible Orthographic or Phonetic Misinterpretation

Letters in Name, Sirturo	Scripted May Appear as	Spoken May Be Interpreted as
Upper case 'S'	'G', '5'	'X'
Lower case 's'	'G', '5', 'g', 'n'	'X'
Lower case 'i'	'e'	Any vowel
Lower case 'r'	's', 'n', 'e', 'v'	---
Lower case 't'	'r', 'f', 'x', 'b',	'D'
Lower case 'u'	'n', 'y', 'v', 'w', Any vowel	---
Lower case 'r'	's', 'n', 'e', 'v'	---
Lower case 'o'	'a', 'c', 'e', 'u'	Oh

Appendix C: Prescription Simulation Samples and Results

Figure 1. Sirturo Study (Conducted on August 6, 2012)

Handwritten Medication Order	Verbal Prescription
<p><u>Medication Order:</u></p> 	<p>Sirturo 100 mg Take as directed Dispense # 188</p>
<p><u>Outpatient Prescription:</u></p> 	

FDA Prescription Simulation Responses (Aggregate 1 Rx Studies Report)

175 People Received Study

84 People Responded

Study Name: Sirturo

Total	25	27	32	84
INTERPRETATION	INPATIENT	VOICE	OUTPATIENT	TOTAL
?	1	1	0	2
CERTARO	0	4	0	4
CERTORO	0	1	0	1
CERTURO	0	1	0	1
SERTARO	0	4	0	4
SERTENO 400 MG PO QD	1	0	0	1
SERTERRO	2	0	0	2
SERTINO	1	0	0	1
SERTIVO	1	0	0	1
SERTORO	0	4	0	4
SERTUIR	1	0	0	1
SERTUIS	1	0	0	1
SERTUM	1	0	0	1
SERTURO	4	0	6	10
SERTURS	1	0	0	1
SIRTARO	0	1	0	1
SIRTURO	1	0	0	1

SITORO	0	1	0	1
SOLTIVIE	0	0	1	1
SOLTURO	0	0	2	2
SORTARO	0	1	0	1
SORTORO	0	1	0	1
SORTURE	0	0	1	1
SORTURO	0	0	22	22
SURTARO	0	1	0	1
SUTURO	10	0	0	10
THUTERO	0	1	0	1
ZARTORO	0	1	0	1
ZARTURO	0	1	0	1
ZERTORO	0	2	0	2
ZIRTORO	0	1	0	1
ZITHARO	0	1	0	1

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

No.	Proprietary Name	Active Ingredient	Similarity to Sirturo	Failure preventions
1	Sirolimus	Rapamycin	Look alike	The pair has sufficient orthographic differences.
2	Santura	Unknown	Look alike	Name identified in POCA, unable to find product characteristics in commonly used drug databases.
3	Sutent	Sunitinib	Look alike	The pair has sufficient orthographic differences.

No.	Proprietary Name	Active Ingredient	Similarity to Sirturo	Failure preventions
4	Sutan	Dexchlorpheniramine tannate/ Pseudoephedrine tannate	Look alike	The pairs have sufficient orthographic differences.
5	Sorbitol	Sorbitol	Look alike	The pair has sufficient orthographic differences.
6	Zoloft	Sertraline	Look alike to active ingredient	The pair has sufficient orthographic differences.
7	Serostim	Somatropin Recombinant	Look alike	The pair has sufficient orthographic differences.
8	Gentasol	Gentamicin	Look alike	The pair has sufficient orthographic differences.
9	Sectral	Acebutolol	Look alike	The pair has sufficient orthographic differences.
10	Gesticare DHA	Prenatal Multivitamins and Minerals	Look alike	The pair has sufficient orthographic differences.
11	Victoza	Liraglutide	Look alike	The pair has sufficient orthographic differences.
12	Vidaza	Azacitidine	Look alike	The pair has sufficient orthographic differences.
13	(b) (4)			
14	Gestiva***	Hydroxyprogesterone	Look alike	The proposed name has been withdrawn (OSE #2010-1818)
15	(b) (4)			
16	Sorbilis	Guarana	Look alike	The pair has sufficient orthographic differences (natural product).

