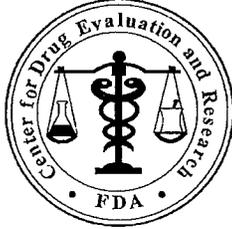


**CENTER FOR DRUG EVALUATION AND  
RESEARCH**

*APPLICATION NUMBER:*

**22-341**

**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: January 13, 2010

To: Mary Parks, MD, Director  
Division of Metabolism and Endocrinology Products

Through: Carlos Mena-Grillasca, RPh, Team Leader  
Denise P. Toyer, PharmD, Deputy Director  
Division of Medication Error Prevention and Analysis (DMEPA)

From: Walter Fava, R.Ph., Safety Evaluator  
Division of Medication Error Prevention and Analysis (DMEPA)

Subject: Proprietary Name Review

Drug Name(s): Victoza (Liraglutide) Injection  
18 mg/3 mL multiple dose prefilled pen

Application Type/Number: NDA 022341

Applicant: Novo Nordisk, Inc.

OSE RCM #: 2010-50

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3	CONCLUSIONS AND RECOMMENDATIONS.....	3
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## **1 INTRODUCTION**

This re-assessment of the proprietary name is written in response to the anticipated approval of this NDA within 90 days from the date of this review. The Division of Medication Error Prevention and Analysis (DMEPA) found the proposed proprietary name, Victoza, acceptable in OSE Reviews #2008-220, dated July 20, 2009, and 2009-1696 dated October 20, 2009. The Division of Metabolism and Endocrinology Products did not have any concerns with the proposed name, Victoza, and the Division of Drug Marketing, Advertising and Communication (DDMAC) found the name acceptable from a promotional perspective on September 23, 2009.

## **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 proprietary name review. We used the same search criteria previously used in OSE Review #2008-220. Since none of the proposed product characteristics were altered we did not re-evaluate previous names of concern. Additionally, DMEPA 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 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.

The searches of the databases referenced in Section 4 did not yield any new names thought to look or sound similar to Victoza and represent a potential source of drug name confusion.

DMEPA staff did not identify any United States Adopted Names (USAN) stems in the proposed proprietary name, Victoza, as of January 12, 2010.

## **3 CONCLUSIONS AND RECOMMENDATIONS**

The proprietary name risk assessment findings indicate that the proposed name, Victoza, 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, Victoza, 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 Metabolism and Endocrinology Products should notify DMEPA because the proprietary name must be re-reviewed prior to the new approval date.

#### 4 REFERENCES

1. OSE review # 2008-220 dated July 20, 2009; Proprietary Name Review of Victoza; Walter Fava, Safety Evaluator.
2. OSE review # 2009-1696 dated October 20, 2009; Proprietary Name Review of Victoza; Walter Fava, Safety Evaluator.
3. **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.

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 Names 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.

Application  
Type/Number

Submission  
Type/Number

Submitter Name

Product Name

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NDA-22341

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ORIG-1

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NOVO NORDISK  
INC

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VICTOZA (LIRAGLUTIDE)

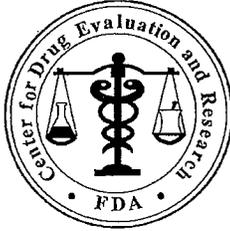
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/s/

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WALTER L FAVA  
01/13/2010

CARLOS M MENA-GRILLASCA  
01/14/2010

DENISE P TOYER  
01/14/2010



**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: October 20, 2009

To: Mary Parks, MD, Director  
Division of Metabolism and Endocrinology Products

Through: Carlos Mena-Grillasca, RPh, Team Leader  
Denise P. Toyer, PharmD, Deputy Director  
Division of Medication Error Prevention and Analysis (DMEPA)

From: Walter Fava, R.Ph., Safety Evaluator  
Division of Medication Error Prevention and Analysis (DMEPA)

Subject: Proprietary Name Review

Drug Name(s): Victoza (Liraglutide) Injection  
18 mg/3 mL multiple dose prefilled pen

Application Type/Number: NDA 022341

Applicant: Novo Nordisk, Inc.

