

**CENTER FOR DRUG EVALUATION AND
RESEARCH**

APPLICATION NUMBER:
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PROPRIETARY NAME REVIEW(S)

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

Date:	March 2, 2011
Application Type/Number:	NDA 201152
Through:	Irene Z. Chan, PharmD, BCPS, Acting Team Leader Carol Holquist, RPh, Director Division of Medication Error Prevention and Analysis (DMEPA)
From:	L. Shenee' Toombs, PharmD, Safety Evaluator Division of Medication Error Prevention and Analysis
Subject:	Proprietary Name Review
Drug Name(s):	Viramune XR (Nevirapine) Extended-release Tablets 400 mg
Applicant/sponsor:	Boehringer Ingelheim
OSE RCM #:	2011-35

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

1 INTRODUCTION

This re-assessment of the proprietary name responds to the anticipated approval of NDA 201152 within 90 days from the date of this review. The Division of Medication Error Prevention and Analysis (DMEPA) found the proposed proprietary name, Viramune XR, acceptable in OSE Review #2010-1324, dated September 9, 2010.

2 METHODS

For the proposed proprietary name, DMEPA staff search a standard set of databases and information sources (see Section 6) to identify names with orthographic and/or phonetic similarity to the proposed name that have been approved since the completion of the previous OSE proprietary name review. We used the same search criteria outlined in OSE Review #2010-1324, for the proposed proprietary name, Viramune XR. None of the product characteristics for Viramune XR have been altered since our previous review, thus we did not re-evaluate previous names of concern. Additionally, DMEPA searches the USAN stem list to determine if the name contains any USAN stems as of the last USAN updates. DMEPA bases the overall risk assessment on the findings of a Failure Mode and Effects Analysis (FMEA) of the proposed proprietary name, and focuses on the avoidance of medication errors.

3 RESULTS

The safety evaluator searches of the databases listed in Section 5 did not identify any additional names thought to look similar to Viramune XR and represent a potential source of drug name confusion. Additionally, DMEPA staff did not identify any United States Adopted Names (USAN) stems in the proposed proprietary name, as of February 22, 2011.

4 CONCLUSIONS AND RECOMMENDATIONS

The Proprietary Name Risk Assessment indicates that the proposed name, Viramune XR, is not vulnerable to name confusion that could lead to medication errors, nor is the name considered promotional. Thus, the Division of Medication Error Prevention and Analysis (DMEPA) has no objection to the proprietary name, Viramune XR, 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 Antiviral Products should notify DMEPA because the proprietary name must be re-reviewed prior to the new approval date.

5 REFERENCES

1. Toombs, L. OSE Review #2010-1324: Proprietary Name Review for Viramune XR. September 9, 2010.

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

USAN Stems List contains all the recognized USAN stems.

4. **Division of Medication Error Prevention and Analysis proprietary name 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.

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

/s/

LATOYA S TOOMBS
03/02/2011

IRENE Z CHAN
03/02/2011

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03/02/2011

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:	September 9, 2010
Application Type/Number:	NDA 201152
Through:	Carlos M Mena-Grillasca, RPh, Team Leader Denise Toyer, PharmD, Deputy Director Division of Medication Error Prevention and Analysis (DMEPA)
From:	L. Shenee' Toombs, PharmD, Safety Evaluator Division of Medication Error Prevention and Analysis
Subject:	Proprietary Name Review
Drug Name(s):	Viramune XR (Nevirapine) Extended-release Tablets 400 mg
Applicant/sponsor:	Boehringer Ingelheim
OSE RCM #:	2010-1324

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*** **This document contains proprietary data from the Institute for Safe Medication Practices (ISMP) and Quantros which cannot be shared outside of the FDA. Users wanting this information must contact Matthew Grissinger, RPh, FISMP, FASCP, Director, Error Reporting Programs at (215) 947-7797.*****

CONTENTS

EXECUTIVE SUMMARY	3
1 BACKGROUND.....	3
1.1 Introduction.....	3
1.2 Regulatory History.....	3
1.3 Product Information.....	3
2 METHODS AND MATERIALS	4
2.1 Search Criteria.....	4
2.2 FDA Adverse Event Reporting System (AERS)	4
2.3 Additional Database Searches.....	5
2.4 FDA Prescription Analysis Studies.....	5
3 RESULTS.....	6
3.1 Database and Information Sources.....	6
3.2 Expert Panel Discussion.....	6
3.3 FDA Adverse Event Reporting System (AERS) Database.....	6
3.4 Additional Database Searches.....	7
3.5 FDA Prescription Analysis Studies.....	7
3.6 Comments from the Division of Anti-Viral Products (DAVP).....	8
3.7 Safety Evaluator Risk Assessment of Proposed Proprietary Name	8
4 Discussion	8
4.1 Promotional Assessment	8
4.2 Safety Assessment.....	8
5 CONCLUSIONS and recommendations	10
5.1 Comments To The Sponsor.....	10
6 REFERENCES	11
APPENDICES	12

EXECUTIVE SUMMARY

Our analysis of the proposed proprietary name Viramune XR indicates that confusion can occur between Viramune and Viramune XR. Although this finding would lead to DMEPA objecting to the proposed name our FMEA determined the use of an alternate proprietary name can lead to concomitant therapy with Viramune and the alternate name with potential adverse events. The Applicant's proposal to add a modifier to the Viramune root name is a recognized naming convention commonly used when an extended-release dosage form is added to a product line with an existing immediate-release product. Therefore, we do not object to the use of the name, Viramune XR, for this product.

