CENTER FOR DRUG EVALUATION AND RESEARCH

APPLICATION NUMBER:

022383Orig1s000

PROPRIETARY NAME REVIEW(S)

Department of Health and Human Services

Public Health Service

Food and Drug Administration

Center for Drug Evaluation and Research

Office of Surveillance and Epidemiology

Date:	April 14, 2011
Application Type/Number:	NDA 022383
Through:	Melina Griffis, R.Ph., Team Leader Carol Holquist, R.Ph., Director Division of Medication Error Prevention and Analysis (DMEPA)
From:	Anne Crandall Tobenkin, PharmD, Safety Evaluator Division of Medication Error Prevention and Analysis
Subject:	Proprietary Name Review
Drug Name(s) and Strength:	Arcapta Neohaler (Indacaterol) Inhalation Powder 75 mcg per capsule
Applicant/Sponsor:	Novartis Pharmaceuticals
OSE RCM #:	2011- 1212

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

1 INTRODUCTION

This re-assessment of the proprietary name, Arcapta Neohaler, is written in response to the anticipated approval and product characteristic change from two proposed strengths to a single strength product of NDA 022383. This change of strength concurs with the recommendations of the Advisory Committee meeting which was held on March 8, 2011.

2 METHODS AND RESULTS

For the proposed proprietary name, DMEPA staff search a standard set of databases and information sources (see section 4) to identify names with orthographic and/or phonetic similarity to the proposed name that have been approved since the previous OSE proprietary name review. We used the same search criteria previously used in OSE Reviews #2010-2483. The search of the databases in Section 4 yielded five additional names; Avandia, Avastin, Isoptin, (b) (4) and (b) (4) One of the five names was eliminated for reasons described in Appendix A.

Because the proposed strengths for this product have been revised from 75 mcg to 150 mcg to only marketing a single strength, 75 mcg, the names that underwent FMEA in the previous review were re-evaluated to determine if any of the names can cause confusion and therefore result in a medication error. Our reassessment based on this change did not alter our previous analysis. Additionally, Failure Mode and Effects Analysis (FMEA) was applied to determine if the proposed proprietary name could potentially be confused with the four new names and lead to medication errors. This analysis determined that the name similarity between Arcapta Neohaler and five identified names was unlikely to result in medication error for the reasons presented in Appendix B.

DMEPA also searches the United States Adopted Names (USAN) stem list to determine if the name contains any USAN stems as of the last USAN updates. DMEPA staff did not identify any United States Adopted Names (USAN) stems in the proposed proprietary name, Arcapta Neohaler, as of March 18, 2011.

3 CONCLUSIONS AND RECOMMENDATIONS

The Proprietary Name Risk Assessment findings indicate that the proposed name, Arcapta Neohaler, is not vulnerable to name confusion that could lead to medication errors nor is the name considered promotional. Thus, the Division of Medication Error Prevention and Analysis has no objection to the proprietary name, Arcapta Neohaler, for this product at this time.

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

4 REFERENCES

1. Reviews

A) OSE review # 2010-2483 dated February 3, 2011; Proprietary Name Review of Arcapta Neohaler; Crandall, Anne.

2. Drugs@FDA (http://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm)

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

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

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

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

USAN Stems List contains all the recognized USAN stems.

5. CDER Proposed Name List

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

APPENDICES

Appendix A: Names of products not used in usual clinical practice for the reasons described.

Proprietary Name	Similarity to Arcapta Neohaler	Reason/Comments
		(b) (4)

Appendix B: Risk of name confusion minimized by preventions listed.

Product name with potential for confusion	Similarity to proposed proprietary name	Strength and dosage form	Usual dose (if applicable)	Failure Mode of name confusion prevented by the combination of stated product characteristics as well as orthographic and/or phonetic differences as described.
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
Avandia (Rosiglitazone maleate)	Orthographic	2 mg, 4 mg, 8 mg oral tablets	Starting dose: 2 mg by mouth twice daily or 4 mg by mouth once daily May increase up to 8 mg per day if warranted	*Orthographic differences* - Arcapta has a downstroke vs. Avandia does not have a downstroke - Arcapta has a cross-stroke vs. Avandia does not have a cross-stroke *Products characteristics* - Strength (75 mcg, single strength, not required on prescription vs. 2 mg, 4 mg, 8 mg, multiple strengths, must be designated on prescription or order)
Avastin (Bevacizumab)	Orthographic	100 mg/4 mL, 400 mg/16 mL intravenous solution	5 mg/kg to 15 mg/kg intravenous infusion every two to three weeks	*Orthographic differences* - Arcapta has a downstroke vs. Avastin does not have a downstroke *Products characteristics* Dose (one capsules vs. weight based dose, 5 mg/kg to 15 mg/kg) Route of administration (oral inhalation vs. intravenous) Frequency of administration (once daily vs. every two to three weeks)

Isoptin (Verapamil hydrochloride)	Orthographic	120 mg, 180 mg, 240 mg oral tablets	120 mg by mouth once daily to 240 mg by mouth twice daily	*Products characteristics* Strength (75 mcg, single strength, not required on prescription vs. 120 mg, 180 mg, 240 mg, multiple strengths, must be designated on prescription or order)
[redacted]				(b) (4)

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

/s/

ANNE CRANDALL
04/14/2011

MELINA N GRIFFIS
04/14/2011

CAROL A HOLQUIST
04/14/2011

Department of Health and Human Services

Food and Drug Administration

Center for Drug Evaluation and Research

Office of Surveillance and Epidemiology

Date:	February 3, 2011
Application	NDA 022383
Through:	Melina Griffis RPh, Team Leader Carol Holquist, R.Ph, Director Division of Medication Error Prevention and Analysis (DMEPA)
From:	Anne Crandall, PharmD, Safety Evaluator Division of Medication Error Prevention and Analysis (DMEPA)
Subject:	Proprietary Name Review
Drug Name(s):	Arcapta Neohaler (Indacaterol) Inhalation Powder 75 mcg, 150 mcg
Applicant/sponsor:	Novartis Pharmaceuticals
OSE RCM #:	RCM 2010-2483

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

CONTENTS

EXECUTIVE SUMMARY

This review summarizes the proprietary name evaluation of Arcapta Neohaler for Indacaterol Maleate Inhalation Powder. Our evaluation did not identify concerns that would render the name unacceptable based on the product characteristics and safety profile known at the time of this review. Thus, DMEPA finds the proposed proprietary name, Arcapta Neohaler, acceptable for this product. The proposed proprietary name, Arcapta Neohaler, will be re-reviewed 90 days prior to the approval of the NDA. If we find the name unacceptable following the re-review, we will notify you.

Additionally, if any of the proposed product characteristics as stated in this review are altered, DMEPA rescinds this finding and the name must be resubmitted for review. The conclusions upon re-review are subject to change.

1 BACKGROUND

1.1 INTRODUCTION

This review is in response to a request from Novartis received November 19, 2010 for an assessment of the proposed proprietary name, Arcapta Neohaler, regarding potential name confusion with other proprietary or established drug names in the usual practice setting. DMEPA previously reviewed the proprietary name for this product, Arcapta Neohaler, and found the name acceptable in July 9, 2009, however the Applicant has proposed a new strength, 75 mcg and does not plan to market the 300 mcg strength which was included in the product characteristics of the previous review. The Applicant has submitted new container labels, carton and package insert labeling for this product which are currently undergoing analysis as a separate review, OSE review #2010-2234.

1.2 REGULATORY HISTORY

Arcapta Neohaler is a pending NDA application with an anticipated action date of April 1, 2011. Arcapta Neohaler received a Complete Response on October 16, 2009 due to multiple clinical issues, including adverse events with the 300 mcg dose and questionable efficacy difference between the 75 mcg and 150 mcg dose. The Division of Pulmonary, Allergy and Rheumatology Products requested further study of doses and frequency of administration upon resubmission.

1.3 PRODUCT INFORMATION

Arcapta Neohaler contains the active ingredient Indacaterol and the device/inhaler which allows for the oral inhalation of Indacaterol maleate. Arcapta Neohaler is indicated for the long term maintenance treatment of chronic obstructive pulmonary disease. (b) (4)

2 METHODS AND MATERIALS

Appendix A describes the general methods and materials used by the Division of Medication Error Prevention and Analysis (DMEPA) when conducting a proprietary name risk assessment for all proprietary names. Sections 2.1, 2.2, and 2.3 identify specific information associated with the methodology for the proposed proprietary name, Arcapta Neohaler.

2.1 SEARCH CRITERIA

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

To identify drug names that may look similar to 'Arcapta Neohaler', the DMEPA staff also considers the orthographic appearance of the name on lined and unlined orders. Specific attributes taken into consideration include the length of the name (seven letters, 'Arcapta' without 'Neohaler', or 15 letters), upstrokes (two, capital letter 'A' and 'N' and lower case letters 't', 'h' and 'l'), downstrokes (one, lower case 'p'), dotted letters (none) and cross-strokes (one, 't') . DMEPA also considers how a name is likely to be scripted in the usual practice setting, with the first component of the name scripted as 'Arcapta', scripted as one word, 'Arcaptaneohaler' as well as the possibility of the Neohaler being dropped so that only 'Arcapta' appears on the prescription. Additionally, several letters in Arcapta Neohaler may be vulnerable to ambiguity when scripted (see Appendix B). As a result, the DMEPA staff also considers these alternate appearances when identifying drug names that may look similar to Arcapta Neohaler.

When searching to identify potential names that may sound similar to Arcapta Neohaler, the DMEPA staff searches for names with similar number of syllables (three), stresses (AR-cap-ta, ar-CAP-ta, or ar-cap-TA), and placement of vowel and consonant sounds. Pronunciation of Arcapta Neohaler was not provided by the Applicant. However, DMEPA staff take into consideration that pronunciation of parts of the name can vary (See Appendix B). Furthermore, names are often mispronounced and/or spoken with regional accents and dialects, so other potential pronunciations of the name are considered.

2.2 FDA PRESCRIPTION ANALYSIS STUDIES

In order to evaluate the potential for misinterpretation of the proposed proprietary name in handwriting and verbal communication of the name, the following inpatient medication order, outpatient and verbal prescription was communicated during the FDA prescription studies (See Appendix for samples and results).