OSE RCM #: 2009-1696

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## **1 INTRODUCTION**

This re-assessment of the proprietary name is written in response to the anticipated approval of this NDA within 90 days from the date of this review. The Division of Medication Error Prevention and Analysis (DMEPA) found the proposed proprietary name, Victoza, acceptable in OSE Review #2008-220, dated July 20, 2009. The Division of Metabolism and Endocrinology Products did not have any concerns with the proposed name, Victoza, and the Division of Drug Marketing, Advertising and Communication (DDMAC) found the name acceptable from a promotional perspective on September 23, 2009.

## **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 proprietary name review. We used the same search criteria previously used in OSE Review #2008-220 and since none of the proposed product characteristics were altered we did not re-evaluate previous names of concern. Additionally, DMEPA 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 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.

The searches of the databases referenced in Section 4 did not yield any new names thought to look or sound similar to Victoza and represent a potential source of drug name confusion.

DMEPA staff did not identify any United States Adopted Names (USAN) stems in the proposed proprietary name, Victoza, as of October 13, 2009.

## **3 CONCLUSIONS AND RECOMMENDATIONS**

The proprietary name risk assessment findings indicate that the proposed name, Victoza, 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, Victoza, 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 Metabolism and Endocrinology Products should notify DMEPA because the proprietary name must be re-reviewed prior to the new approval date.

#### 4 REFERENCES

1. OSE review # 2008-220 Proprietary Name Review of Victoza; Walter Fava, Safety Evaluator.

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.

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USAN Stems List contains all the recognized USAN stems.

4. **CDER Proposed Names 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.

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/s/

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WALTER L FAVA  
10/21/2009

CARLOS M MENA-GRILLASCA  
10/21/2009

DENISE P TOYER  
10/23/2009



**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 20, 2009

To: Mary Parks, M.D., Director  
Division of Metabolism and Endocrinology Products

Thru: Kellie Taylor, MPH, PharmD., Team Leader  
Denise Toyer, PharmD., Deputy Director  
Carol Holquist, R.Ph., Director  
Division of Medication Error Prevention and Analysis

From: Walter Fava, R.Ph., Safety Evaluator  
Division of Medication Error Prevention and Analysis

Subject: Proprietary Name Review

Drug Name(s): Victoza (liraglutide) Injection **b(4)**

Application Type/Number: NDA: 22-341  
IND: 61,040

Sponsor: NovoNordisk, Inc.

OSE RCM #: 2008-220  
2008-929

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

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## EXECUTIVE SUMMARY

Victoza is the proposed proprietary name for liraglutide injection. 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 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 Victoza conditionally acceptable for this product. The proposed proprietary name must be re-reviewed upon submission of the NDA and 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

b(4)

This review was written in response to a request from the Division of Metabolism and Endocrinology Products, to evaluate the product for its potential to contribute to medication errors. The proposed name, Victoza, is evaluated to determine if the name could potentially be confused with other proprietary or established drug names. The Applicant submitted an independent analysis of the name by the \_\_\_\_\_, a subsidiary of the \_\_\_\_\_ for review and comment. Container (pen) labels, carton and insert labeling were also provided to evaluate from a medications errors perspective and review comments will be provided under separate cover in a forthcoming review (OSE #: 2008-1096).

### 1.2 PRODUCT INFORMATION

Victoza (Liraglutide) is a long-acting derivative of the naturally occurring intestinal hormone, glucagon-like peptide-1 (GLP-1). Liraglutide is a selective GLP-1 agonist, with a high potency at the human GLP-1 receptor. It is proposed to be indicated as an adjunct to diet and exercise to improve glycemic control in patients with type 2 diabetes mellitus. It is administered as a subcutaneous injection once daily at any time during the day. The recommended initial dose is 0.6 mg as monotherapy or as combination therapy. The dose can be increased in one week intervals to 1.2 mg per day, then up to a maximum dose of 1.8 mg once daily.

Victoza is provided in pre-filled disposable pen injectors with a 3 mL cartridge in a concentration of 6 mg/mL.

b(4)

## 2 METHODS AND MATERIALS

This section describes the methods and materials used by the Division of Medication Error Prevention and Analysis staff conducting a proprietary name risk assessment (see section 2.1). The primary focus of the assessment is to identify and remedy potential sources of medication error prior to drug approval. The Division of Medication Error Prevention and Analysis 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.<sup>1</sup>

## **2.1 PROPRIETARY NAME RISK ASSESSMENT**

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

For the proprietary name, Victoza, the DMEPA staff search a standard set of databases and information sources to identify names with orthographic and phonetic similarity (see Sections 2.1.1 for detail) and held an CDER Expert Panel discussion to gather professional opinions on the safety of the proposed proprietary name (see 2.1.1.2). We also conduct internal CDER prescription analysis studies (see 2.1.2), and, when provided, external prescription analysis studies results are considered and incorporated into the overall risk assessment (see detail 2.1.4).

