

**CENTER FOR DRUG EVALUATION AND
RESEARCH**

APPLICATION NUMBER:

208276Orig1s000

PROPRIETARY NAME REVIEW(S)

PROPRIETARY NAME MEMORANDUM

Division of Medication Error Prevention and Analysis (DMEPA)
Office of Medication Error Prevention and Risk Management (OMEPRM)
Office of Surveillance and Epidemiology (OSE)
Center for Drug Evaluation and Research (CDER)

***** This document contains proprietary information that cannot be released to the public*****

Date of This Review:	April 26, 2018
Application Type and Number:	NDA 208276
Product Name and Strength:	Implantable System for Remodulin [for use with Remodulin (Treprostinil) Injection 200 mg/20 mL]
Product Type:	Device
Rx or OTC:	Rx
Applicant/Sponsor Name:	United Therapeutics Corporation
Panorama #:	2018-20666737
DMEPA Safety Evaluator:	Maximilian Straka, PharmD, FISMP
DMEPA Team Leader:	Chi-Ming (Alice) Tu, PharmD, BCPS, FISMP

1 INTRODUCTION

This memorandum is to reassess the proposed proprietary name, Implantable System for Remodulin, which was found conditionally acceptable under NDA 208276 on April 7, 2017.^a We note that all product characteristics remain the same.

2 METHODS AND DISCUSSION

2.1 SAFETY ASSESSMENT

The appropriateness of the root name, Remodulin, and the modifiers, “Implantable System for” were evaluated and found acceptable in our previous review and we maintain our previous decision.^b For re-assessment of the proposed proprietary name, DMEPA searched the USAN stem list to determine if the name contains any USAN stems as of the last USAN updates. The February 2, 2018, search of USAN stems did not find any USAN stems in the proposed proprietary name.

2.2 COMMUNICATION OF DMEPA’S ANALYSIS AT MIDPOINT OF REVIEW

DMEPA communicated our findings to the Division of Cardiovascular and Renal Products (DCRP) via e-mail on April 19, 2018. At that time we also requested additional information or concerns that could inform our review. The Division of Cardiovascular and Renal Products did not forward any additional concerns with the proposed proprietary name, Implantable System for Remodulin.

3 CONCLUSIONS

Our re-assessment did not identify any safety concerns. Therefore, we maintain that the proposed proprietary name is acceptable.

If you have any questions or need clarifications, please contact Darrell Lyons, OSE project manager, at 301-796-4092.

3.1 COMMENTS TO THE APPLICANT

We have completed our review of the proposed proprietary name, Implantable System for Remodulin, and have concluded that this name is acceptable.

If any of the proposed product characteristics as stated in your submission, received on January 30, 2018, are altered prior to approval of the marketing application, the name must be resubmitted for review.

^a Thomas, S. Proprietary Name Review for Implantable System for Remodulin (NDA 208276). Silver Spring (MD): FDA, CDER, OSE, DMEPA (US);2017 Apr 7. Panorama No. 2016- 12573862.

^b Thomas, S. Proprietary Name Review for Implantable System for Remodulin (NDA 208276). Silver Spring (MD): FDA, CDER, OSE, DMEPA (US);2017 Apr 7. Panorama No. 2016- 12573862.

4 REFERENCES

1. USAN Stems (<http://www.ama-assn.org/ama/pub/physician-resources/medical-science/united-states-adopted-names-council/naming-guidelines/approved-stems.page>)

USAN Stems List contains all the recognized USAN stems.

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/s/

MAXIMILIAN STRAKA
04/26/2018

CHI-MING TU
04/26/2018

PROPRIETARY NAME REVIEW

Division of Medication Error Prevention and Analysis (DMEPA)
Office of Medication Error Prevention and Risk Management (OMEPRM)
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Product Type:	Device
Rx or OTC:	Rx
Applicant/Sponsor Name:	United Therapeutics Corporation
Panorama #:	2016-12573862
DMEPA Primary Reviewer:	Sarah Thomas, PharmD
DMEPA Team Leader:	Chi-Ming (Alice) Tu, PharmD, BCPS
Associate Director (Acting):	Danielle Harris, PharmD, BCPS

Contents

1	INTRODUCTION.....	1
1.1	Regulatory History.....	1
1.2	Product Information.....	1
2	RESULTS.....	2
2.1	Misbranding Assessment.....	2
2.2	Safety Assessment.....	2
3	CONCLUSIONS.....	4
3.1	Comments to the Applicant.....	5
	REFERENCES.....	6
	APPENDICES.....	7

1 INTRODUCTION

This review evaluates the proposed proprietary name, Implantable System for Remodulin, from a safety and misbranding perspective. The sources and methods used to evaluate the proposed name are outlined in the reference section and Appendix A respectively. The Applicant did not submit an external name study for this proposed proprietary name.

1.1 REGULATORY HISTORY

The Applicant previously submitted the proposed proprietary name, (b) (4) (b) (4)***, on June 16, 2016. Since the implantable pump will be packaged separately from Remodulin, the proposed proprietary name (b) (4)*** would be misleading because end users might be misled to believe the device package already contains the drug Remodulin inside. At a teleconference on July 15, 2016, we recommended that United Therapeutics Corporation consider the name, “Implantable System for Remodulin”, to address our concerns.

Thereafter, the Applicant withdrew the name, (b) (4)***, and submitted the name, “Implantable System for Remodulin,” for review on August 5, 2016. However, NDA 208276 received a complete response on October 8, 2016 secondary to the device remaining under a CDRH Not Approvable letter.

The Applicant resubmitted NDA 208276 for review under a Class 1 resubmission on December 15, 2016. Subsequently, the proposed proprietary name, “Implantable System for Remodulin,” was resubmitted for review on January 13, 2017.