3 RESULTS

3.1 DATABASE AND INFORMATION SOURCES

The DMEPA safety evaluator searches yielded a total of 22 names as having some similarity to the name Arcapta Neohaler. Sixteen names (Arcalyst, Aricept, Ancobon, Aranesp, Acanya, Aralast, Arcoxia, Artane, Neobenz Micro, Herceptin, Anaprox, Avapro, Alcortin, ARC-API, and Arixtra) were designated as orthographically similar to Arcapta Neohaler. Two names; Parcopa and Arava were designated as phonetically similar to Arcapta Neohaler and the remaining four names ((b) (4)*, Arcapta Neohaler, (b) (4), and Neoral) were designated as both phonetically and orthographically similar.

---

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

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

A search of the United States Adopted Name stem list on December 14, 2010 did not identify any United States Adopted Names (USAN) stem within the proposed name, Arcapta Neohaler.

3.2 EXPERT PANEL DISCUSSION

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

3.3 FDA PRESCRIPTION ANALYSIS STUDIES

A total of 23 practitioners responded. Thirteen of the respondents interpreted the name correctly as 'Arcapta Neohaler'. Common misinterpretations included; 'e' for 't', 'l' for 't', 'c' for 'a', the final 'a' in Arcapta as 'o' and 'In' for 'Neo'. One respondent misinterpreted the name as one word 'Arcaptoihnaler'. See Appendix C for the complete listing of interpretations from the verbal and written prescription studies. None of the respondents misinterpreted the proposed proprietary name, Arcapta Neohaler, for a proprietary name that is a currently marketed product.

3.4 COMMENTS FROM THE DIVISION OF PULMONARY, ALLERGY AND RHEUMATOLOGY PRODUCTS (DPARP)

In response to the OSE e-mail on December 15, 2010, the Division of Pulmonary, Allergy, and Rheumatology Products did not forward any comments or concerns on the proposed proprietary name at the initial phase of the review.

DMEPA notified DPARP via e-mail on January 10, 2011 that we have no objections to the proposed proprietary name Arcapta Neohaler. Per e-mail correspondence from DPARP on January 31, 2011, they indicated they concur with our assessment of the proposed proprietary name, Arcapta Neohaler.

3.6 SAFETY EVALUATOR RISK ASSESSMENT

Independent searches by the primary Safety Evaluator identified 10 additional names that have some similarity to Arcapta Neohaler. Eight names ([(b) (4)] Atripla, Cosopt, [(b) (4)] Astepro, and Oleptro) were designated as orthographically similar to Arcapta Neohaler. The remaining two names (Arcapta and Neohaler) were designated as orthographically and phonetically similar to Arcapta Neohaler.

Additionally, no other aspects of the name were identified as additional sources of error. Thus, a total of 32 were identified as names with some similarity to Arcapta Neohaler.

4 DISCUSSION

Arcapta Neohaler is the proposed proprietary name for Indacaterol maleate and the inhaler that accompanies the product. This proposed name was evaluated from a safety and promotional perspective based on the product characteristics provided by the Applicant. We sought input from pertinent disciplines involved with the review of this application and considered it accordingly. Our review considered comments from the Division and DDMAC.

4.1 PROMOTIONAL ASSESSMENT

DDMAC did not have promotional concerns with the proposed name, Arcapta Neohaler. DPARP and DMEPA concurred with DDMAC's assessment.

4.2 SAFETY ASSESSMENT

We identified 32 names for their similarity to Arcapta Neohaler. No other aspects of the name were identified as a potential source for error. However, the product design does pose a risk for medication errors. The findings of our analysis are discussed below.

4.2.1 Look-Alike and Sound-like Analysis

DMEPA evaluated 32 names for their potential similarity to the proposed proprietary name Arcapta Neohaler. We determined nine (Arcapta Neohaler, Arcapta, Neohaler, (b) (4) (b) (4), ARC-API) of the 32 names would not pose a risk for confusion for the reasons noted in Appendix D.

Failure Mode and Effects Analysis (FMEA) was then applied to determine if the proposed name, Arcapta Neohaler, could potentially be confused with the remaining 23 names and lead to medication errors. This analysis determined that the name similarity between Arcapta Neohaler was unlikely to result in medication errors with any of the 23 products for the reasons presented in Appendix E.

4.3 PRODUCT DESIGN CONCERNS

The proposed product design will contribute to errors in administration. The following sections discuss our concerns.

4.3.1 Misadministration of Capsules for Inhalation

The capsule configuration as currently proposed will lead to wrong route of administration errors. The use of a capsule as an inhalation product is inherently error prone because users intuitively associate capsules with oral ingestion rather than inhalational administration. The FDA has received numerous reports of patients swallowing Spiriva® and Foradil® capsules instead of inhaling them. We recognize that Novartis is in the NDA stage of this product, however we would still like to actively encourage Novartis to consider developing a device where the drug product is integrated into the device rather then separate capsules that must be loaded into the device prior to inhalation.

If the development of a drug integrated device is not feasible, DMEPA recommends that Novartis emphasize the proper method of ingestion, inhalation, throughout the provider education and encourage providers to write inhale on the prescription as well as discuss with the patient the proper route of administration.

DMEPA intends to submit an article to the Institute of Safe Medication Practices (ISMP), similar to the article previously written by DMEPA, entitled, "Misadministration of capsules for inhalation"[3] which was published in Drug Topics in 2005. Our intention with this article is to decrease medication errors by communicating the correct administration to patient and reminding practitioners to counsel patients about inhaling the capsule with the Neohaler device. Furthermore we intend to remind prescribers to append the 'Neohaler' component of the name, to 'Arcapta', which may remind patients that the Neohaler device is a component of the product and should always be used to properly administer the drug product.

[3] Maladministration of capsules for inhalation, Tezky, Tina PharmD. Holquist, Carol, RPh. Drug Topics. (2005)

4.3.2 Drug Product Capsule and Device Interchangeability

Current standard of care for COPD patients involves the use of both an orally inhaled beta agonist and an orally inhaled anticholinergic. One orally inhaled anticholinergic that could potentially be used with Arcapta Neohaler is the Spiriva Handihaler®, which is also available as an inhalation powder. Both Arcapta Neohaler and Spiriva Handihaler® are co-packaged with an inhaler device and individually packaged capsules that should not be removed from the blister until immediately before inhalation. Since a patient may use both products concomitantly, this raises concerns because the Arcapta capsules may be used interchangeably with the Spiriva Handihaler® device and may result in potential confusion and medication errors. The capsules should be designed so that they do not fit into the other product's device, however DMEPA is uncertain if this is possible given the timeline for approval.

Further, we note Novartis' proposed interchangeability usability study is still ongoing. The results of this study may reveal methods to help patients mitigate errors with capsule and device selection. We would recommend this study be completed and analyzed before approval because the study results may lead to redesign or label changes that can be implemented prior to the approval of Arcapta Neohaler and reduce the risk of error.

We provide recommendations in our label and labeling review which aim at reducing this type of error. Additionally, DMEPA intends on discussing the topic of device interchangeability in the aforementioned article. The article will warn practitioners and patients that the devices which enable inhalation of the powder should not be used interchangeably and may alter product delivery.

5 CONCLUSIONS AND RECOMMENDATIONS

DMEPA has concerns regarding the capsule inhalation product design. This design can lead to misadministration of capsules and device and capsule interchangeability among the devices. DMEPA will provide recommendations in the Arcapta Neohaler label and labeling review (OSE # 2010-2234) which aim at reducing this type of error.

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

If any of the proposed product characteristics as stated in this review are altered prior to approval of the product, DMEPA rescinds this Risk Assessment finding and the name must be resubmitted for review. In the event that our Risk Assessment finding is rescinded, the evaluation of the name on resubmission is independent of the previous Risk Assessment, and as such, the conclusions on re-review of the name are subject to change. Furthermore, if the approval of this application is delayed beyond 90 days from the signature date of this review, the proposed name must be resubmitted for evaluation.

If you have further questions or need clarifications, please contact Maria Wasilik, OSE Project Manager at 301-0567.

5.1 COMMENTS TO THE APPLICANT

A. Name Assessment

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

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

If any of the proposed product characteristics are altered prior to approval of the marketing application, the proprietary name should be resubmitted for review. The conclusions upon re-review are subject to change.

B. Misadministration of Capsules for Inhalation

The capsule device configuration, as proposed, will lead to wrong route of administration errors. The use of a capsule as an inhalation product is inherently error prone because users intuitively associate capsules with oral ingestion rather than inhalational administration. The FDA has received numerous reports of patients swallowing Spiriva® and Foradil® capsules instead of inhaling them. We recognize that Novartis is in the NDA stage of this product, however we would still like to actively encourage Novartis to consider developing a device where the drug product is integrated into the device rather then separate capsules that must be loaded into the device prior to inhalation.

If the development of a drug integrated device is not feasible, DMEPA recommends that Novartis emphasize the proper method of ingestion, inhalation, throughout the provider education and encourage providers to write “inhale” on the prescription as well as discuss the proper route of administration with the patient.

C. Drug Product Capsule and Device Interchangeability

Current standard of care for COPD patients involves the use of both an orally inhaled beta agonist and an orally inhaled anticholinergic. One orally inhaled anticholinergic that could potentially be used with Arcapta Neohaler is the Spiriva Handihaler®, which is also available as an inhalation powder. Both Arcapta Neohaler and Spiriva Handihaler® are co-packaged with an inhaler device and individually packaged capsules that should not be removed from the blister until immediately before inhalation. Since a patient may use both products concomitantly, this raises concerns because the Arcapta capsules may be used interchangeably with the Spiriva Handihaler® device and may result in potential confusion and medication errors. The capsules should be designed so that they do not fit into the other product’s device, however DMEPA is uncertain if this is possible given the timeline for approval.

Further, we note that the proposed interchangeability usability study is still ongoing. The results of this study may reveal methods to help patients mitigate errors with capsule and device selection. We would recommend this study be completed and analyzed before approval because the study results may lead to redesign or label changes that can be implemented prior to the approval of Arcapta Neohaler and reduce the risk of error.

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.

4. AMF Decision Support System [DSS]

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

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

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

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

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

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

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

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

USPTO provides information regarding patent and trademarks.

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

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

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

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

11. Natural Medicines Comprehensive Databases (*www.naturaldatabase.com****)***

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

12. Stat!Ref (*www.statref.com****)***

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

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

USAN Stems List contains all the recognized USAN stems.