The Safety Evaluator assigned to the Proprietary Name Risk Assessment is responsible for considering the collective findings, and provides an overall risk assessment of the proposed proprietary name (see detail 2.1.4). The overall risk assessment is based on the findings of a Failure Mode and Effects Analysis (FMEA) of the proprietary name, and is focused on the avoidance of medication errors. FMEA is a systematic tool for evaluating a process and identifying where and how it might fail.<sup>2</sup> 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 use the clinical expertise of the DMEPA staff to anticipate the conditions of the clinical setting that the product is likely to be used in based on the characteristics of the proposed product.

In addition, the product characteristics provide the context for the verbal and written communication of the drug names and can interact with the orthographic and phonetic attributes of the names to increase the risk of confusion when there is overlap, or, in some instances, decrease the risk of confusion by helping to differentiate the products through dissimilarity. As such, the staff consider 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. 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.<sup>3</sup>

### **2.1.1 Search Criteria**

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

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

<sup>2</sup> Institute for Healthcare Improvement (IHI). Failure Modes and Effects Analysis. Boston. IHI:2004.

<sup>3</sup> Institute of Medicine. Preventing Medication Errors. The National Academies Press: Washington DC. 2006.

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 ISMP Medication Error Reporting Program involve pairs beginning with the same letter.<sup>45</sup>

To identify drug names that may look similar to Victoza, 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 (7 letters), upstrokes (2, capital letter 'V' and lower case letter 't'), downstrokes (one or none, depending on how the letter 'z' is scripted), cross-strokes (one letter, 't'), and dotted letters (one letter, 'i'). Additionally, several letters in Victoza may be vulnerable to ambiguity when scripted, including the letter 'V' which may appear as the letters 'U', 'N', 'L', 'Z' or 'C'; the lower case letter 'i' may appear as a lower case 'e', 'r', or 'u'; and '-oza' may appear as '-ozo', '-azo', '-aza', '-oyo', '-oya', '-aya', '-ogo', '-ago', '-oga', '-aga'. As such, the staff also consider these alternate appearances when identifying drug names that may look similar to Victoza.

When searching to identify potential names that may sound similar to Victoza, the staff search for names with similar number of syllables (3), stresses (vic-TO-za or VIC-to-ZA), and placement of vowel and consonant sounds. Additionally, the DMEPA staff considers that pronunciation of parts of the name can vary such as 'Vic' may sound like 'Vike', 'Bic', 'Vuc', 'Vec'; and 'to' may sound like 'too'. The Applicant did not provide their intended pronunciation of the proprietary name in the proposed name submission and, therefore, it could not be taken into consideration. Moreover, names are often mispronounced and/or spoken with regional accents and dialects, so other potential pronunciations of the name are considered.

The staff also consider the product characteristics associated with the proposed drug throughout the identification of similar drug names, since the product characteristics of the proposed drug ultimately determine the use of the product in the clinical practice setting. For this review, the staff were provided with the following information about the proposed product: the proposed proprietary name (Victoza), the established name (liraglutide), proposed indication (Type II Diabetes), strength (1.2 mg, 1.8 mg), dose (1.2 mg daily, titrate up to 1.8 mg daily based on clinical response), frequency of administration (daily), route (parenteral) and dosage form of the product (injection). Appendix A provides a more detailed listing of the product characteristics the medication error generally take into consideration.

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

#### **2.1.1.1 Database and Information Sources**

The proposed proprietary name, Victoza, was provided to the DMEPA staff to conduct a search of the internet, several standard published drug product reference texts, and FDA databases to identify existing and proposed drug names that may sound-alike or look-alike to Victoza using the criteria outlined in 2.1.1.1. A standard description of the databases used in the searches is provided in Section 7. 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

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

<sup>5</sup> Kondrack, G and Dorr, B. Automatic Identification of Confusable Drug Names. Artificial Intelligence in Medicine (2005)

Analysis (POCA), uses complex algorithms to select a list of names from a database that have some similarity (phonetic, orthographic, or both) to the trademark being evaluated. Lastly, the DMEPA staff reviews the United States Adopted Names (USAN) stem list to determine if any USAN stems are present within the proprietary name. The findings of the individual Safety Evaluators were then pooled and presented to the Expert Panel.