No.	Proprietary Name	Active Ingredient	Similarity to Sirturo	Failure preventions
17	Lintox	Unknown	Look alike	Name indentified in Micromedex, unable to duplicate the results of the search. Unable to find product characteristics in commonly used drug databases.
18	Seroquel	Quetiapine	Sound alike	The pair has sufficient phonetic differences.
19	Centrum	Mutivitamin	Sound alike	The pair has sufficient phonetic differences.
20	Certiva	Diphtheria, Tetanus, and Pertussis Vaccine	Sound alike	The pair has sufficient phonetic differences. International Drug name.

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.

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
1.	<p>Surfaxin (Lucinactant)</p> <p><u>Strength and Dosage Form:</u> 8.5 mL Intratracheal Suspension</p> <p><u>Dose, Route and Frequency:</u> 5.8 mL/kg of birth weight, via intratracheal route. Up to 4 doses can be administered in the first 48 hours of life</p>	<p>Orthographic similarity</p> <p>Both names begin with the same letter ‘S’, and have an upstroke in the same position. When scripted, the prefix sir- looks similar to the prefix sur-.</p> <p>Overlapping product characteristics</p> <p>Both are single strength products; thus strength may be omitted from a prescription.</p>	<p>Orthographic differences</p> <p>When scripted the suffix -axin in Surfaxin looks sufficiently different from the suffix –uro in Sirturo.</p> <p>Key differences in product characteristics</p> <p><u>Dose:</u> There is no overlap in dose</p> <p><u>Frequency:</u> Sirturo is administered on a continuous basis for 24 weeks vs. Surfaxin which is administered once and may be repeated.</p>

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
2.	Sanctura (Trospium) <u>Strength and Dosage Form:</u> 20 mg tablet, 60 mg extended-release capsule <u>Dose, Route and Frequency:</u> 20 mg tablet orally twice or once daily; 60 mg capsule orally daily	Orthographic similarity Both names begin with the same letter ‘S’, and have the cross stroke ‘t’ in the similar positions. When scripted, the prefix sir- looks similar to the prefix san- and the suffix -uro looks similar to the suffix -ura. Overlapping product characteristics Both have the same frequency (daily), and same route of administration (oral).	Orthographic differences The letter strings between the first letter of each name and the upstroke, –anc- in Sanctura and –ir- in Sirturo, appear sufficiently different when scripted. Key differences in product characteristics <u>Strength:</u> In addition to Sanctura the extended release 60 mg tablet is also available as Sanctura XR, therefore an order would either require the strength or the modifier to be filled, which would be a differentiating factor between the names. There is no overlap in strength.

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
3.	<p>Cardura (Doxazosin)</p> <p><u>Strength and Dosage Form:</u> 1 mg, 2 mg, 4 mg and 8 mg tablets</p> <p><u>Dose, Route and Frequency:</u> 1 mg to 16 mg orally once daily</p>	<p>Orthographic similarity</p> <p>Both names have same number of letters (n=7), and have an upstroke in the same position. When scripted, the suffix -uro looks similar to the suffix -ura.</p> <p>Overlapping product characteristics</p> <p>Same route of administration, dosage form and frequency (daily). Overlap in dose if scripted as 2 tablets for each drug on an outpatient prescription.</p>	<p>Orthographic differences</p> <p>When scripted the prefix Sir- in Sirturo looks sufficiently different from the prefix Car- in Cardura.</p> <p>Key differences in product characteristics</p> <p><u>Strength:</u> Cardura has multiple strengths which must be specified on a prescription as compared to Sirturo which is single strength. There is no overlap in strengths.</p>

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
4.	<p>Sustiva (Efavirenz)</p> <p><u>Strength and Dosage Form:</u> 600 mg tablets, 200 mg and 50 mg capsules</p> <p><u>Dose, Route and Frequency:</u> Adults: 300 mg or 600 mg orally once daily</p> <p>Children: 200 mg to 600 mg orally daily (in 50 mg intervals according to weight)</p>	<p>Orthographic similarity</p> <p>Both names begin with the same letter ‘S’, have an cross stroke ‘t’ in the same position and have the same number of letters (n=7). When scripted the suffix -uro looks similar to the suffix -iva.</p> <p>Overlapping product characteristics</p> <p>Same route of administration dosage form (tablet), dose and frequency may overlap (400 mg daily – children)</p>	<p>Orthographic differences</p> <p>When scripted the letter strings between the upstrokes of each name –us for Sustiva and –ir in Sirturo look sufficiently different.</p>