14. Red Book Pharmacy's Fundamental Reference

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

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

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

16. Medical Abbreviations Book

Medical Abbreviations Book contains commonly used medical abbreviations and their definitions

APPENDICES

Appendix A:

FDA's Proprietary Name Risk Assessment considers the potential for confusion between the proposed proprietary name and the proprietary and established names of drug products existing in the marketplace and those pending IND, NDA, BLA, and ANDA products currently under review by the Center. DMEPA defines a medication error as any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer. 4

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

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

FMEA is a systematic tool for evaluating a process and identifying where and how it might fail. 5 DMEPA uses FMEA to analyze whether the drug names identified with orthographic or phonetic similarity to the proposed proprietary name could cause confusion that subsequently leads to medication errors in the clinical setting. DMEPA uses the clinical expertise of its staff to anticipate the conditions of the clinical setting where the product is likely to be used based on the characteristics of the proposed product.

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

Typical product characteristics considered when identifying drug names that could potentially be confused with the proposed proprietary name include, but are not limited to; established name of the proposed product, proposed indication of use, dosage form, route of administration, strength, unit of measure, dosage units, recommended dose, typical quantity or volume, frequency of administration, product packaging, storage conditions, patient population, and prescriber population. Because drug

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

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

name confusion can occur at any point in the medication use process, DMEPA staff considers the potential for confusion throughout the entire U.S. medication use process, including drug procurement, prescribing and ordering, dispensing, administration, and monitoring the impact of the medication.[6] DMEPA provides the product characteristics considered for this review in section one.

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

6 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**		
	Potential causes of drug name similarity	*Attributes examined to identify similar drug names*	*Potential Effects*
Look-alike	Similar spelling	Identical prefix Identical infix Identical suffix Length of the name Overlapping product characteristics	• Names may appear similar in print or electronic media and lead to drug name confusion in printed or electronic communication • Names may look similar when scripted and lead to drug name confusion in written communication
	Orthographic similarity	Similar spelling Length of the name Upstrokes Down strokes Cross-stokes Dotted letters Ambiguity introduced by scripting letters Overlapping product characteristics	• Names may look similar when scripted, and lead to drug name confusion in written communication
Sound-alike	Phonetic similarity	Identical prefix Identical infix Identical suffix Number of syllables Stresses Placement of vowel sounds Placement of consonant sounds Overlapping product characteristics	• Names may sound similar when pronounced and lead to drug name confusion in verbal communication

Lastly, the DMEPA staff also considers the potential for the proposed proprietary name to inadvertently function as a source of error for reasons other than name confusion. Post-marketing experience has demonstrated that proprietary names (or components of the proprietary name) can be a source of error in a variety of ways. Consequently, DMEPA considers and evaluates these broader safety implications of the name throughout this assessment and the medication error staff provides additional comments related to the safety of the proposed proprietary name or product based on professional experience with medication errors.

1. Database and Information Sources

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

2. CDER Expert Panel Discussion

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

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

3. FDA Prescription Analysis Studies

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

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

4. Safety Evaluator Risk Assessment of the Proposed Proprietary Name

The primary Safety Evaluator applies his/her individual expertise gained from evaluating medication errors reported to FDA, conducts a Failure Mode and Effects Analysis, and provides an overall risk assessment of name confusion. Failure Mode and Effects Analysis (FMEA) is a systematic tool for evaluating a process and identifying where and how it might fail.[7] When applying FMEA to assess the risk of a proposed proprietary name, DMEPA seeks to evaluate the potential for a proposed proprietary name to be confused with another drug name because of name confusion and, thereby, cause errors to occur in the medication use system. FMEA capitalizes on the predictable and preventable nature of medication errors associated with drug name confusion. FMEA allows the Agency to identify the potential for medication errors due to orthographically or phonetically similar drug names prior to approval, where actions to overcome these issues are easier and more effective than remedies available in the post-approval phase.

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

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

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

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

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

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

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

---

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

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

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

If DMEPA objects to a proposed proprietary name on the basis that drug name confusion could lead to medication errors, the primary Safety Evaluator uses the FMEA process to identify strategies to reduce the risk of medication errors. DMEPA is likely to recommend that the Applicant select an alternative proprietary name and submit the alternate name to the Agency for DMEPA to review. However, in rare instances FMEA may identify plausible strategies that could reduce the risk of medication error of the currently proposed name. In that instance, DMEPA may be able to provide the Applicant 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. However, the safety concerns set forth in criteria a through e are supported either by FDA regulation or by external healthcare authorities, including the Institute of Medicine (IOM), World Health Organization (WHO), Joint Commission on Accreditation of Hospitals (JCOAH), and the Institute for Safe Medication Practices (ISMP). These organizations have examined medication errors resulting from look- or sound-alike drug names and called for regulatory authorities to address the issue prior to approval. Additionally, DMEPA contends that the threshold set for the Proprietary Name Risk Assessment is reasonable because proprietary drug name confusion is a predictable and a preventable source of medication error that, in many instances, the Agency and/or Applicant can identify and rectify prior to approval to avoid patient harm.

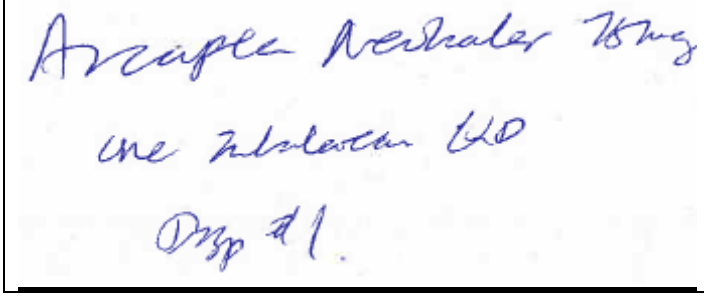
Furthermore, post-marketing experience has demonstrated that medication errors resulting from drug name confusion are notoriously difficult to rectify post-approval. Educational and other post-approval

efforts are low-leverage strategies that have had limited effectiveness at alleviating medication errors involving drug name confusion. Applicants have undertaken higher-leverage strategies, such as drug name changes, in the past but at great financial cost to the Applicant and at the expense of the public welfare, not to mention the Agency's credibility as the authority responsible for approving the error-prone proprietary name. Moreover, even after Applicants' have changed a product's proprietary name in the post-approval phase, it is difficult to eradicate the original proprietary name from 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. (See Section 4 for limitations of the process).

Appendix B: Letters with possible orthographic or phonetic misinterpretation

Letters in Name, Arcapta Neohaler	**Scripted may appear as**	**Spoken may be interpreted as**
A	l, O, Cl, Q	"R"
r	v, s, n	"rr"
c	e, o	"k", "ck", "q"
a	u, e, o	
p	g, f, j,	"b"
t	f, l	"d"
a	u e, o	
N	m, V	"M"
e	i, o, a	"i"
o	a, e	"a"
h	n, b, lo	
a	u, e, o	"ai"
l	f, t,	
e	i, o, a	"i"
r	v, s, n	

Appendix C: Rx Study 1210

Handwritten Medication Order	**Verbal Prescription**
	Arcapta Neohaler 75 mcg One inhalation once daily
	

Appendix D: FDA Prescription 1210 Study Responses

Inpatient Medication Order	**Outpatient Prescription**	**Voice Prescription**
Arcapta Neohaler	Arcapea Neohaler	Arcapta Neohaler
Arcapta Neohaler	Arcapea inhaler	Arcapto neohaler
Arcapta Neohaler	Arapec inhaler	Arcapta Neohaler
Arcapta Neohaler	Azcapta Neohaler	Arcapta Neohaler
Arcapta Neohaler	Arcapea nebulizer	Arcaptoihnaler
Arcapta Neohaler	Arcapla Neuhaler	Arcapta Neohaler
		Arcapta Neo-inhaler
		Arcapta Neohaler
		Arcapto
		Arcapta Neohaler
		Arcapta Neohaler

Appendix E: Names that did not undergo FMEA analysis

Name	Reason
Arcapta Neohaler	Application under review
Arcapta	Application under review
Neohaler	Application under review
(b) (4)	
ARC-API	Found in Orphan drug database, no product characteristics provided

Appendix E: Name confusion is prevented by the combination of stated product characteristics and/or orthographic differences as described

Product name with potential for confusion	**Similarity to Proposed Proprietary Name**	**Strength**	**Usual Dose (if applicable)**	**Name confusion is prevented by the stated orthographic/phonetic and/or product characteristic differences as described**
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg, 150 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
Arcalyst (Rilonacept)	Orthographic	220 mg powder for reconstitution	12 to 17 years of age: weight based, 4.4 mg/kg subcutaneous load dose followed by 2.2 mg/kg subcutaneous once weekly adults: 320 mg subcutaneously once followed by 160 mg subcutaneously once a week	*Orthographic differences* - Acrapta has two upstrokes vs. Arcalyst has three upstrokes - Arcapta does not end in an upstroke vs. Arcalyst does end with an upstroke *Product differences* - Route of administration (oral vs. subcutaneous) - Frequency of administration (once daily vs. every week) - Strength (75 mcg, 150 mcg vs. 220 mg)
Aricept, Aricept ODT (Donepezil hydrochloride)	Orthographic	5 mg, 10 mg oral tablet, oral disintegrating tablet, 1 mg/mL oral solution	One tablet by mouth once daily	*Orthographic differences* - Arcapta does not end with an upstroke vs. Aricept ends with an upstroke *Product differences* - Strength (75 mcg, 150 mcg vs. 5 mg, 10 mg)

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)	Name confusion is prevented by the stated orthographic/phonetic and/or product characteristic differences as described
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg, 150 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
Ancobon (Flucoytosine)	Orthographic	250 mg, 500 mg oral capsule	50 mg to 150 mg/kg/day by mouth administered in divided doses at 6 hour intervals.	*Orthographic differences* - Arcapta has one down-stroke vs. Ancobon has no down-strokes - Arcapta ends with 'ta' vs. Ancobon ends with 'bon' making the names look visually different *Product differences* - Strength (75 mcg, 150 mcg vs. 250 mg, 500 mg) - Frequency of administration (once daily vs. four times daily)
Aranesp (Darbepoetin alfa)	Orthographic	25 mcg, 40 mcg, 60 mcg, 100 mcg, 150 mcg, 200 mcg, 300 mcg, 500 mcg single use vials and pre-filled syringes	0.45 mcg/kg to 0.75 mcg/ kg subcutaneously once weekly	*Orthographic differences* - Arcapta has two upstrokes vs. Aranesp has one upstroke - Arcapta ends with 'ta' vs. Aranesp ends with a downstroke making it appear visually different *Product differences* - Route of administration (oral vs. subcutaneous) - Frequency of administration (every day vs. once a week)
Asmanex (Mometasone furoate) Twisthaler	Orthographic	110 mcg, 220 mcg twisthaler, inhaled dosing device	110 mcg to 440 mcg inhaled once daily in the evening or 440 mcg inhaled twice daily	*Orthographic differences* - Arcapta has a downstroke vs. Asmanex has no downstrokes - Arcapta has two upstrokes vs. Asmanex has one upstroke *Product differences* - Strength (75 mcg, 150 mcg vs. 110 mcg, 220 mcg)