However, we recommend at the time of product launch the Applicant inform healthcare practitioners about the differences between Viramune XR and currently marketed Viramune products, and clearly communicate the available strengths for both products.

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 responds to a request from Boehringer Ingelheim, dated June 11, 2010, for an assessment of the proposed proprietary name, Viramune XR, regarding potential name confusion with other proprietary or established drug names in the usual practice settings.

The Applicant also submitted draft container labels, and insert labeling. The labels and labeling will be reviewed separately under OSE Review #2010-1339.

1.2 REGULATORY HISTORY

Viramune (Nevirapine) is currently marketed in the United States. Viramune Tablets were approved by the FDA on June 21, 1996 under NDA 020636. Viramune Oral Solution was approved on September 11, 1998 under NDA 020933. For this application, the Applicant is proposing an Extended-release formulation of nevirapine to be marketed under the proprietary name Viramune XR.

1.3 PRODUCT INFORMATION

Viramune XR is indicated for use in combination with other antiretroviral agents for the treatment of HIV-1 infection. The recommended initial dose in patients naïve to nevirapine therapy is 200 mg of immediate-release Viramune for 14 days followed by 400 mg of Viramune XR once daily. In treatment experienced patients, therapy can be transitioned to Viramune XR once daily without the 14-day lead in period. Therapy is initiated with a 14-day lead in period to reduce the frequency of severe and life-threatening skin reactions associated with nevirapine therapy. Patients experiencing a mild to moderate rash without constitutional symptoms during the 14-day lead-in period should not have their nevirapine dose increased until the rash has resolved. The total duration of the once-daily lead in period should not exceed 28 days at which point an alternative regimen should be used. Viramune XR will be available as 400 mg tablets and marketed in bottles of 30 tablets.

Viramune (Nevirapine) immediate release tablets and oral solution are already approved for the treatment of HIV-1. Immediate release Viramune is available as a 200 mg tablet, and an oral solution in a 50 mg/ 5mL concentration. The recommended initial dose is 200 mg once daily for 14 days followed by 200 mg twice daily in combination with other anti-retroviral agents.

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 reviewing the proposed proprietary name, Viramune XR

2.1 SEARCH CRITERIA

For this review, particular consideration was given to drug names beginning with the letter “V” 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} Additionally, since omission of a modifier is cited in the literature as a common cause of medication errors³, DMEPA considers “Viramune XR” as a complete name as well as “Viramune,” the root term, omitting the modifying term “XR.”

DMEPA staff evaluates the appropriateness of the modifier “XR” for this product in addition to searching commonly used databases (see Section 6) for currently marketed product names that include “XR” and defining the meaning of “XR” for those products.

To identify drug names that may look similar to Viramune XR, 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 root name (8 letters), upstrokes (1, capital letter ‘V’), downstrokes (none), cross strokes (none), dotted letters (1, lower case letter ‘i’) and modifiers (XR). Additionally, several letters in Viramune XR may be vulnerable to ambiguity when scripted (see Appendix B). DMEPA staff also considers how the exclusion of “XR” may change the appearance of the name. As a result, the DMEPA staff also considers these alternate appearances when identifying drug names that may look similar to Viramune XR.

When searching to identify potential names that may sound similar to Viramune XR, the DMEPA staff search for names with similar number of syllables (five), stresses (VIR-a-mune “X R”; vir-A-mune “X R”; vir-a-MUNE “X R”), and placement of vowel and consonant sounds. Additionally, the DMEPA staff considers that pronunciation of parts of the name can vary (see Appendix B). The Sponsor’s intended pronunciation (VIH-rah-mune XR) was also taken into consideration, as it was included in the Proprietary Name Review Request. Furthermore, names are often mispronounced and/or spoken with regional accents and dialects, so other potential pronunciations of the name are considered. DMEPA staff also considers how the exclusion of “XR” may change the sound of the name.

2.2 FDA ADVERSE EVENT REPORTING SYSTEM (AERS)

Since the root name “Viramune” has been marketed since 1996, DMEPA conducted a search of the FDA Adverse Event Reporting System (AERS) database to determine if there are any medication errors which may be indicative of potential name confusion with Viramune XR. DMEPA conducted an AERS search on July 29, 2010, for medication errors involving Viramune or nevirapine.