**2.1.1.2 CDER Expert Panel Discussion**

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

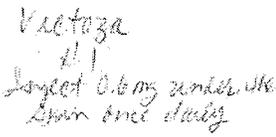
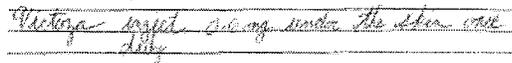
The pooled results of the staff were presented to the Expert Panel for consideration. Based on the clinical and professional experiences of the Expert Panel members, the Panel may recommend the addition of names, additional searches by the Safety Evaluator to supplement the pooled results, or general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

**2.1.2 CDER 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 Victoza 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 Victoza 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 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. Victoza Study (conducted on March 13, 2008)**

HANDWRITTEN PRESCRIPITON AND MEDICATION ORDER	VERBAL PRESCRIPTION
<p>Outpatient Prescription:</p> 	<p>Victoza #1 Inject 0.6 mg under the skin once daily.</p>
<p>Inpatient Medication Order:</p> 	

### ***2.1.3 External Proprietary Name Risk Assessment***

For this product, the Applicant submitted an independent risk assessment of the proposed proprietary name conducted by a consulting firm. 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 's 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 the usual practice settings.

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

### ***2.1.4 Comments from the Division of Metabolism and Endocrinology Products***

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.

### ***2.1.5 Safety Evaluator Risk Assessment of the Proposed Proprietary Name***

Based on the criteria set forth in Section 2.1.1, the Safety Evaluator Risk Assessment applies their individual expertise gained from evaluating medication errors reported to FDA to conduct a Failure Mode and Effects Analysis and provide an overall risk of name confusion. Failure Mode and Effects Analysis (FMEA) is a systematic tool for evaluating a process and identifying where and how it might fail.<sup>6</sup> When applying FMEA to assess the risk of a proposed proprietary name, DMEPA seeks to evaluate the potential for a proposed name to be confused with another drug name as a result of the name confusion and cause errors to occur in the medication use system. FMEA capitalizes on the predictable and preventable nature of medication errors associated with drug name confusion. FMEA allows the Agency to identify the potential for medication errors due to look- or sound-alike drug names prior to approval, where actions to overcome these issues are easier and more effective than 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 modes.

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

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<sup>6</sup> Institute for Healthcare Improvement (IHI). Failure Modes and Effects Analysis. Boston. IHI:2004.

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 Victoza 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 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.

The Division of Medication Error Prevention and Analysis will object to the use of proposed proprietary name when the one or more of the following conditions are identified in the Safety Evaluator's Risk Assessment:

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

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

If none of these conditions are met, then DMEPA will not object to the use of the proprietary name. If any of these conditions are met, then 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 Applicant; however, the safety concerns set forth in criteria 1 through 5 are supported either by FDA Regulation or by external healthcare

authorities, including the Institute of Medicine, the World Health Organization, the Joint Commission on Accreditation of Healthcare Organizations, and the Institute of Safe Medication Practices, have examined medication errors resulting from look- or sound-alike drug names and called for Regulatory Authorities to address the issue prior to approval.

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

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

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

### **3 RESULTS**

#### **3.1 PROPRIETARY NAME RISK ASSESSMENT**

##### ***3.1.1 Database and Information Sources***

This search identified 23 names as having some similarity to the name Victoza.

Fifteen names were thought to look like Victoza, which include: Bicitra, Virazole, Zolinza, Asolza\*\*\*, Nicotine, Vadova\*\*\*, Vectibix,  Viactiv, Vicodin, Vi-Dom-A, Videx, Visudyne, Vicam, and Vitaros. Three names,  Vytorin, and Vasotec, were thought to sound like Victoza. Five additional names, Vectrin, Victrix, Vicotuss, Vidaza, and Victoza, were thought to look and sound similar to Victoza.

Additionally, the Division of Medication Error Prevention did not identify any United States Adopted Names (USAN) stems in the name Victoza, as of the last date searched on April 16, 2009.