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)	Name confusion is prevented by the stated orthographic/phonetic and/or product characteristic differences as described
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg, 150 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
Acanya (Clindamycin phosphate and Benzoyl peroxide)	Orthographic	1.2%/2.5% topical gel	Apply pea-sized amount to the face once daily	*Orthographic differences* - Arcapta has two upstrokes vs. one upstroke in Acanya - Arcapta has one cross-stroke vs. Acanya has no cross-strokes *Product characteristics* - Strength (75 mcg, 150 mcg vs. 1.2%/2.5%, single strength not required on prescription) - Route of administration (oral vs. topical)
Aralast (alpha-1 proteinase inhibitor human) kit	Orthographic	0.5 g, 1 g lyophilized powder single use vial with diluent for intravenous use	60 mg/kg administered once weekly by intravenous infusion, at a rate not to exceed 0.08 mL/kg/ minute	*Orthographic differences* - Arcapta has two upstrokes vs. Aralast has three upstrokes - Arcapta has a letter that follows the last upstroke vs. Aralast ends with an upstroke *Product differences* - Route of administration (oral vs. intravenous) - Frequency of administration (every day vs. once weekly) - Dose (1 capsule vs. weight based regimen, 60 mg/kg) - Strength (75 mcg, 150 mcg vs. 0.5 g, 1 g)

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)	Name confusion is prevented by the stated orthographic/phonetic and/or product characteristic differences as described
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg, 150 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
[redacted] (b) (4)				
Artane (trihexy-phenidyl hydrochloride)	Orthographic	2 mg, 5 mg oral tablets and capsule, 2 mg/5 mL oral solution	1 mg to 15 mg by mouth per day	*Orthographic differences* - Arcapta has a downstroke vs. Artane has no down-stroke - The second upstroke in Arcapta is positioned at the end of the name vs. the second upstroke for Artane which is positioned at the beginning *Product differences* - Strength (75 mcg, 150 mcg vs. 2 mg, 5 mg)
Neobenz Micro (Benzoyl peroxide)	Orthographic	3.5% topical cream	Apply pea-sized amount to affected area twice daily on the affected areas	*Orthographic differences* - Neohaler has three upstrokes vs. Neobenz has two upstrokes - Arcapta would appear before Neohaler vs. Neobenz would be presented alone or followed by 'micro' *Product characteristics* - Strength (75 mcg, 150 mcg vs. 3.5%, single strength) - Route of administration (oral vs. topical) - Frequency of administration (once daily vs. twice daily)

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)	Name confusion is prevented by the stated orthographic/phonetic and/or product characteristic differences as described
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg, 150 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
Herceptin (Trastuzumab) kit	Orthographic	440 mg lyophilized powder, one vial of diluent	Initial dose 4 to 8 mg/kg intravenous infusion over 90 mintes, then 2 to 6 mg/kg over 30 to 60 minutes once weekly or every three weeks depending on dose	*Orthographic differences* - Arcapta consists of seven letters vs. Herceptin consists of nine letters making it appear longer *Product differences* - Route of administratoin (oral vs. intravenous) - Frequency of administration (every day vs. once weekly or every three weeks) - Instructions (inhale vs. infusion over 30, 60 or 90 minutes) - Dose (one capsule or inhalation vs. weight based regimen)
Anaprox (Naproxen sodium)	Orthgraphic	275 mg, 550 mg (DS) oral tablet	One tablet by mouth twice daily	*Orthographic differences* - Arcapta has two upstrokes vs. Anaprox has one upstroke *Product differences* - Strength (75 mcg, 150 mcg vs. 275 mg, 550 mg) Frequency of administration (once daily vs. twice daily)

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)	Name confusion is prevented by the stated orthographic/phonetic and/or product characteristic differences as described
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg, 150 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
Avapro (Irbesartan)	Orthographic	75 mg, 150 mg, 300 mg oral tablet	75 mg to 300 mg by mouth once daily	*Orthographic differences* - Arcapta has two upstrokes vs. Avapro has one upstroke - Arcapta has a cross-stroke vs. Avapro has no cross-stroke - Arcapta has three letters in between the A upstroke and the downstroke vs. Avapro has two letters making the names appear different
Alcortin (Iodoquinol/ Hydrocorti-sone	Orthographic	1%/2% topical gel in 2 g individual packs	Apply to affected area three to four times daily	*Orthographic differences* - Arcapta has two upstrokes vs. Alcortin has three usptrokes - Arcapta has one down-stroke vs. Alcortin has no down-strokes *Product differences* - Strength (75 mcg, 150 mcg vs. single strength, 1%/2%, not required on precsription) - Route of administration (oral vs. topical) - Frequency of administration (once daily vs. three to four times daily)

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)	Name confusion is prevented by the stated orthographic/phonetic and/or product characteristic differences as described
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg, 150 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
Arixtra (Fondaparinux sodium)	Orthographic	2.5 mg, 5 mg, 7.5 mg, 10 mg single-dose pre-filled syringe	2.5 mg to 10 mg subcutaneously once daily	*Orthographic differences* - Arcapta has once down-stroke vs. Arixtra has no down-strokes - Arcapta has one (horizontal) cross-stroke vs. Arixtra has two cross-strokes, horizontal and diagnol *Product characteristics* - Route of administration (oral vs. subcutaneous) - Dosage form (capsule vs. syringe)
Neoral (Cyclosporine capsules, USP)	Orthographic and phonetic	25 mg, 100 mg oral capsules or 100 mg/mL oral solution	0.15 mg/kg to 4 mg/kg per day divided in two doses (twice daily administration)	*Orthographic differences* - Arcapta has a downstroke vs. Neoral has no downstroke - Arcapta has one cross-stroke vs. Neoral has no cross-stroke *Product differences* - Strength (75 mcg, 150 mcg vs. 25 mg and 100 mg) - Frequency of administration (once daily vs. twice daily) - Dose (one capsule vs. multiple capsules)

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)	Name confusion is prevented by the stated orthographic/phonetic and/or product characteristic differences as described
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg, 150 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
Parcopa (Carbidopa and Levodopa)	Phonetic	10 mg/100 mg, 25 mg/100 mg, 25 mg/250 mg orally disintegrating tablet	One to two tablets by mouth three to four times a day	*Phonetic differences* - Arcapta begins with the sound ”Ar” vs. Parcopa begins with the sound ”Pah” - The middle syllable sound in Arcapta is ”cap” vs. ”cohp” in Parcopa *Product characteristics* - Strength (75 mcg, 150 mcg vs. 10 mg/100 mg, 25 mg/100 mg, 25 mg/250 mg) - Frequency of administration (once daily vs. three to four times daily)
Arava (Leflunomide)	Phonetic	10 mg, 20 mg 100 mg oral tablets	100 mg once daily by mouth for three days then 10 mg or 20 mg by mouth once daily	*Phonetic differences* - Second syllable of Arcapta begins with sound ”kah” and ends with ”ap” vs. second syllable in Arava has one sound ”ah” - Last syllable of Arcapta sound is ”tah” vs. last syllable sound of ”va” *Product characteristics* - Strength (75 mcg, 150 mcg vs. 10 mg, 20 mg, 100 mg)

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)	Name confusion is prevented by the stated orthographic/phonetic and/or product characteristic differences as described
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg, 150 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
Atripla (Efavirenz, Emtrictabine, and Tenofovir disoproxil fumarate)	Orthographic	600 mg/200 mg/ 300 mg oral tablet	One tablet by mouth once daily	*Orthographic differences* - Arcapta has two upstrokes vs. Atripla has three upstrokes - The cross stroke in Arcapta is located at the end of the name vs. Atriple has the cross-stroke at the beginning *Product differences* - Strenght (75 mcg, 150 mcg vs. 600 mg/200 mg/300 mg single strength, not required on prescription) - Frequency of administration (once daily vs. twice daily)
Cosopt (Dorzolamide hydrochloride and Timolol maleate)	Orthographic	20 mg/5 mg ophthalmic solution	One drop in the affected eye(s) twice daily	*Orthographic differences* - Arcapta has one letter that follows the last upstroke vs. Cosopt ends with an upstroke *Product differences* - Route of administration (oral vs. eye) - Dose (inhalation vs. drop) - Frequency of administration (once daily vs. twice daily)

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)	Name confusion is prevented by the stated orthographic/phonetic and/or product characteristic differences as described
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg, 150 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
(b) (4)				
Astepro (Azelastine)	Orthographic	0.1%, 0.15% nasal spray	One to two sprays per nostril twice daily	*Orthographic differences* - Arcapta has the cross-stroke at the end of the name vs. Astepro has the cross-stroke at the beginning of the name *Product differences* - Strength (75 mcg, 150 mcg vs. 0.1%, 0.15%) - Route of administration (oral vs. nostril) - Frequency of administration (once daily vs. twice daily)

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)	Name confusion is prevented by the stated orthographic/phonetic and/or product characteristic differences as described
Arcapta Neohaler (Indacaterol) Powder for Inhalation		**75 mcg, 150 mcg capsule for inhalation**	**1 inhalation by mouth once daily**	
Oleptro (Trazodone hydrochloride)	Orthographic	150 mg, 300 mg extended release tablet	150 mg to 300 mg by mouth once daily	*Orthographic differences* - Arcapta has three upstrokes vs. Oleptro has two upstrokes - Arcapta has one letter after the 't' upstroke vs. Oleptro has two letters after the 't' upstrokes - Arcapta has three letters in between the upstroke and downstroke vs. Oleptro has one letter in between the upstroke and down-stroke

---

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

/s/

ANNE CRANDALL
02/03/2011

MELINA N GRIFFIS
02/04/2011

CAROL A HOLQUIST
02/04/2011

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

Date:	July 9, 2009
To:	Badrul Chowdhury, M.D., Director Division of Pulmonary and Allergy Products
Through:	Melina Griffis, RPh, Acting Team Leader Denise Toyer, PharmD, Deputy Director Carol Holquist, RPh, Director Division of Medication Error Prevention and Analysis
From:	Anne Crandall, PharmD, Safety Evaluator Division of Medication Error Prevention and Analysis
Subject:	Proprietary Name Review
Drug Name:	Arcapta Neohaler (Indacaterol Maleate) Inhalation Powder 150 mcg and 300 mcg
Application Type/Number:	NDA 22-383
Applicant:	Novartis
OSE RCM #:	2009-892

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

CONTENTS

EXECUTIVE SUMMARY

Arcapta Neohaler is the second proposed proprietary name for Indacaterol maleate inhalation powder. The first name, Arcapta (b) (4) was rejected due to (b) (4)

The proposed name, Arcapta Neohaler, was evaluated from a safety and promotional perspective based on the product characteristics provided by the Applicant. We sought input from pertinent disciplines involved with the review of this application and considered it accordingly. Our evaluation did not identify concerns that would render the name unacceptable based on the product characteristics and safety profile known at the time of this review. Thus, DMEPA finds the proposed proprietary name Arcapta Neohaler conditionally acceptable for this product. The proposed proprietary name must be re-reviewed 90 days before approval of the NDA.