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)

³ Lesar TS. Prescribing Errors Involving Medication Dosage Forms. *J Gen Intern Med.* 2002; 17(8): 579-587.

The MedRA High Level Group Terms (HLGT) “Medication Errors” and “Product Quality Issues” were used as search criteria for *Reactions*. The search criteria used for *Products* were active ingredients “nevirapine” trade name “Viramune” and verbatim substance search “Viram%”. No date limitations were set.

The reports were manually reviewed to determine if a medication error occurred. Duplicate reports were combined into cases. The cases that described a medication error were categorized by type of error. We reviewed the cases within each category to identify factors that contributed to the medication errors. If a root cause was associated with name confusion or look and/or sound alike to Viramune, the case was considered pertinent to this review. Those reports that did not describe a medication error or did not describe an error applicable to this review (e.g. errors related to accidental exposures, intentional overdoses, etc.) were excluded from further analysis.

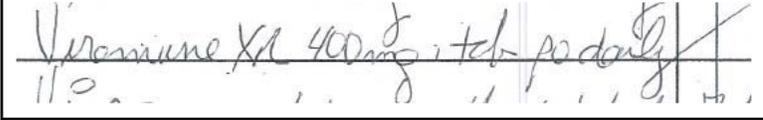
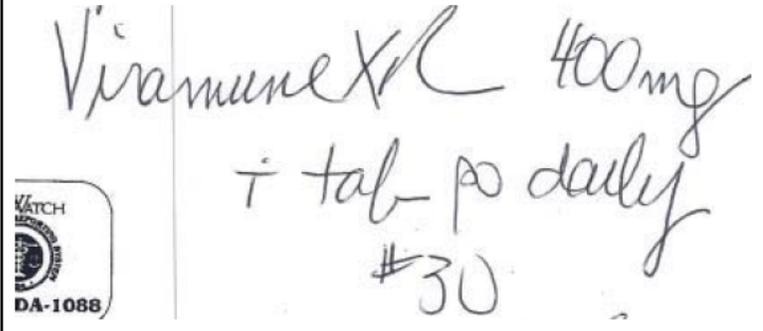
2.3 ADDITIONAL DATABASE SEARCHES

To further assess the significance of name confusion medication errors between Viramune and Viracept we extended our search to additional databases; MEDERRS, PubMed, Google, Stat Ref, and ISMP.

2.4 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.

Figure 1. Viramune XR Study (conducted on July 20, 2010)

HANDWRITTEN REQUISITION MEDICATION ORDER	VERBAL PRESCRIPTION
<p><u>Inpatient Medication Order:</u></p> 	<p>Viramune XR 400 mg Take one daily Dispense #30</p>
<p><u>Outpatient Prescription:</u></p> 	

3 RESULTS

3.1 DATABASE AND INFORMATION SOURCES

The database searches yielded a total of 18 names as having some similarity to the name Viramune XR.

Fourteen of the 18 names (Vesicare, Zymine XR, Levemir, Virac REX, Virazole, Nesacaine, Vusion, (b) (4), Viracept, (b) (4), Niravam, Carimune NF, Renamin, Vincamine) were thought to look like Viramune XR. One of the 18 names (Rapamune) was thought to sound like Viramune XR. The remaining three names (Viramune, Viramune O/S, Viromone) were thought to look and sound similar to Viramune XR.

Additionally, DMEPA identified the United States Adopted Names (USAN) stem “Vir-“ in the proposed proprietary name, as of July 27, 2010. The stem “Vir-“ represents antiviral products.

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 Viramune XR.

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

3.3 FDA ADVERSE EVENT REPORTING SYSTEM (AERS) DATABASE

The AERS search conducted on July 29, 2010, yielded 129 reports. Of these reports, 119 were excluded from further evaluation in this review because they were not related to name confusion with Viramune. However these 119 reports will be considered in our review of the product labels and labeling.

The remaining ten cases describe wrong drug errors between Viramune and another product (See Appendix C for ISR#):

- (2009) One case describes a physician who wrote an order for Viral Immune but the pharmacy filled it as Viramune. The patient was admitted to the hospital with rash and elevated LFT's. No contributing factors were reported. This is the only report involving confusion with Viral Immune. After further researching this product, Viral Immune Stimulator is an homeopathic agent available on-line. Since there has only been one medication error involving this product, we conclude no further action is needed at this time. However, DMEPA will continue to monitor for errors involving this product.
- (2007) A foreign case describes an 8 day old newborn that received 200 mg of nevirapine (Viramune), instead of the prescribed 200 mg of nelfinavir (Viracept). The patient experienced mild isolated neutropenia and hyperlactatemia. Contributing factors were noted as confusion between nevirapine (Viramune) and nelfinavir (Viracept).
- (2002) One case involved a pharmacist grabbing a nevirapine (Viramune) bottle instead of nelfinavir, when trying to dispense medications to an employee based on a post-exposure prophylaxis protocol. The pharmacist realized the error before the patient administered the dose. Contributing factors of similar sounding drug names, similarity in generic and brand names, and both medications indicated in the treatment of HIV were noted.
- (2002) One case describes a physician who wrote a prescription for Viracept 250 mg tid but the pharmacy dispensed Viramune 200 mg tid. The patient developed a rash and fatigue. The patient was treated with Zyrtec and steroid therapy. No contributing factors were reported.
- (1998) In one case a physician wrote a prescription for Viracept tablets but in error the pharmacy dispensed Viramune tablets. The bottle was correctly labeled as Viramune but included

instructions for Viracept dosing. The patient developed rash covering the body, nausea, vomiting, headache, chills and facial swelling. The patient was hospitalized for 5 days and the events resolved. No contributing factors were reported.