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
5.	Lutera (Ethinyl Estradiol/ Levonorgestrel) <u>Strength and Dosage Form:</u> 0.02 mg/0.1 mg tablet <u>Dose, Route and Frequency:</u> 1 tablet orally daily	Orthographic similarity Both names have the cross stroke ‘t’ in similar positions. When scripted, the suffix -uro looks similar to the suffix -era. Overlapping product characteristics Both products are single strength, same route of administration and frequency (daily)	Key differences in product characteristics <u>Dose:</u> Lutera is administered as a single tablet daily as compared to Sirturo which may be administered as 4 tablets (or 400 mg) or 2 tablets (or 200 mg) for each dose.

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
6.	Fentora (Fentanyl Citrate) <u>Strength and Dosage Form:</u> 100 mcg, 200 mcg, 400 mcg, 600 mcg, and 800 mcg buccal tablets <u>Dose, Route and Frequency:</u> 100 mcg to 800 mcg for breakthrough pain every 4 hours as needed.	Orthographic similarity Both names have the cross stroke 't' in the same position and both have the same number of letters (n=7). When scripted, the suffix -uro looks similar to the suffix -ora. Overlapping product characteristics Similar strengths (100 mcg vs. 100 mg), similar doses (200 mcg and 400 mcg vs. 200 mg and 400 mg).	Key differences in product characteristics <u>Frequency:</u> Sirturo is administered on a continuous schedule (for up to 24 weeks) as compared to Fentora which is administered on as needed basis every 4 hours for breakthrough pain.

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
7.	<p>Sarafem (Fluoxetine)</p> <p><u>Strength and Dosage Form:</u> 10 mg, 20 mg, 40 mg and 60 mg capsules; 10 mg, 15 mg, and 20 mg tablets</p> <p><u>Dose, Route and Frequency:</u> 10 mg to 80 mg orally daily</p>	<p>Orthographic similarity</p> <p>Both names begin with the same letter ‘S’, and have an upstroke letter in similar positions. When scripted, the prefix sir- looks similar to the prefix sar-.</p> <p>Overlapping product characteristics</p> <p>Same route and frequency of administration (daily), similarity in strength (10 mg vs. 100 mg) and similarity in doses (40 mg vs. 400 mg and 20 mg vs. 200 mg)</p>	<p>Orthographic differences</p> <p>The letter strings between the first letter of each name and the upstroke, –ara- in Sarafem and –ir- in Sirturo, appear sufficiently different when scripted.</p>

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
8.	Sitrex (Guaifenesin/ Phenylephrine) <u>Strength and Dosage Form:</u> 1200 mg/30 mg and 1200 mg/20 mg extended-release tablets <u>Dose, Route and Frequency:</u> 1 tablet every 12 hours as needed	Orthographic similarity Both names begin with the same letter ‘S’, and have the cross stroke ‘t’ in similar positions. Overlapping product characteristics Same route of administration and dosage form	Orthographic differences When scripted the suffix – rex in Sitrex and the suffix -uro in Sirturo appear sufficiently different. Key differences in product characteristics <u>Strength and Dose:</u> Sitrex is available in multiple strengths which must be present on a prescription as compared to Sirturo which is single strength. There are no overlaps in strength or dose. <u>Frequency:</u> Sirturo is administered on a continuous schedule (for up to 24 weeks) as compared to Sitrex which is administered on as needed basis every 12 hours for a limited period of time.

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
9.	Restora (Lactobacillus Casei KE-99 enhanced with Omega 3) <u>Strength and Dosage Form:</u> 4 billion CFUs/ 400 mg <u>Dose, Route and Frequency:</u> 1 capsule daily orally	Orthographic similarity Both names have the same number of letters and the cross stroke ‘t’ in the same position. When scripted the suffix -uro looks similar to the suffix -ora. Overlapping product characteristics Same route of administration and frequency (daily). Both products are single strength.	Key differences in product characteristics <u>Dose:</u> Restora is administered as a single capsule daily as compared to Sirturo which may be administered as 4 tablets (or 400 mg) or 2 tablets (or 200 mg) for each dose.