Additionally, if any of the proposed product characteristics as stated in this review are altered, DMEPA rescinds this finding and the name must be resubmitted for review. The conclusions upon re-review are subject to change.

1 BACKGROUND

1.1 INTRODUCTION

This review is in response to a request from the Applicant, Novartis, for an assessment of the proposed proprietary name Arcapta Neohaler, regarding potential name confusion with other proprietary or established drug names. The Applicant also submitted container labels, carton and insert labeling which will be reviewed separately in OSE Review # 2009-137.

1.2 REGULATORY HISTORY

Arcapta Neohaler is a pending NDA application with an anticipated action date of October 18, 2009. The Applicant has three other INDs (48,649, 66,337, 69,754) currently under review for indications other then COPD or in addition to COPD.

The initial proposed proprietary name, Arcapta (b) (4), was deemed unacceptable based on (b) (4) However, the Arcapta portion was found acceptable from a sound and look-alike as well as promotional perspective.

1.3 PRODUCT INFORMATION

Arcapta Neohaler contains the active ingredient Indacaterol Maleate and the device/inhaler which allows for the oral inhalation of Indacaterol Maleate. Arcapta Neohaler is indicated for the long term maintenance treatment of chronic obstructive pulmonary disease. (b) (4)

2 METHODS AND MATERIALS

This section describes the methods and materials used by the Division of Medication Error Prevention and Analysis (DMEPA) conducting a proprietary name risk assessment (see 2.1 Proprietary Name Risk Assessment). The primary focus for this assessment is to identify and remedy potential sources of medication error prior to drug approval. DMEPA defines a

medication error as any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer.[1]

2.1 PROPRIETARY NAME RISK ASSESSMENT

FDA's Proprietary Name Risk Assessment considers the potential for confusion between the proposed proprietary name, Arcapta Neohaler, and the proprietary and established names of drug products existing in the marketplace and those pending BLA, IND, NDA, and ANDA products currently under review by the CDER.

DMEPA searches a standard set of databases and information sources to identify names with orthographic and phonetic similarity (see Sections 2.1.1 for detail) and held a CDER Expert Panel discussion to gather professional opinions on the safety of the proposed proprietary name (see 2.1.2). We also conduct internal CDER prescription analysis studies (see 2.1.3), and, when provided, external prescription analysis studies results are considered and incorporated into the overall risk assessment (see detail 2.3).

The Safety Evaluator assigned to the Proprietary Name Risk Assessment is responsible for considering the collective findings, and provides an overall risk assessment of the proposed proprietary name (see detail 2.1.6). The overall risk assessment is based on the findings of a Failure Mode and Effects Analysis (FMEA) of the proprietary name, and is focused on the avoidance of medication errors.

FMEA is a systematic tool for evaluating a process and identifying where and how it might fail.[1] FMEA is used to analyze whether the drug names identified with look- or sound-alike similarity to the proposed name could cause confusion that subsequently leads to medication errors in the clinical setting. We define 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. [2] We use the clinical expertise of our staff to anticipate the conditions of the clinical setting that the product is likely to be used in based on the characteristics of the proposed product.

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

Typical product characteristics considered when identifying drug names that could potentially be confused with the proposed drug name include, but are not limited to established name of the proposed product, the proposed indication, dosage form, route of administration, strength, unit of measure, dosage units, recommended dose, typical quantity or volume, frequency of administration, product packaging, storage conditions, patient population, and prescriber population.

---

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

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

Because drug name confusion can occur at any point in the medication use process, we consider the potential for confusion throughout the entire U.S. medication use process, including drug procurement, prescribing and ordering, dispensing, administration, and monitoring the impact of the medication.[3]

2.1.1 Search Criteria

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

For this review, particular consideration was given to drug names beginning with the letter 'A' or 'N' when searching to identify potentially similar drug names, as 75% of the confused drug names reported by the USP-ISMP Medication Error Reporting Program involve pairs beginning with the same letter.[4,5] With regard to the modifier, the search criteria also took into consideration that Neohaler could be misinterpreted as a component of the dosing instructions or omitted entirely from the prescription. Because the omission of a modifier is a known cause of the medication errors, DMEPA considers 'Arcapta Neohaler' as a complete name as well as 'Arcapta' the root term, omitting the modifying term, 'Neohaler'.

To identify drug names that may look similar to Arcapta Neohaler and Arcapta or Neohaler individually, the DMEPA staff also consider the other orthographic appearance of the name on lined and unlined orders. Specific attributes taken into consideration include the length of the name (two words, 15 letters, or seven letters without modifier), upstrokes (five, 't', ' h', 'l', capital letters 'A', 'N'), downstrokes (one, 'p'), cross-strokes (one, 't'), and dotted letters (none). Additionally, several letters in Arcapta Neohaler may be vulnerable to ambiguity when scripted, including the letter 'A' which may appear similar to 'L', 'O', or 'Cl'; the letter 'r' may appear as 'v', 's' or 'n'; lower case 'c' may appear as 'e' or 'o'; lower case 'a' may appear as 'u' or 'e'; lower case 'p' may appear as a lower case 'g' or 'j'; lower case 't' may appear as a lower case 'f' or 'l'; Upper case 'N' may appear as 'M' or 'V'; lower case 'e' may appear as 'i' or 'o'; lower case 'o' may appear as 'a' or 'e'; lower case 'h' may appear as an 'n', 'b' or 'lo'; lower case 'l' may appear as a lower case 't' or 'f'. As such, the staff also considers these alternate appearances when identifying drug names that may look similar to Arcapta Neohaler.

When searching to identify potential names that may sound similar Arcapta Neohaler, DMEPA searches for names with similar number of syllables (seven, or three without Neohaler), stresses (AR-cap-ta, ar-CAP-ta or ar-cap-TA) (NE-o-ha-ler, ne-O-ha-ler, ne-o-HA-ler, ne-o-ha-LER), and placement of vowel and consonant sounds.

In addition, several letters in Arcapta Neohaler may be subject to interpretation when spoken, including the letters 'Ar' may be interpreted as 'R'; 'a' may be interpreted as 'e'; the letters 'p' may be interpreted as 'b'; the letter 't' as 'd'; the letter 'c' as 'k', the letter 'N' may be interpreted as 'M', and the 'e' may be misinterpreted as 'i'. As such, DMEPA also considers these alternate pronunciations when identifying drug names that may sound similar to Arcapta Neohaler.

---

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

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

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

The Applicant's intended pronunciation of the proprietary name (ar-CAP-ta NEE-o-hay-ler) was taken into consideration, as this was provided with the proposed name submission, however DMEPA understands that pronunciation of the product will vary greatly from region to region and be based upon cultural background.

The staff also considers the product characteristics associated with the proposed drug throughout the identification of similar drug names, since the product characteristics of the proposed drug ultimately determine the use of the product in the clinical practice setting. For this review, the DMEPA staff were provided with the following information about the proposed product: the proposed proprietary name (Arcapta Neohaler), the established name (Indacaterol maleate inhalation powder), proposed indication (long term, maintenance treatment of chronic obstructive pulmonary disease), strength (150 mcg, 300 mcg), dose (one capsule), frequency of administration (once daily), route of administration (oral inhalation) and dosage form of the product (inhalation powder).

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

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

2.1.2 Database and Information Sources

The proposed proprietary name, Arcapta Neohaler, was provided to DMEPA staff to conduct a search of the internet, several standard published drug product reference texts, and FDA databases to identify existing and proposed drug names that may sound-alike or look-alike to Arcapta Neohaler using the criteria outlined in 2.1.1. A standard description of the databases used in the searches is provided in Appendix A. To complement the process, DMEPA staff uses a computerized method of identifying phonetic and orthographic similarity between medication names. The program, Phonetic and Orthographic Computer Analysis (POCA), uses complex algorithms to select a list of names from a database that have some similarity (phonetic, orthographic, or both) to the trademark being evaluated. Lastly, DMEPA staff reviews the USAN stem list to determine if any USAN stems are present within the proprietary name. The findings of the individual Safety Evaluators were then pooled and presented to the Expert Panel.

2.1.3 CDER Expert Panel Discussion

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

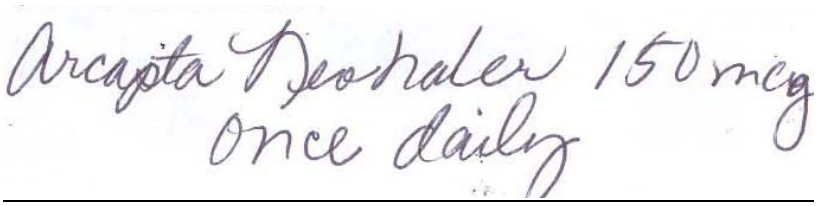
The pooled results of the DMEPA staff were presented to the Expert Panel for consideration. Based on the clinical and professional experiences of the Expert Panel members, the Panel may recommend the addition of names, additional searches by the Safety Evaluator to supplement the pooled results, or general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

2.1.4 FDA Prescription Analysis Studies

Three separate studies are conducted within the Centers of the FDA for the proposed proprietary name to determine the degree of confusion of Arcapta Neohaler with marketed U.S. drug names (proprietary and established) due to similarity in visual appearance with handwritten prescriptions or verbal pronunciation of the drug name. The studies employ a total of 123 healthcare professionals (pharmacists, physicians, and nurses), and attempts to simulate the prescription ordering process. The results are used by the Safety Evaluator to identify any orthographic or phonetic vulnerability of the proposed name to be misinterpreted by healthcare practitioners.