- (1998) One case describes a patient who received a prescription for Nelfinavir but the pharmacy inadvertently placed the nelfinavir label on a bottle of nevirapine. The patient did not take any of the medication. The similarity of the generic and brand names as well as available strengths were considered contributing factors. The source of this case was from an article reported in the New England Journal of Medicine.
- (1998) A case reported in the New England Journal of Medicine involves a patient who was prescribed nelfinavir, discovered while her medications were examined during a clinic visit, that three bottles of Nevirapine were erroneously labeled as nefinavir. The patient experienced fatigue, hypersomnia, nausea and rash which improved after discontinuing the medication. Contributing factors such as similarity of the generic and brand names as well as available strengths were attributed to the error.
- (1997) One case involved a patient who was dispensed Viramune in error instead of Viracept. The patient experienced fatigue, hyperinsomnia, rash and nausea. The medications were stopped and the patient was seen in the clinic four days later. Her symptoms resolved. No contributing factors were reported.
- (1997) One case involves a pharmacist complaint that the similarity of the drug names Viramune and Viracept, is going to cause confusion. Viramune is a 200 mg tablet and Viracept is a 250 mg tablet. The similarity in strength further increases the chance of confusing the drugs.
- (1997) One case involves a complaint that the sound alike antiretrovirals Viracept and Viramune are problematic. A physician ordered Viracept and Viramune was dispensed. Contributing factors include sound-alike names, similar color packaging, stored in close proximity due to spelling of names, and the pharmacy supervisor add the new drug (Viracept) to stock without issuing the usual memo when a drug is added to the formulary. No patient outcomes were reported.

3.4 INSTITUTE FOR SAFE MEDICATION PRACTICES DATABASE SEARCHES⁴

Our review of the cases identified from the Quantros search from January 1, 2001 to August 6, 2010 retrieved 2 additional cases of name confusion. These cases occurred in 2004 and 2010. However, outcome information was not reported.

3.5 FDA PRESCRIPTION ANALYSIS STUDIES

A total of 35 practitioners responded. Twenty-six (n=26) practitioners interpreted the name correctly as 'Viramune XR'. Two practitioners omitted the modifier 'XR'. The majority of correct responses occurred in the outpatient written study. The remainder of the practitioners misinterpreted the drug name. The majority of misinterpretations occurred in the verbal study, were misspelled phonetic variations of the proposed name with the ending letter string being misinterpreted as 'moon', and the first syllable being misinterpreted as 'Zer' and 'Ser'. In the written inpatient studies, the majority of misinterpretations involved the second letter 'i' being interpreted as the letter 'e'. In the outpatient studies, all responses were correct. It is important to note that thirty-three practitioners (n=33) presented the complete name

⁴ This document contains proprietary information from Quantros database through an agreement with the Institute for Safe Medication Practices (ISMP) and cannot be shared outside of the FDA.

with the modifier, however in 1 of the 33 responses the modifier was misinterpreted as ‘SR’. See Appendix D for the complete listing of interpretations from the verbal and written prescription studies.

3.6 COMMENTS FROM THE DIVISION OF ANTI-VIRAL PRODUCTS (DAVP)

3.6.1 Initial Phase of Review

In a response to the OSE July 1, 2010 e-mail, the Division of Anti-Viral Products (DAVP) did not have any concerns regarding the proposed proprietary name, Viramune XR as long as another similar name has not been approved.

3.6.2 Midpoint of Review

On August 20, 2010, DMEPA notified the Division of Anti-Viral Products (DAVP) via e-mail that we had no objections to the proposed proprietary name Viramune XR. Per e-mail correspondence from the Division of Anti-Viral Products on August 27, 2010, and indicated that they have no additional comments to our assessment of the proposed proprietary name, Viramune XR.

3.7 SAFETY EVALUATOR RISK ASSESSMENT OF PROPOSED PROPRIETARY NAME

Independent searches by the primary Safety Evaluator resulted in the identification of 3 additional names which were thought to look or sound similar to Viramune XR and represent a potential source of drug name confusion.

Two of the three names (b) (4) and (b) (4) identified by the primary Safety Evaluator were thought to look similar to Viramune XR.