##### ***3.1.2 Expert Panel Discussion***

The Expert Panel reviewed the pool of names identified by the Division of Medication Error Prevention staff (see section 3.1.1. above), and noted no additional names thought to have orthographic similarity to Victoza and have the potential for confusion. The Expert Panel also noted that despite orthographic similarity of the letter 'V' with the letters 'L' in some handwriting samples, no names beginning with that

letter was included in the pool. The Expert Panel recommended that independent searches consider the potential for confusion with drug names beginning with this letter.

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 External Proprietary Name Risk Assessment***

In the Proposed Name Risk Assessment submitted by the Applicant, the Drug Safety Institute identified and evaluated twelve names not previously identified by DMEPA and thought to have some potential for confusion with the name, 'Victoza'. Twelve names, Actos, Evactol, Lipitor, Valtrex, Vicon-C, Victors, Vincol, Viscoat, Vitazin, Vitonic, Vi-zac, and Vytone, were generated by the Computerized Orthographic and Phonologic Analysis (COPA) and each was identified as having both orthographic and phonetic similarity to 'Victoza'.

### ***3.1.4 Comments from the Division of Metabolism and Endocrinology Products (DMEP)***

On July 8, 2009, DMEPA notified DRUP via e-mail that we had no objections to the proposed proprietary name, Victoza. Per e-mail correspondence from DMEP on July 20, 2009, they indicated that they concur with our assessment of the proposed proprietary name, Victoza.

### ***3.1.5 CDER Prescription Analysis Studies***

A total of 32 practitioners responded, but none of the responses overlapped with any existing or proposed drug names. About two thirds of the participants (n=21) interpreted the name correctly as "Victoza," with correct interpretation occurring more frequently in the written studies. The remainder of the responses misinterpreted the drug name. The majority of misinterpretations occurred in the phonetic prescription study, with the vowels in Victoza reported as 'u', instead of 'i'. Additionally, in the verbal prescription studies, the letter 'V' was misinterpreted as an 'Z' by one respondent and as the letter 'B' by another respondent. The ending letters, 'oza' were misinterpreted as 'osa' by nine respondents. See Appendix A for the complete listing of interpretations from the verbal and written prescription studies.

### ***3.1.6 Safety Evaluator Risk Assessment***

Independent searches by the primary Safety Evaluator identified an additional three names, Vitrase, Vilasta\*\*\*, and Lovaza, thought to look similar to Victoza and represent a potential source of drug name confusion. Careful evaluation was afforded to drug names beginning with the letter 'L' in accordance with the Expert Panel's recommendations. The searches also revealed that the proprietary name Victoza is trademarked in other countries. All of these trademarks are registered to Novo Nordisk, therefore, it was not reviewed further. As such, a total of 37 names were analyzed to determine if the drug names could be confused with Victoza.

## 4 DISCUSSION

Neither DDMAC nor the Division of Metabolism and Endocrinology Products had concerns with the proposed name. We analyzed a total of thirty seven names for their potential orthographic and phonetic similarity to the proposed name, Victoza. Fifteen of the thirty-seven names lacked orthographic and/or phonetic similarity and were not evaluated further (see Appendix C).

Failure mode and effects analysis (FMEA) was then applied to determine if the proposed name, Victoza, could potentially be confused with any of the 22 names and lead to medication errors. This analysis determined that the name similarity between Victoza was unlikely to result in medication errors with any of the twenty two products for the reasons presented in Appendices D through J. This finding was consistent with and supported by an independent risk assessment of the proprietary name submitted by the Applicant.

Additionally, we did not identify other issues with the proposed name that would render the name unacceptable at this time.

## 5 CONCLUSIONS AND RECOMMENDATIONS

The Proprietary Name Risk Assessment findings indicate that the proposed name, Victoza, is not vulnerable to name confusion that could lead to medication errors. As such, the Division of Medication Error Prevention and Analysis does not object to the use of the proprietary name, Victoza, for this product at this time. If you have further questions or need clarifications, please contact Mildred Wright, at 301-796-1027.