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

Figure 1. Arcapta Neohaler Study 1203 (conducted on Decemeber 3, 2008)

HANDWRITTEN PRESCRIPITON AND MEDICATION ORDER	VERBAL PRESCRIPTION
Inptatient Written Prescription: 	Arcapta Neohaler 150 mcg One inhalation by mouth once daily
Outpatient Written Prescription: 	

2.1.5 Comments from the Office of New Drug Division or the Office of Generic Drugs

DMEPA requests the regulatory division in the Office of New Drugs responsible for the application for their comments or concerns with the proposed proprietary name and any clinical issues that may impact the DMEPA review during the initial phase of the name review. Additionally, when applicable, at the same time DMEPA requests concurrence/non-concurrence with DDMAC's decision on the name. Any comments or concerns are addressed in the safety evaluator's assessment.

The 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 regulatory division is requested to concur/not concur with DMEPA's final decision.

2.1.6 External Proprietary Name Risk Assessment

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

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

2.1.7 Safety Evaluator Risk Assessment of the Proposed Proprietary Name

Based on the criteria set forth in Section 2.1.1, the Safety Evaluator applies their individual expertise gained from evaluating medication errors reported to FDA to conduct a Failure Mode and Effects Analysis and provide an overall risk of name confusion.

Failure Mode and Effects Analysis (FMEA) is a systematic tool for evaluating a process and identifying where and how it might fail.[6] When applying FMEA to assess the risk of a proposed proprietary name, the DMEPA staff seeks to evaluate the potential for a proposed name to be confused with another drug name as a result of the name confusion and cause errors to occur in the medication use system.

FMEA capitalizes on the predictable and preventable nature of medication errors associated with drug name confusion. FMEA allows the Agency to identify the potential for medication errors due to look- or sound-alike drug names prior to approval, where actions to overcome these issues are easier and more effective then remedies available in the post-approval phase.

In order to perform an FMEA of the proposed name, the Safety Evaluator must analyze the use of the product at all points in the medication use system. Because the proposed product is not yet marketed, the Safety Evaluator anticipates the use of the product in the usual practice settings by considering the clinical and product characteristics listed in Appendix A.

The Safety Evaluator then analyzes the proposed proprietary name in the context of the usual practice setting and works to identify potential failure modes and the effects associated with the failure mode.

In the initial stage of the Risk Assessment, the Safety Evaluator compares the proposed proprietary name to all of the names gathered from the above searches, expert panel evaluation, and studies, and identifies potential failure modes by asking:

> ***"Is the name Arcapta Neohaler convincingly similar to another drug name, which may cause practitioners to become confused at any point in the usual practice setting?"***

An affirmative answer indicates a failure mode and represents a potential for Arcapta Neohaler to be confused with another proprietary or established drug name because of look- or sound-alike similarity.

---

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

If the answer to the question is no, the Safety Evaluator is not convinced that the names posses similarity that would cause confusion at any point in the medication use system and the name is eliminated from further review.

In the second stage of the Risk Assessment, all potential failure modes are evaluated to determine the likely *effect* of the drug name confusion, by asking :

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

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

However, if the Safety Evaluator determines through FMEA that the name similarity could ultimately cause medication errors in the usual practice setting, the Safety Evaluator will then recommend that an alternate proprietary name be used.

In rare instances, the FMEA findings may provide other risk-reduction strategies, such as product reformulation to avoid an overlap in strength or an alternate modifier designation may be recommended as a means of reducing the risk of medication errors resulting from drug name confusion.

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

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

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

If none of these conditions are met, then we will not object to the use of the proprietary name. If any of these conditions are met, then we will object to the use of the proprietary name. The threshold set for objection to the proposed proprietary name may seem low to the Sponsor; however, the safety concerns set forth in criteria 1 through 5 are supported either by FDA Regulation or by external healthcare authorities, including the IOM, WHO, JCAHO, and ISMP, all who have examined medication errors resulting from look- or sound-alike drug names and called for Regulatory Authorities to address the issue prior to approval.

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

Additionally, post-marketing experience has demonstrated that medication errors resulting from drug name confusion are notoriously difficult to remedy post-approval. Educational efforts and so on are low-leverage strategies that have proven to have limited effectiveness at alleviating the medication errors involving drug name confusion. Higher-leverage strategies, such as drug name changes, have been undertaken in the past; but at great financial cost to the Sponsor, and at the expense of the public welfare, not to mention the Agency's credibility as the authority responsible for the approving the error-prone proprietary name. Moreover, even after Sponsor's have changed a product's proprietary name in the post-approval phase, it is difficult to eradicate the original proprietary name from practitioner's vocabulary, and as such, the Agency has continued to receive reports of drug name confusion long after a name change in some instances. Therefore, we believe that post-approval efforts at reducing name confusion errors should be reserved for those cases in which the potential for name confusion could not be predicted prior to approval (see limitations of the process).

If we object to a proposed proprietary name on the basis that drug name confusion could lead to medication errors, the FMEA process is used to identify strategies to reduce the risk of medication errors. We are likely to recommend that the Sponsor select an alternative proprietary name and submit the alternate name to the Agency for us to review. However, in rare instances FMEA may identify plausible strategies that could reduce the risk of medication errors of the currently proposed name, and so we may be able to provide the Sponsor with recommendations that reduce or eliminate the potential for error and render the proposed name acceptable.

3 RESULTS

3.1 PROPRIETARY NAME RISK ASSESSMENT

3.1.1 Database and Information Sources

For this review, DMEPA identified 22 names as having some similarity to the name Arcapta Neohaler. The names Capoten, Arcalyst, Neo HC, Oncospar, Acanya, Ucepha, Arixtra, Atripla, Aricept, Neoprofen, Lycapta, Septra, Aircapta, Apidra, Nicotrol, An-DTPA, and Neofradin were thought to look like Arcapta Neohaler. The names Neo-haler, Neohale, Neoral, Nebuhaler and Parcopa were thought to look and sound like Arcapta Neohaler.

A search of the United States Adopted Name (USAN) stem list on June 3, 2009 identified no USAN stem names within the proposed name, Arcapta Neohaler.

3.1.2 CDER Expert Panel Discussion

The Expert Panel reviewed the pool of names identified by DMEPA (see section 3.1.1 above), and noted no additional names.

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

3.1.3 FDA Prescription Analysis Studies

A total of 22 practitioners responded to our study, and one response nearly overlapped with an existing drug name, Aricept. About 23 percent of the participants (n=5) interpreted the name correctly as "Arcapta Neohaler". About 27 percent of the participants (n=6) interpreted the name Arcapta correctly, but misinterpreted the second component of the name, Neohaler and about 50% interpreted Neohaler correctly. About 27 percent (n=6) dropped the Neohaler component entirely from the name. In this particular Rx study, correct interpretation occurred more frequently in the written studies. The majority of misinterpretations occurred in the inpatient study, with the first component 'Arc' being misinterpreted as 'Ari' or 'Atr or the voice studies misinterpreted the 'c' as 'k', 'ch' or 't', the middle component of the name 'cap' was misinterpreted as 'cep', 'cac', 'ac', 'a' or 'ac' and the last component of the name 'ta' was misinterpreted as 'ca', 'tin', 'to', 'te', or tanil'. The name Neohaler was misinterpreted in the voice study in multiple ways; one respondent conjoined the names to create the name; Arcaptonealhalers. Three respondents added the beginning of sound Neohaler to Arcapta to form the names; Arcactin, Arkactanil or Archataneo. See Appendix B for the complete listing of interpretations from the verbal and written prescription studies.

3.1.4 Comments from the Division

DMEPA notified the Division of Pulmonary and Allergy Products, via e-mail, that we had no objections to the proposed proprietary name, Arcapta Neohaler, on June 12, 2009. Per e-mail correspondence from the Division of Pulmonary and Allergy Products on June 12, 2009 they indicated they concur with our assessment of the proposed proprietary name, Arcapta Neohaler.

3.1.5 External Name Study

In the submission dated April 28, 2009 the Applicant provided a proposed name validation study conducted by (b) (4) which identified 36 names that look-alike or sound-alike to the proposed name, Arcapta Neohaler. Five of the 36 names (Aricept, Capoten, Parcopa, Neo HC, and Neoral) were also identified by DMEPA. The names Adapt, Alimta, Ara-A, Arava, Arcoval, Artane, Atacand, Entacapone, Herceptin, Taractan, Neoloid, Nephlex Rx, Neulasta, Neumega, Nexavar, Nizoral A-D, Norflex, and Novarel were thought to look like Arcapta Neohaler. The remaining names; Alercap, Aquatab, Aquatag, Aquatar, Atrocap, Capital, Captopril, Mercaptopurine, Narcan, Partapp TD, and Raptiva were thought to sound like Arcapta Neohaler and Ercatab and Theolair were thought to sound and look like Arcapta Neohaler. (b) (4) found the name, Arcapta Neohaler, acceptable.

3.1.6 Safety Evaluator Risk Assessment

Independent searches by the primary Safety Evaluator identified one additional name, Fanapt, which was thought to look similar to and represent a potential source of drug name confusion to Arcapta Neohaler. As such, a total of 54 names were analyzed for look-alike and sound-alike similarity.

4 DISCUSSION

Neither DDMAC or the Division of Pulmonary and Allergy Products had concerns with the proposed name.

DMEPA identified and evaluated a total of 54 names for their potential orthographic and phonetic similarity to the proposed name, Arcapta Neohaler. Twenty names lacked orthographic and/or phonetic similarity and were not evaluated further (see Appendix C)

Failure Mode and Effect Analysis was then applied to determine if the proposed name could potentially be confused with the 34 names and lead to medication errors. This evaluation determined that the name similarity between Arcapta Neohaler was unlikely to result in medication errors with any of the 34 products for the reasons presented in Appendices D through H. DMEPA did not identify other areas of concern with the name that would render the name unacceptable. This finding was consistent with and supported by an independent risk assessment of the proprietary name submitted by the Applicant.