The remaining name, Viramune Mask, was thought to look and sound similar to the proposed proprietary name, Viramune XR.

Thus, we evaluated a total of 21 names for their similarity to the proposed name: eighteen names were identified from the database searches, and three names from the Safety Evaluator independent search.

4 DISCUSSION

The proposed proprietary name, Viramune XR, was evaluated from a safety and promotional perspective based on the product characteristics provided by the Applicant. Furthermore, input from pertinent disciplines involved with the review of this application were considered accordingly.

4.1 PROMOTIONAL ASSESSMENT

DDMAC had no concerns regarding the proposed proprietary name from a promotional perspective and did not offer any additional comments relating to the proposed name. DMEPA and the Division of Anti-Viral Products concurred with the findings of this assessment.

4.2 SAFETY ASSESSMENT

The safety review considered all sources of potential confusion with the proposed name including orthographic or phonetic similarities with currently marketed products, use of the modifier XR, and the USAN stem Vir-.

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

4.2.1 Look-Alike and Sound-Alike Analysis

DMEPA identified 21 names for their potential similarity to the proposed name, Viramune XR. Two of the 21 names lacked convincing orthographic and/or phonetic similarity and were not evaluated further (see Appendix E).

One name identified was Viramune O/S, however it is not the approved proprietary name and refers to the oral solution that is currently available on the market. Therefore it was not evaluated further. Thus, DMEPA evaluated the remaining 18 names.

Failure mode and effects analysis (FMEA) was then applied to determine if the proposed proprietary name could potentially be confused with the remaining 18 names and lead to medication errors. This analysis determined that the name similarity between Viramune XR and seventeen of the 18 remaining names identified was unlikely to result in medication errors for the reasons presented in Appendices F through L.

The remaining name, Viramune, was determined to be vulnerable to confusion due to orthographic and phonetic similarities with the proposed name Viramune XR and overlapping product characteristics.

Viramune XR will be an extension to the Viramune product line which currently contains two formulations, an immediate release tablet (200 mg) and an oral solution (50 mg/5 mL). Both solid oral dosage formulations of Viramune and Viramune XR have product characteristics that allow for achievable strengths between the two formulations. If a physician intends to write a prescription for Viramune XR 400 mg once daily but omits the modifier, the prescription can be filled using two, 200 mg immediate release tablets. By choosing to develop an extended-release formulation of nevirapine tablets with product characteristics that allow for an achievable dose between the formulations, the Applicant has eliminated a potentially valuable error-reduction strategy that has been employed in other product line extensions. If, the Applicant chose a product strength that could not be achieved using multiple tablets of the immediate-release formulation, the unachievable strength would offer an opportunity for an error to be caught before it reaches the patient, if the modifier were omitted or overlooked. However, since the Applicant has completed their clinical trials and submitted their new drug application, DMEPA acknowledges it is unlikely that the product strength will be changed at this time.

DMEPA also analyzed the approach of using an alternative proprietary name for the Nevirapine extended-release product while maintaining the Viramune name for the immediate release product. The FMEA identified the additional failure mode of concomitant therapy. The risk of concomitant therapy leading to over exposure of antiretroviral medication may increase the incidence of severe or life-threatening rash associated with nevirapine. Thus, using the root name, Viramune, with a modifier to distinguish the proposed product from the currently marketed immediate release product is an acceptable approach.

4.2.2 Use of Modifier “XR”

The Applicant proposes to use the root name Viramune and the modifier XR to differentiate the extended-release formulation from the currently marketed Viramune products. This naming convention is commonly used when an extended-release dosage form is added to a product line with an existing immediate-release formulation.

In this case, Viramune XR will be dosed once daily. Thus, the modifier will help differentiate the once daily dosing interval of Viramune XR from the twice daily dosing interval of the currently marketed product Viramune. There are several other products currently marketed where the modifier “XR” corresponds to an extended release product that is dosed once daily. Examples include Keppra XR, Effexor XR, Namenda XR or Xanax XR. Thus, the modifier “XR” adequately emphasizes the most notable difference between Viramune XR and the existing Viramune product, which is the dosing

interval, and the modifier XR is recognized by healthcare practitioners. Therefore, DMEPA believes that the modifier “XR” is appropriate for this product.

4.2.3 USAN Stem

The root name, Viramune, contains the USAN stem Vir-, which represents antiviral products. Inclusion of a USAN stem in a proprietary name typically renders the name unacceptable. However, since the proprietary name, Viramune is approved and the proposed product is a product line extension of Viramune we will not object to the proposed name Viramune XR because it contains a USAN stem.

5 CONCLUSIONS AND RECOMMENDATIONS

Our analysis of the proposed proprietary name Viramune XR indicates that confusion can occur between Viramune and Viramune XR. Although this finding would lead to DMEPA objecting to the proposed name our FMEA determined the use of an alternate proprietary name can lead to concomitant therapy with Viramune and the alternate name with potential adverse events. The Applicant’s proposal to add a modifier to the Viramune root name is a recognized naming convention commonly used when an extended-release dosage form is added to a product line with an existing immediate-release product. Therefore, we do not object to the use of the name, Viramune XR, for this product.