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
10.	Silenor (Doxepin) <u>Strength and Dosage Form:</u> 3 mg and 6 mg tablets <u>Dose, Route and Frequency:</u> 3 mg or 6 mg orally once daily	Orthographic similarity Both names begin with the same letter ‘S’, have the same number of letters (n=7), and have an upstroke in similar positions. Overlapping product characteristics Same route of administration, frequency of administration and dosage form	Orthographic differences Sirturo have a cross stroke ‘t’ as compared to no cross stroke in Silenor. Key differences in product characteristics <u>Strength and Dose:</u> Silenor is available in multiple strengths which must be present on a prescription as compared to Sirturo which is single strength. There are no overlaps in strength or dose.

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
11.	<p>Lindane established name for (Gamene, Kwell and Scabene)</p> <p><u>Strength and Dosage Form:</u> 1% topical lotion and shampoo</p> <p><u>Dose, Route and Frequency:</u> Thin layer of lotion over skin from neck down once. Sufficient amount of shampoo directly to dry hair once rinse after 4 minutes.</p>	<p>Orthographic similarity</p> <p>Both names have the same number of letters (n=7) and an upstroke in the same position.</p> <p>Overlapping product characteristics</p> <p>Both products are single strength</p> <p>Both may be ordered “as directed”</p>	<p>Orthographic differences</p> <p>Sirturo has a cross stroke ‘t’ as compared to no cross stoke in Lindane.</p> <p>Key differences in product characteristics</p> <p><u>Dose and Frequency:</u> Lindane is administered as a thin layer of lotion or sufficient amount of shampoo once as compared to Sirturo which may be administered as 4 tablets (or 400 mg) or 2 tablets (or 200 mg) for each dose given on a continuous basis for up to 24 weeks.</p>

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
12.	Servira (Atropine/ Hyoscyamine/ Phenobarbital/ Scopolamine) <u>Strength and Dosage Form:</u> 0.0582mg/ 0.3111mg/ 48.6mg/0.0195mg Extended-release tablet <u>Dose, Route and Frequency:</u> 1 tablet orally every 8 hours or 12 hours	Orthographic similarity Both names start with the same letter ‘S’ and have the same number of letters (n=7). When scripted the prefix Ser- look similar to the prefix Sir- and the suffix -ira looks similar to the suffix -uro. Overlapping product Both products are single strength, and have the same route of administration.	Orthographic differences Sirturo have a upstroke ‘t’ as compared to no upstroke in Servira giving the names sufficiently different shapes. Key differences in product characteristics <u>Dose:</u> Servira dose is 1 tablet as compared to Sirturo which may be administered as 4 tablets (or 400 mg) or 2 tablets (or 200 mg). There is no overlap in dose.

No.	Proposed name: Sirturo Dosage Form: Oral Tablets Strength: 100 mg Usual Dose and Frequency: 400 mg daily for 14 days (maximum daily dose 400 mg) then 200 mg three times per week for 22 weeks	Failure Mode: Incorrect Product Ordered/ Selected/Dispensed or Administered because of Name confusion Causes (could be multiple)	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
13.	<p>Sancuso (Granisetron)</p> <p><u>Strength and Dosage Form:</u> 3.1 mg /24 hours transdermal patch</p> <p><u>Dose, Route and Frequency:</u> Apply 1 patch to upper outer arm 24 hours to 48 hours before chemotherapy. The patch may be worn up to 7 days and delivers up to 34.3 mg of drug.</p>	<p>Orthographic similarity</p> <p>Both names start with the same letter ‘S’ and have the same number of letters (n=7). When scripted the prefix San- look similar to the prefix Sir- and the suffix -uso looks similar to the suffix -uro.</p> <p>Overlapping product</p> <p>Both products are single strength.</p>	<p>Orthographic differences</p> <p>Sirturo have a upstroke ‘t’ as compared to no upstroke in Sancuso giving the names sufficiently different shapes.</p> <p>Key differences in product characteristics</p> <p><u>Dose and Frequency:</u> Sancuso is administered as a single patch once before chemotherapy, as compared to Sirturo which may be administered as 4 tablets (or 400 mg) or 2 tablets (or 200 mg) for each dose given on a continuous basis for up to 24 weeks.</p>

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/s/

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