5 CONCLUSIONS

The Proprietary Name Risk Assessment findings indicate that the proposed name, Arcapta Neohaler, is acceptable. As such, the Division of Medication Error Prevention and Analysis does not object to the use of the proprietary name, Arcapta Neohaler, for this product.

If any of the proposed product characteristics as stated in this review are altered prior to approval of the product, the Division of Medication Error Prevention and Analysis rescinds this Risk Assessment finding, and recommends that the name be resubmitted for review. In the event that our Risk Assessment finding is rescinded, the evaluation of the name on resubmission is independent of the previous Risk Assessment, and as such, the conclusions on re-review of the name are subject to change. If the approval of this application is delayed beyond 90 days from the signature date of this review, the proposed name must be resubmitted for evaluation.

We would be willing to meet with the Division for further discussion, if needed. If you have further questions or need clarifications, please contact Sean Bradley, Project Manager, at 301-796-1332.

5.2 COMMENTS TO THE APPLICANT

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

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

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

6 REFERENCES

6.1 REVIEWS

1. OSE Review # 2008-2047, Arcapta (b) (4) Crandall, A., March 11, 2009.

6.2 DATABASES

1. MICROMEDEX INTEGRATED INDEX (HTTP://WEBLERN/**)**

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

2. Phonetic and Orthographic Computer Analysis (POCA)

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

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

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

4. AMF Decision Support System [DSS]

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

5. Division of Medication Error Prevention proprietary name consultation requests

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

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

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

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

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

8. US Patent and Trademarks Office **http://www.uspto.gov**.

Provides information regarding patent and trademarks.

9. Clinical Pharmacology Online (**http://weblern/**)

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

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

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

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

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

12. Stat!Ref (**http://weblern/**)

Contains full-text information from approximately 30 texts. Includes tables and references. Among the database titles are: Handbook of Adverse Drug Interactions, Rudolphs Pediatrics, Basic Clinical Pharmacology and Dictionary of Medical Acronyms Abbreviations.

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

List contains all the recognized USAN stems.

14. Red Book Pharmacy's Fundamental Reference

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

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

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

16. Medical Abbreviations Book

Contains commonly used medical abbreviations and their definitions.

APPENDICES

Appendix A:

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

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

Type of similarity	Considerations when searching the databases		
	Potential causes of drug name similarity	Attributes examined to identify similar drug names	Potential Effects
Look-alike	Similar spelling	Identical prefix Identical infix Identical suffix Length of the name Overlapping product characteristics	• Names may appear similar in print or electronic media and lead to drug name confusion in printed or electronic communication • Names may look similar when scripted and lead to drug name confusion in written communication
	Orthographic similarity	Similar spelling Length of the name Upstrokes Downstrokes Cross-stokes	• Names may look similar when scripted, and lead to drug name confusion in written communication

		Dotted letters Ambiguity introduced by scripting letters Overlapping product characteristics	
Sound-alike	Phonetic similarity	Identical prefix Identical infix Identical suffix Number of syllables Stresses Placement of vowel sounds Placement of consonant sounds Overlapping product characteristics	• Names may sound similar when pronounced and lead to drug name confusion in verbal communication

Appendix B: CDER Prescription Study Responses, Study 0521

Inpatient	Outpatient	Voice
Atriapta	Arcapta Neohaler	Arcactin Neohaler
Ariapta	Arcapta Neohaler	Arkactanil inhaler
Ariapta Neohaler	Arcapta Neohaler	Arcaptonealhalers
Ariapta		Archateneo Inhaler
Aripata		Artacta Neohaler
Ariapta Neohaler		Arcapta Neo Inhaler
Ariapta		Arcapta Neohaler
Ariapta		Arcactin Neelhalers
Aricepta Neohaler		Arcapta Neohaler
		Arcaptin Neohaler

Appendix C: Names determined to lack of significant orthographic or phonetic similarities

Name	Similarity to Arcapta Neohaler	Site where name found
Alimta	Look	(b) (4)
Aquatab	Sound	(b) (4)
Aquatag	Sound	(b) (4)
Aquatar	Sound	(b) (4)
Ara-a	Look	(b) (4)
Artane	Look	(b) (4)
Capital	Sound	(b) (4)
Entacapone	Look	(b) (4)
Narcan	Sound	(b) (4)
Partapp TD	Sound	(b) (4)
Raptiva	Sound	(b) (4)
Nephlex Rx	Look	(b) (4)
Neumega	Look	(b) (4)
Nexavar	Look	(b) (4)
Nizoral A-D	Look	(b) (4)
Norflex	Look	(b) (4)
Novarel	Look	(b) (4)
Theolair	Both	(b) (4)
Mercaptopurine	Sound	(b) (4)
Captopril	Sound	(b) (4)

Appendix D: Drug name found in Saegis, however unable to find in other commonly used drug databases

Proprietary Name	Owner at Registration
Lycapta	Merz Pharma GMBH & Co. (Germany)
Aircapta	Novartis
Neohale	SAEGIS
Nebuhaler (device)	SAEGIS (Canada)
Neo-haler (device)	SAEGIS (India)

Appendix E: Drug discontinued and not marketed generically

Proprietary Name	Established Name
Atrocap	(Atropine sulfate, Hyoscyamine sulfate, Hyoscine hydrobromide, Phenobarbital)
Taractan	Chlorprothixene
Adapt	Povidone, EDTA, Thimerosal (lens solution)

Appendix F: Products with no numerical overlap in strength and dose

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)
Arcapta Neohaler (Indacaterol Maleate Inhalation Powder)		**150 mcg, 300 mcg capsule for inhalation**	**One capsule inhaled via (b) (4) once daily**
Arixtra (Fondaparinux Sodium)	Look	2.5 mg, 5 mg, 7.5 mg, 10 mg single unit syringe	2.5 mg to 10 mg injected subcutaneously once daily
Arcalyst (Interleukin-1 (IL-1) Trap)	Look	160 mg Lyophilized powder for injection	160 mg injected subcutaneously once weekly

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)
Arcapta Neohaler (Indacaterol Maleate Inhalation Powder)		**150 mcg, 300 mcg capsule for inhalation**	**One capsule inhaled via (b) (4) once daily**
Neo HC Syrup(Hydrocodone bitartrate/Chlorpheniramine maleate/ Phenylephrine HCl	Look	5mg/3 mg/7.5 mg/ 5mL oral syrup	6 to 11 years: 2.5 mL to 5 mL by mouth every 4 to 6 hours, up to 4 doses per day >11 years: 5 mL to 10 mL by mouth every 4 to 6 hours, up to 4 doses per day
Atripla (Efavirenz, Emtricitabine, Tenofovir Disoproxil Fumarate)	Look	600 mg/200 mg/ 300 mg oral tablet	One tablet orally once daily, preferably at bedtime
Oncaspar (Pegaspargase)	Look	3,750 International Units/5 mL single use vial for injection	2,500 International Units/m^2 intramuscularly or intravenously no more frequently then every 14 days
Acanya (Clindamycin phosphate/Benzoyl peroxide) Kit	Look	1.2 % topical solution 2.5% topical gel	Apply pea sized amount to face once daily
Nicotrol (Nicotine)	Look	Inhaler packaged with 168 cartridges; 10 mg cartridge Nasal spray; 10 mg/mL in a 10 mL bottle,	Inhale 6 to 16 cartridges per day initially then taper off from there based on need Inhale 1-2 doses per hour, up to 40 per day initially then taper off from there based on need
Arcoval (Multivitamin, containing Vitamin A, Vitamin D, Thiamine, B2, Nicotinamine, B6, Calcium pantothenate, B12, Vitamin C, Vitamin E)	Both	Oral capsule	One capsule once daily
Atacand (Candesartan cilexetil)	Look	4 mg, 8 mg, 16 mg, 32 mg oral tablet	4 mg to 32 mg orally once or twice daily
Ercatab* (Ergotamine/Caffeine) *Discontinued	Both	1 mg/100 mg oral tablet	1 to 2 tablets up to 4 times daily

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)
Arcapta Neohaler (Indacaterol Maleate Inhalation Powder)		**150 mcg, 300 mcg capsule for inhalation**	**One capsule inhaled via (b) (4) once daily**
Neulasta (Pegfilgrastim)	Look	6 mg single-dose syringe	6 mg subcutaneously once per chemotherapy cycle

Appendix G: Products with an overlapping strength or achievable strength but multiple differentiating product characteristics

Product name with potential for confusion	Similarity to Product Name	Strength	Usual Dose (if applicable)	Other differentiating product characteristics
Arcapta Neohaler (Indacaterol maleate inhalation powder)		**150 mcg, 300 mcg capsule for inhalation**	**One capsule inhaled via (b) (4) once daily**	
An-DTPA (pentetate calcium trisodium) injection	Look	Kit containing 20.6 mg of pentetate calcium trisodium, 0.15 mg minimum stannous tin and 0.3 mg total tin packaged as either 5 or 30 sterile 10 mL vials	111- 740 megabecquerels intravenously Patient dose us measured by radioactivity calibration system prior to administration	Dose (mcg vs. megabecquerels or mci) Utilization (limited use of An-DPTA and patient must take immediately after mixed and calibrated for radioactivity) An-DPTA would only be available in nuclear pharmacy
Capoten	Look	12.5 mg, 25 mg, 50 mg 100 mg oral tablet	25 mg to 50 mg orally twice or three times daily	Frequency of administration (once daily vs. two to three times daily) Usual dose (150 mcg, 300 mcg vs. 25 mg, 50 mg)
Parcopa (Carbidopa and Levodopa)	Both	25 mg/100 mg, 10 mg/100 mg, 25 mg/250 mg orally disintegrating tablets	1 tablet by mouth 3 times daily, may increase up to a total of 8 tablets per day	Frequency of administration (once daily vs. three times daily) Parcopa contains 2 active ingredients and corresponding strength vs. one for Arcapta Neohaler