However, we recommend at the time of product launch the Applicant inform healthcare practitioners about the differences between Viramune XR and currently marketed Viramune products, and clearly communicate the available strengths for both products. Further enhancements to the labels and labeling will also minimize the confusion between Viramune and Viramune XR.

We are willing to meet with the Division for further discussion, if needed. If you have further questions or need clarifications, please contact Twanda Scales, OSE Project Manager at 301-796-5056

5.1 COMMENTS TO THE SPONSOR

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

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

If **any** of the proposed product characteristics as stated in your June 11, 2010, submission is altered prior to approval of the marketing application, the proprietary name should be resubmitted for review.

6 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.⁵

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.

⁵ National Coordinating Council for Medication Error Reporting and Prevention. <http://www.nccmerp.org/aboutMedErrors.html>. Last accessed 10/11/2007.

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.⁶ 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 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.⁷ 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 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 for Healthcare Improvement (IHI). Failure Modes and Effects Analysis. Boston. IHI:2004.

⁷ Institute of Medicine. Preventing Medication Errors. The National Academies Press: Washington DC. 2006.

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

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

Lastly, 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 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. Comments from the OND review Division or Generic drugs

DMEPA requests the Office of New Drugs (OND) or Office of Generic Drugs (OGD) Regulatory Division 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. The primary Safety Evaluator addresses any comments or concerns in the safety evaluator's assessment.

The OND or OGD Regulatory Division is contacted a second time following our analysis of the proposed proprietary name. At this point, DMEPA conveys their decision to accept or reject the name. The OND or OGD Regulatory Division is requested to concur/not concur with DMEPA's final decision.

5. Safety Evaluator Risk Assessment of the Proposed Proprietary Name

The primary Safety Evaluator applies his/her individual expertise gained from evaluating medication errors reported to FDA, 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.⁸ 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 possess similarity that would cause confusion at any point in the medication use system, thus the name is eliminated from further review.

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

⁸ Institute for Healthcare Improvement (IHI). Failure Mode and Effects Analysis. Boston. IHI:2004.

“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.

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, Viramune XR	Scripted may appear as	Spoken may be interpreted as
Capital ‘V’	C, L, N, r, U,	F
lower case ‘i’	c, e, l	Any vowel
lower case ‘r’	n, s, t, v, x	w
lower case ‘a’	e, o, c	Any vowel
lower case ‘m’	n, w	n
lower case ‘u’	m, n, o, re, v, w,	any vowel
lower case ‘n’	b, h, m, r, v	m
lower case ‘e’	a, o, c	Any vowel
Modifier ‘XR’		
‘XR’	XA	SR, X

Appendix C: Relevant AERS Cases

Wrong Drug ISR #	
6504511-4	4114935-0
5384631-0	3009271-X
5391641-0	4168407-8
4009007-X	4161233-5
3021843-5	4209410-9

Appendix D: FDA Prescription Study Responses

Inpatient Medication Order	Outpatient Prescription	Voice Prescription
Viramune XR	Viramune XR	Viramoon XR
Viramune XR	Viramune XR	Viramune XR
Viramune XR	Viramune XR	Veramoon XR
Viramune XR	Viramune XR	Zeromoon XR
Viremune XR	Viramune XR	Viramune XR
Viremune SR	Viramune XR	Seramine XR
Viramune XR	Viramune XR	
Viremune XR	Viramune XR	
Viramune XR	Viramune XR	
Viramune	Viramune XR	
Viramune XR		
Veramune		
Viramune XR		

Appendix E: Names Lacking Orthographic and/or Phonetic Similarity.

Name	Similarity to Viramune XR
Levemir	Look
Zymine XR	Look

Appendix F: Discontinued products with no generic equivalent available

Proprietary Name	Similarity to Viramune XR	Established Name
Virac REX	Look	Lapyrium chloride; Undecoylium chloride iodine complex

Appendix G: Products not likely to be written on a prescription

Proprietary Name	Similarity to Viramune XR	Reason
Vincamine Powder :1 gm	Look	Unformulated chemical for pharmacy compounding; Distributed by Professional Compounding Centers of America (PCCA); a distributor of unformulated chemicals for pharmacy compounding.
Tablet: 20 mg		Discontinued by Manufacturer

Appendix H: Expired USPTO Trademarked product with no product information available

Proprietary Name	Similarity to Viramune XR	Commonly used references with no information found
Viromone	Look	Drugs@FDA, Facts and Comparison, Orange Book, RedBook, Micromedex

Appendix I: Proprietary names not approved by the Agency

Proprietary Name	Similarity to Viramune	Reason for Discard
(b) (4)	Look	This was an Alternate name; Application approved under the name Onmel

Appendix J: Products which are not drug names.