### 5.1 COMMENTS TO THE APPLICANT

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

The proposed proprietary name Victoza will be re-reviewed if approval of the NDA is delayed beyond 90 days from the date of this review. 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

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 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. ***WWW location*** <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](http://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](http://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 consider 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. The DMEPA staff also examine 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 led to medication errors. The DMEPA staff apply their expertise gained from root-cause analysis of such medication errors to identify sources of ambiguity within the name that could be introduced when scripting (i.e. “T” may look like “F,” lower case ‘a’ looks like a lower case ‘u,’ etc), along with other orthographic attributes that determine the overall appearance of the drug name when scripted (see detail in Table 1 below). Additionally, since verbal communication of medication names is common in clinical settings, the DMEPA staff compare the pronunciation of the proposed proprietary name with the pronunciation of other drug names. If provided, DMEPA will consider the Sponsor’s intended pronunciation of the proprietary name. However, because the Applicant has little control over how the name will be spoken in practice, DMEPA also considers a variety of pronunciations that could occur in the English language.

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

Type of similarity	Considerations when searching the databases		
	Potential causes of drug name similarity	Attributes examined to identify similar drug names	Potential Effects
Look-alike	Similar spelling	Identical prefix Identical infix Identical suffix Length of the name Overlapping product characteristics	<ul style="list-style-type: none"> <li>Names may appear similar in print or electronic media and lead to drug name confusion in printed or electronic communication</li> <li>Names may look similar when scripted and lead to drug name confusion in written communication</li> </ul>
	Orthographic similarity	Similar spelling Length of the name Upstrokes Downstrokes Cross-strokes Dotted letters Ambiguity introduced	<ul style="list-style-type: none"> <li>Names may look similar when scripted, and lead to drug name confusion in written communication</li> </ul>

		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	<ul style="list-style-type: none"> <li>Names may sound similar when pronounced and lead to drug name confusion in verbal communication</li> </ul>

**Appendix B:**

CDER Prescription Study Responses

Outpatient Prescription	Voice Prescription	Inpatient Medication Order
Victoza	Viacta	Victoza
Victoza	Victoza	Victoza
Victoza	Victosa	Victoza
Victoza	Victoza	Victorza
Victoza	Buctosa	Victoza
Victoza	Victosa	Victoza
Victoza	Victosa	Victoza
Victoza	Victosa	Victoza
	Victosa	Victoza
	Victosa	Victoza
	Victosa	
	Victoza	
	Victoza	
	Zictosa	

**Appendix C:** Proprietary names lacking convincingly similar orthographic and/or phonetic characteristics with Victoza

<b>Proprietary Name</b>	<b>Similarity to Victoza</b>
Actos	Look and Sound
Asolza	Look
Lipitor	Look and Sound
Vectibix	Look
Vi-Dom-A	Look
Videx	Look
Visudyne	Look
Vicam	Look
Vicon-C	Look and Sound
Virazole	Look
Viscoat	Look and Sound
Vytone	Look and Sound
Vytorin	Look
Vasotec	Look
Zolinza	Look

**Appendix D:** Proprietary names used only in Foreign Countries

Proprietary Name	Similarity to Victoza	Country
Victrix	Look	Brazil

**Appendix E:** Proprietary names for discontinued products, no generics are available.

Proprietary Name	Similarity to Victoza
Evactol	Look and Sound
Vi-Zac	Look and Sound
Vicotuss	Look and Sound
Victors	Look and Sound
Vincol	Look and Sound
Vitonic	Look and Sound

**Appendix F:** Proprietary names of products withdrawn by the Commissioner and no generics available

Proprietary Name	Date Withdrawn
_____	July 24, 1970

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**Appendix G:** Proprietary names not marketed and withdrawn from consideration by the Applicant

Proprietary Name	Status Date
Vadova***	Withdrawn January 25, 2008

**Appendix H:** Proprietary names for over-the-counter products with orthographic similarity to Victoza, but differentiating product characteristics minimize errors

Proprietary Name	Similarity to Victoza	Differentiating Product Characteristics
Viactiv	Look	Different dosage forms: Injection vs chewable  Different routes of administration: Subcutaneous vs oral  Different doses: milligrams vs 'pieces'
Vitazin	Look and Sound	Different dosage forms: Injection vs tablet  Different routes of administration: Subcutaneous vs oral  Different doses: milligrams vs tablets