Product name with potential for confusion	Similarity to Product Name	Strength	Usual Dose (if applicable)	Other differentiating product characteristics
Arcapta Neohaler (Indacaterol maleate inhalation powder)		**150 mcg, 300 mcg capsule for inhalation**	**One capsule inhaled via (b) (4) once daily**	
Septra (Sulfamethox-azole/ Trimetho-prim)	Look	Oral suspension: 200 mg/40 mg/ 5 mL Tablet: 400 mg/80 mg	6 mg/kg to 10 mg/kg by mouth every 12 hours or 150 mg/m^2 three times a week 1-2 tablets by mouth every 12 hours or 15 to 20 mg/kg trimethoprim component divided in 3 doses per day.	Potential for Overlap exists with the liquid formulation only Frequency of administration (once daily vs. every 12 hours or three times a week) Dose: (150 mcg, 300 mcg vs. 200 mg/40 mg (5 mL) to 600 mg/120 mg (15 mL)
Aler-cap* (Diphenhydra -mine) *Discontinued, available generically	Sound	25 mg oral capsule	1-2 capsules every 4 to 6 hours as needed	Frequency of administration (once daily vs. up to 6 times daily as needed) Dose (150 mcg, 300 mcg vs. 25 mg to 50 mg maximum dose) Aler-cap is a branded generic no longer available and this product would likely be ordered as Diphenhydramine or reference listed drug, Benadryl.
Neoloid* (Castor Oil) *Discontinued	Both	36.4% Oral solution	15 mL to 60 mL by mouth once daily	Dose (150 mcg, 300 mcg vs. 15 mL to 60 mL or 1 to 4 tablespoons) Dosage form (capsule for inhalation vs. solution)
Neo-Fradin (Neomycin)	Look	125 mg/5 mL oral solution	4 to 12 grams by mouth per day in divided doses	Dose (150 mcg, 300 mcg vs. 2000 g to 6000 g) Dosage form (capsule for inhalation vs. oral solution) Frequency (once daily vs. two to four times daily)

Product name with potential for confusion	Similarity to Product Name	Strength	Usual Dose (if applicable)	Other differentiating product characteristics
Arcapta Neohaler (Indacaterol maleate inhalation powder)		**150 mcg, 300 mcg capsule for inhalation**	**One capsule inhaled via (b) (4) once daily**	
Neoprofen (Ibuprofen lysine)	Look	17.1 mg/mL preservative free single use vial	10 mg/kg intravenously, followed by 2 doses of 5 mg/kg each, after 24 hours and 48 hours. Course of therapy totals 3 doses.	Route of administration (oral vs. intravenous) Dose (150 mcg, 300 mcg vs. weight based regimen, only approved for premature infants) Schedule (chronic therapy vs. total number of doses recommended is 3 doses)
Ucephan (Benzoate and phenylacetate)	Look	10%/10% intravenous solution	Loading dose: 55 mL per m^2 intravenously over 90 to 120 minutes Maintenance dose: 55 mL per m^2 over 24 hours Must be given in combination with Arginine HCl 10% IV 2mL/kg	Route of administration (oral vs. intravenous) Population (neonatal patients in hyperammonemic coma vs. adults) Additional therapy (Ucephan must be given in combination with Arginine HCl)
Apidra (Insulin glusiline)	Look	100 units/mL, 10 mL vial	0.5 to 1Unit/kg/day subcutaneously based on individual response.	Route of administration (oral vs. subcutaneous) Dose (written in mcg or inhalation vs. Units)
Herceptin (Trastuzu-mab)	Look	440 mg/20 mL multi-use vial, lyophilized powder	2 mg to 8 mg/kg weekly intravenous infusions over 30 to 90 minutes for up to 52 weeks depending on diagnosis	Route of administration (oral vs. intravenous) Frequency (once daily vs. once weekly)

Appendix H: Potential confusing name with numerical overlap in strength or dose or required further analysis due to name similarity

Arcapta Neohaler (Indacaterol Maleate Inhalation Powder)	**150 mcg, 300 mcg capsule for inhalation**	**Usual dose: One capsule inhaled via neohaler once daily**
Failure Mode: Name Confusion	**Causes (could be multiple)**	**Rationale**
Aricept (Donepezil Hydrochloride) 5 mg, 10 mg oral tablet, orally disintegrating tablet 1 mg/1 mL oral solution 5 mg to 10 mg orally once daily	Orthographic: both Arcapta and Aricept begin with 'Ar', 'capt' looks similar to 'cept', both have same number of letters/length Frequency of administration (once daily) Patient population is similar (adult, elderly) Similar prescribers (Internal medicine)	Medication errors are unlikely to occur due to the orthographic differences as well as differentiating product characteristics. Orthographically Arcapta (without Neohaler) contains no dotted letter vs. one dotted letter in Aricpet ('i'), also the placement of this dotted letter helps differentiate by placing an extra letter between the 'r' and 'c' in Aricept vs. 'Arc' in Arcapta. The crossed letter 't' is followed by another letter 'a' in Arcapta vs. the crossed letter 't' ending the name for Aricept. The following product characteristics will also help differentiate between Arcapta Neohaler and Aricept; Arcapta Neohaler is available in 150 mcg and 300 mcg strengths while Aricept is available in 5 mg and 10 mg. It is very unlikely that these strengths will be confused with one another as multiple numbers would have to be overlooked for the 5 mg vs. 150 mcg and the 10 mg and 300 mcg to be confused. Although both Arcapta Neohaler and Aricept are taken orally, Arcapta is inhaled and Aricept is ingested. The written prescription would likely indicate or instruct the patient to inhale.
Fanapt (Iloperodine) 1 mg, 2 mg, 4 mg, 6 mg, 8 mg, 10 mg, 12 mg oral tablet Titration: 1 mg orally twice daily for one day, then 2 mg twice daily for one day, then 4 mg twice daily for one day then 6 mg orally twice daily Maintenance dose: up to 12 mg orally twice daily	Orthographic: both Arcapta and (b) (4) contain 'apt', both names have similar number of letters/length Phonetic: The second syllables contain '-ap' Frequency of administration (once daily)	Medication errors are unlikely to occur due to orthographic and phonetic differences in addition to product characteristics. Orthographically Arcapta (without Neohaler) begins with 'Ar' vs. 'Fa' of Fanapt. Arcapta ends an upstroke followed by another letter, 'ta' vs. an upstroke ending for fanapt, 't'. If the full name Arcapta Neohaler is utilized, the presence of (b) (4) will help differentiate Arcapta Neohaler from Fanapt. Phonetically Arcapta (without Neohaler) begins with the sound (R) vs. (FA) in (b) (4) the second syllable starts with the sound (K) in Arcapta vs. (N) in (b) (4), Arcapta has three syllables vs. two

Arcapta Neohaler (Indacaterol Maleate Inhalation Powder)	150 mcg, 300 mcg capsule for inhalation	Usual dose: One capsule inhaled via neohaler once daily
Failure Mode: Name Confusion	**Causes (could be multiple)**	**Rationale**
		syllables in Fanapt. The following product characteristics will also help differentiate between Arcapta Neohaler and Fanapt; Arcapta Neohaler is available as 150 mcg and 300 mcg while Fanapt is available as 1 mg, 2 mg, 4 mg, 6 mg, 10 mg and 12 mg. It is very unlikely that these strengths will be confused with one another as multiple numbers would have to be overlooked for the 12 mg vs. 150 mcg and the 10 mg and 300 mcg. Patients using Fanapt must undergo multiple titrations to achieve the desired dose and will take it twice daily while undergoing the titration. Arcapta is always dosed once daily and is only available as two strengths.
Neoral (Cyclosporine) 25 mg, 100 mg soft gelatin capsules 100 mg/mL, 50 mL oral solution 2.5 mg/kg to 12 mg/kg per day in 2 divided doses, depending on type of transplant	Orthographic: Both Neohaler and Neoral begin with 'Neo', and contain 'al' similarly placed after 'Neo'	Medication errors are unlikely to occur due to orthographic differences in addition to product characteristics. The following orthographic differences will help differentiate between Arcapta Neohaler and Neoral: Considering the name Neohaler vs. Neoral; Neohaler contains 8 letters vs. 6 letters in Neoral, Neohaler has 3 upstrokes vs. 2 upstrokes in Neoral and Neoral ends with 'l' providing an upstroke vs. Neohaler has 'er' following the 'l' upstroke. Additionally, the name 'Neohaler' is unlikely to be used without the drug name, 'Arcapta' preceding Neohaler, which adds considerable differentiation to the names. It is much more likely that the Neohaler modifier would get dropped and the drug would be referred to as Arcapta. Arcapta Neohaler is an inhaled product used once daily with a device. Neoral is taken orally, however is available in capsules and oral solution and is a weight based regimen that is always taken twice daily.

Arcapta Neohaler (Indacaterol Maleate Inhalation Powder)	150 mcg, 300 mcg capsule for inhalation	Usual dose: One capsule inhaled via neohaler once daily
Failure Mode: Name Confusion	**Causes (could be multiple)**	**Rationale**
Arava (Leflunomide) 10 mg, 20 mg, 100 mg oral tablets Loading dose of 100 mg by mouth once daily for 3 days then 10 mg or 20 mg once daily thereafter	Othographic: Both Arcapta and Arava start with 'Ar' and both banes end in 'a' Frequency of administration (once daily) Achievable dose (150 mcg vs. 100 mg, 20 mg and 10 mg)	Medication errors are unlikely to occur due to orthographic differences in addition to product characteristics. The following orthographic differences will help differentiate between Arcapta Neohaler and Arava: Considering the name Arcapta vs. Arava; Arcapta contains both a down stroke,'p' and an upstroke and cross-stroke, 't', vs. Arava which contains no cross-strokes, down-strokes and only one upstroke provided by the capital letter 'A'. The upstroke and downstroke provided by the 'p' and 't' also lengthen the name Arcapta to 7 letters vs. 5 letters in Arava. The dose of Arcapta Neohaler is a fixed dose of 150 mcg or 300 mcg vs. Arava 100 mg loading dose which is only taken for 3 days or the 10 mg and 20 mg tablets which are taken once daily. Arcapta Neohaler could not be broken down to allow for the 100 mg dose. 100 mg is the highest recommended dose for Arava, therefore any confusion over names would prompt a call to the prescriber, as no indication requires a dose over 100 mg. Additionally, the 100 mg strength is only available in a 3 day course, 3 tablet pack and would be prescribed only once with no refills.

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

/s/

Anne Crandall
7/9/2009 11:27:48 AM
DRUG SAFETY OFFICE REVIEWER

Carol Holquist
7/9/2009 03:55:14 PM
DRUG SAFETY OFFICE REVIEWER