Proprietary Name	Similarity to Viramune XR	Status
Viramune Mask	Look and Sound	Respiratory face masks for non-medical purposes

Appendix K: Products with multiple differentiating characteristics

Product name with potential for confusion	Similarity to Viramune XR	Strength /Dosage Form	Usual Dose (if applicable)	Differentiating Product Characteristics and Orthographic Differences
Viramune XR (nevirapine)	N/A	Tablet: 400 mg	400 mg (one tablet) once daily	
Nesacaine Nesacaine-MPF (chloroprocaine)	Look	Injectable: Nesacaine: 1% (10 mg/mL) 2% (20 mg/mL) Nesacaine-MPF 2% (20 mg/mL) 3% (30 mg/mL)	Local anesthesia through infiltration and nerve block Frequency of Administration: Single injection or continuously through an indwelling catheter. Dose administered varies. Maximum single dose without epinephrine, is 11 mg/kg or 800 mg. If given with epinephrine maximum total dose is 14 mg/kg or 1000 mg	-Dosage form (tablet vs. injectable) -Route of administration (oral vs. parenteral), -Strength (single vs. multiple) -Frequency of administration (once daily vs once or continuous infusion)

Product name with potential for confusion	Similarity to Viramune XR	Strength /Dosage Form	Usual Dose (if applicable)	Differentiating Product Characteristics and Orthographic Differences
Viramune XR (nevirapine)	N/A	Tablet: 400 mg	400 mg (one tablet) once daily	
Vusion (miconazole/zinc oxide/ white petrolatum)	Look	Ointment: (0.25%/15% /91.35%) 50 gram tube	Indication: Adjunctive treatment of diaper dermatitis when complicated by documented candidiasis in immunocompetent pediatric patients 4 weeks and older Apply a thin layer to the affected area at each diaper change for 7 days	-Dosage form (tablet vs. topical ointment) -Route of administration (oral vs. topical) -Frequency of administration (once daily vs. at each diaper change) -Duration of therapy (maintenance vs. 7 days) -Orthographic: Length of Name (ten letters vs. six letters)
Carimune NF (Immune Globulin -human)	Look	Lyophilized powder for injection 3 gram/vial, 6 gram/vial, 12 gram/vial	Treatment of patients with primary immunodeficiencies and immune thrombocytopenic purpura (ITP) Immunodeficiency syndromes 0.2 gm/kg to 0.3 gm/kg once a month <u>ITP</u> <i>Induction</i> -0.4g/kg on 2 to 5 consecutive days Maintenance: 0.4 g/kg to 1gm/kg as a single infusion	-Dosage form (tablet vs. injectable) -Route of Administration (oral vs intravenous) -Frequency of Administration (once daily vs. once a month, once on two to five consecutive days or single infusion) -Strength (Single vs. Multiple)

(b) (4)

Product name with potential for confusion	Similarity to Viramune XR	Strength /Dosage Form	Usual Dose (if applicable)	Differentiating Product Characteristics and Orthographic Differences
Viramune XR (nevirapine)	N/A	Tablet: 400 mg	400 mg (one tablet) once daily	
Renamin (Amino Acids)	Look	Injectable: 6 %	Intravenous nutritional support Dosage: Adult: 250 to 500 mL Children: 0.5 to 1 g/kg/day Infusion rates: 20 to 100 mL/hour	-Dosage form (tablet vs. injection) -Route of Administration (oral vs intravenous) -Frequency of administration (once daily vs. continuous infusion) -Strength-unit of measure: (mg vs. %)
Virazole (Ribavirin)	Look	Inhalation Powder for Solution: 6 gm/vial	Severe respiratory syncytial virus (RSV) infection: 20 mg/mL as the starting solution, with continuous aerosol administration for 12 to 18 hours per day for 3 to 7 days	-Dosage form (tablet vs. powder for inhalation) -Route of Administration (orally vs. nasal/oral inhalation) -Frequency of Administration (once daily vs. continuous aerosol administration for 12 to 18 hours per day) -Duration of therapy: (maintenance vs. 3 to 7 days)
Niravam (alprazolam)	Look	Orally disintegrating tablets: 0.25 mg, 0.5 mg, 1 mg, 2 mg	Anxiety/Panic Disorders Initial dosing: 0.25 to 0.5 mg given three times daily. Max dose: 4 mg in divided doses.	-Frequency of administration (once daily vs three times daily) -Strength (single vs. multiple) -Directions for use: (orally vs. may include“place on tongue” Orthographic differences: Length of letters (7 vs. 10 letters), Addition of modifier (XR) further differentiates the names

Appendix L: Potential confusing names

Viramune XR (Nevirapine)	Tablet: 400 mg	1 tablet orally once daily
Failure Mode: Name confusion	Causes	Rationale

(b) (4)