**Appendix I:** Products with no overlap in strength and dose.

Product name with potential for confusion	Similarity to Proposed Proprietary Name	Strength	Usual Dose (if applicable)
<b>Victoza (liraglutide)</b>		<b>0.6 mg 1.2 mg 1.8 mg</b>	<b>Recommended Maintenance dose: 1.2 mg to 1.8 mg injected subcutaneously once a day</b>
Valtrex	Look and Sound	500 mg and 1000 mg	1000 mg to 3000 mg per day in divided doses
Bicitra (sodium citrate and citric acid)	Look	500 mg sodium citrate and 334 mg citric acid monohydrate/5 mL	15 mL to 30 mL diluted with water after meals and at bedtime
Nicotine (established name for Nicorette)	Look	2 mg and 4 mg gum;  21 mg/24 hr, 14 mg/24 hr, and 7 mg/24 hr transdermal patches	<25 cigarettes/day: 2 mg gum up to 24 pieces per day >25 cigarettes/day: 4 mg gum up to 24 pieces per day  1 patch topically each day in decreasing increments as follows: 21 mg/24 hr patch daily for 4 to 6 weeks, then

			14 mg/24 hr patch daily for 2 weeks, then 7 mg/24 hr patch daily for 2 weeks.
Vicodin (hydrocodone bitartrate/acetaminophen)	Look	5 mg hydrocodone bitartrate/500 mg acetaminophen	1 to 2 tablets by mouth every 4 to 6 hours as needed for pain
Vectrin (minocycline)	Look	50 mg, 75 mg, and 100 mg capsules	50 mg to 100 mg by mouth twice a day
Vitaros*** (Alprostadil)	Look	0.2% or 0.3% Cream	300 mcg applied to the tip of the penis 5 to 30 minutes prior to attempting intercourse using the AccuDose dispenser provided.
_____			
_____			
Vitrase (hyaluronidase)	Look	200 units/mL solution for injection; 6,200 units lyophilized powder for injection	150 units to 200 units infused at a rate and frequency specifically adjusted for patients.
Lovaza (Omega-3 Acid Ethyl Esters)	Look	1 gram capsules	1 to 2 capsules by mouth three times a day with meals

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**Appendix J:** Potential confusing name with multiple differentiating product characteristics

Proprietary Name	Strength	Usual Dose:
Victoza	0.6 mg, 1.2 mg, 1.8 mg	1.2 mg to 1.8 mg subcutaneously once a day
Failure Mode: Name Confusion	Causes (could be multiple)	Effects
Vidaza (Azacitidine)	<p>Orthographic similarities include:</p> <p>Both names begin with the letters 'Vi'</p> <p>The letter 'd' in Vidaza may appear like the letters 'ct' when scripted</p> <p>Both names end in the letters 'za'</p> <p>Both names contain an upstroke letter in similar</p>	<p>Despite orthographic similarities and overlapping routes of administration (subcutaneous), different product characteristics minimize the potential for confusion.</p> <p><i>Rationale:</i></p> <p>Different dosage forms: <i>injection vs lyophilized powder</i></p> <p>Different delivery systems: <i>prefilled pens vs syringe/IV line</i></p> <p>Different product strengths: <i>0.6 mg,</i></p>

	<p>positions in the names 'd' vs 't'</p> <p>Ending letter string 'aza' in Vidaza may look like the ending letter string 'oza' in Victoza</p> <p>Six letters (Vidaza) vs Seven letters (Victoza) making the names appear similar in length when scripted</p> <p>Similar product characteristics include:</p> <p>Both products are parenterals</p> <p>Both products may be administered subcutaneously</p> <p>Both products may be administered once a day</p>	<p><i>1.2 mg, 1.8 mg vs 100 mg</i></p> <p>Different dosing regimens: <i>0.6 mg to 1.8 mg vs 75 mg/m<sup>2</sup></i></p> <p>No achievable or overlapping doses:</p> <p><i>1.2 mg per day vs 100 mg/m<sup>2</sup> therefore, it is not possible to achieve the usual dose of Vidaza with Victoza, and conversely, it is not possible to measure the usual dose of Victoza with Vidaza.</i></p> <p>Different dosing frequencies: <i>once daily vs once daily for 5 to 7 days every 4 weeks</i></p> <p>Different prescribing populations: <i>Endocrinologists/Internists vs Oncologists</i></p> <p>Different usual settings of use: <i>Outpatient/Amulatory vs clinic/inpatient</i></p> <p>Different prescribing requirements: <i>Victoza prescribers will typically write orders; 'Victoza XX mg Pen, Inject xx mg subcutaneously once a day' vs 'Vidaza Infuse xx mg IV daily for 5-7 days every 4 weeks'.</i></p>
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