Viramune XR (Nevirapine)	Tablet: 400 mg	1 tablet orally once daily
Failure Mode: Name confusion	Causes	Rationale
<p>Rapamune (sirolimus)</p> <p>Strengths: 0.5 mg, 1 mg, 2 mg 60 mg/ 60 mL Oral solution</p> <p>Prophylaxis of organ rejection in patients >13 years receiving renal transplants</p> <p>Usual Dose:</p> <p>Low to moderate immunologic risk One loading dose of 6 mg on day 1, followed by daily maintenance doses of 2 mg</p> <p>High Immunologic Risk: One loading dose of 15 mg on day 1, followed by daily maintenance doses of 5 mg.</p>	<p>Orthographic and Phonetic Similarities: Both names contain the letter string ‘mune’ at the end of the name</p> <p>Route of Administration: Both products are given orally</p> <p>Overlap in Frequency of administration: once daily</p>	<p>The orthographic differences in addition to the differing product characteristics minimize the likelihood of medication errors in usual practice settings.</p> <p>Rationale: The beginning letter strings are different (Vir- vs Rap-) differ between the names adding visual differences which will minimize name confusion. The downstroke ‘p’ in Rapamune also visual differentiates the name.</p> <p>There is no overlap or achievable strengths between the two products. Although, Viramune XR is a single strength product and will not require a strength to be written on the prescription, Rapamune is available in multiple strengths requiring a strength to be written on a prescription. Since the strengths do not overlap, this will allow a pharmacist to detect if an error has occurred.</p> <p>In addition, a prescription/order for Rapamune oral solution may be ordered/written using dose designations such as teaspoons or milliliters, which would differentiate it from Viramune XR which is only proposed to be available as tablets.</p>

Viramune XR (Nevirapine)	Tablet: 400 mg	1 tablet orally once daily
Failure Mode: Name confusion	Causes	Rationale
<p>Vesicare (Solifenacin) Tablets</p> <p>Strengths: 5 mg, 10 mg</p> <p>Usual Dose: 5 mg to 10 mg once daily</p>	<p>Orthographic Similarities:</p> <p>Same root name length (8 letters)</p> <p>Similarity in beginning letter string when scripted ('Vir' vs 'Ves')</p> <p>Similarity in ending letter string when scripted ('ne' vs 're')</p> <p>Route of Administration:</p> <p>Both products are given orally</p> <p>Overlap in Frequency of administration:</p> <p>once daily</p>	<p>Orthographic differences and product characteristic differences minimize the likelihood of medication error in the usual practice setting.</p> <p>Rationale:</p> <p>Although both root names have the same number of letters and similar beginning and ending letter strings, the middle letter string of the names are different ('amu' vs 'ica').</p> <p>In addition the modifier "XR" helps to distinguish the names from each other.</p> <p>Also, Vesicare is available in two strengths which will require the prescription to include a strength. This will help minimize confusion if the names are confused. Additionally there are no overlapping doses.</p>

Viramune XR (Nevirapine)	Tablet: 400 mg	1 tablet orally once daily
Failure Mode: Name confusion	Causes	Rationale
<p>Viracept (Nelfinavir) Treatment of HIV-1</p> <p>Adults: 1250 mg twice daily 750 mg three times daily</p> <p>Peds: 45 to 55 mg/kg twice daily or 25 to 35 mg three times daily</p> <p>Supplied: tablet: 250 mg, 525 mg Oral Powder: 50 mg/scoopful</p>	<p><i>Orthographic:</i></p> <p>Similarity of brand name Similarity of generic name</p> <p><i>Other Product Characteristics:</i></p> <p>Similarity in strength (200 mg vs 250 mg)</p> <p><i>Population of Use:</i></p> <p>Both drugs are used to treat HIV-1</p>	<p>Eleven cases of name confusion between Viracept and Viramune have been reported. Contributing factors include similarity of the established names (nevirapine vs. nelfinavir), proprietary names (Viramune vs. Viracept) and strengths (200 mg vs 250 mg).</p> <p>Viramune and Viracept were approved within one year of each other, 1996 and 1997 respectively. Six of the name confusion cases occurred within the first 2 years of both products co-existing in the marketplace (1997 to 1998). Two of the six cases involved practitioners reporting their concerns about potential confusion and two of the cases involved name confusion between the established names (Nelfinavir and Nevirapine).</p> <p>The remaining five cases of name confusion occurred over the past 12 years (1999 to 2010). Three of the five cases involved proprietary name confusion and two involved established name confusion.</p> <p>DMEPA believes the introduction of the extended release formulation, Viramune XR, will not exacerbate proprietary name confusion medication errors with Viracept. On the contrary, the use of the modifier “XR” will further differentiate the two proprietary names.</p> <p>However, DMEPA will continue to monitor both proprietary and established name confusion medication errors between these products.</p>

Application Type/Number	Submission Type/Number	Submitter Name	Product Name
NDA-201152	ORIG-1	BOEHRINGER INGELHEIM PHARMACEUTICA LS INC	Nevirapine Extended Release Tablets

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

/s/

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09/09/2010

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