1.2 PRODUCT INFORMATION

The following Remodulin drug product information is provided in the December 15, 2016 submission, as well as obtained from the Remodulin Prescribing Information.

- Intended Pronunciation: not provided in submissions
- Active Ingredient: Treprostinil
- Indication of Use: The Implantable System for Remodulin consists of the drug product Remodulin (treprostinil) Injection and a fully implanted, programmable infusion system for chronic intravenous delivery of the drug product in patients with pulmonary arterial hypertension to diminish symptoms associated with exercise.
- Route of Administration: Intravenous
- Dosage Form: Injection
- Strength: Remodulin (treprostinil) Injection is available by prescription in four strengths (20 mg/20 mL, 50 mg/20 mL, 100 mg/20 mL, and 200 mg/20 mL); (b) (4)
(b) (4)
- Dose and Frequency: Per Remodulin Prescribing Information Highlights Section, PAH in patients with NYHA Class II-IV symptoms:

- Initial dose for patients new to prostacyclin infusion therapy: 1.25 ng/kg/min; increase based on clinical response (increments of 1.25 ng/kg/min per week for the first 4 weeks of treatment, later 2.5 ng/kg/min per week). Avoid abrupt cessation.
- Mild to moderate hepatic insufficiency: Decrease initial dose to 0.625 ng/kg/min. Severe hepatic insufficiency: No studies performed.
- How Supplied:
 - Remodulin is currently provided to patients through specialty pharmacies. Remodulin will continue to be marketed by itself as the drug only (20 mL multi-dose vials as sterile solutions in water for injection, individually packaged in cartons), and the option of using the Implantable System for Remodulin will be noted on the vial container label and carton labeling. Remodulin will be distributed for use either in the Implantable System for Remodulin or with an external pump, either intravenous or subcutaneous, as currently approved. United Therapeutics Corporation is intending to provide both the current Remodulin package insert as well as the Implantable System for Remodulin package insert with each carton of Remodulin.
 - The device components of the Implantable System for Remodulin will be packaged and sold separately from the drug. The Implantable System for Remodulin will initially be filled in a hospital setting at the time of pump implant, and refills of the implanted pump will be administered by a qualified healthcare provider.
- Storage: Unopened vials of Remodulin are stable until the date indicated when stored at 25°C (77°F), with excursions permitted to 2-30°C (36-86°F).

2 RESULTS

The following sections provide information obtained and considered in the overall evaluation of the proposed proprietary name.

2.1 MISBRANDING ASSESSMENT

The Office of Prescription Drug Promotion (OPDP) determined that the proposed name would not misbrand the proposed product. DMEPA and the Division of Cardiovascular and Renal Products (DCRP) concurred with the findings of OPDP's assessment of the proposed name.

2.2 SAFETY ASSESSMENT

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

2.2.1 *United States Adopted Names (USAN) Search*

There is no USAN stem present in the proprietary name^a.

^a USAN stem search conducted on February 28, 2017.

2.2.2 Components of the Proposed Proprietary Name

The Applicant did not provide a derivation or intended meaning for the proposed name, Implantable System for Remodulin, in their submission. This proprietary name is comprised of the modifier “Implantable System for”, followed by the root name “Remodulin”. We evaluated the appropriateness of the modifier in section 2.2.5, and the use of the root name, Remodulin, in section 2.2.6.

2.2.3 FDA Name Simulation Studies

Eighty-seven practitioners participated in DMEPA’s prescription studies. Thirty-seven participants interpreted Implantable System for Remodulin correctly in the inpatient and outpatient handwritten prescription studies and verbal prescription studies. Of note, a common misinterpretation observed in the outpatient written prescription study involved participants misinterpreting the letter “R” in the prefix “Rem” as the letter “B” (e.g., “Bem”) (n=20 in the outpatient study). The responses did not overlap with any currently marketed products nor did the responses sound or look similar to any currently marketed products or any products in the pipeline. Appendix B contains the results from the verbal and written prescription studies.

2.2.4 Comments from Other Review Disciplines at Initial Review

In response to the OSE, February 8, 2017 e-mail, the Division of Cardiovascular and Renal Products (DCRP) did not forward any comments or concerns relating to the proposed proprietary name at the initial phase of the review.

2.2.5 Analysis of the Modifier “Implantable System for”

There is currently no implantable infusion system marketed for Remodulin. The modifier “Implantable System for” is a novel modifier. The proposed device is an implantable system, and the intended use involves surgical implantation of the device to provide for continuous delivery of Remodulin. Therefore, the use of the modifier “Implantable System for” within the proposed proprietary name “Implantable System for Remodulin” is appropriate.

2.2.6 Medication Error Data Selection of Cases

We searched the FDA Adverse Event Reporting System (FAERS) database using the strategy listed in Table 2 (see Appendix A1 for a description of FAERS database) for name confusion errors involving Remodulin that would be relevant for this review.

Table 2. FAERS Search Strategy	
Search Date	January 24, 2017
Drug Name	Remodulin [product name] Remodulin [product verbatim] (Selected all associated names)
Event (MedDRA Terms)	Medication Error Event PT and

	<p>DMEPA Official PNR Name Confusion Search Terms Event List:</p> <p>Preferred Terms: CIRCUMSTANCE OR INFORMATION CAPABLE OF LEADING TO MEDICATION ERROR DRUG ADMINISTRATION ERROR) DRUG DISPENSING ERROR DRUG PRESCRIBING ERROR INTERCEPTED DRUG DISPENSING ERROR INTERCEPTED DRUG PRESCRIBING ERROR INTERCEPTED MEDICATION ERROR MEDICATION ERROR PRODUCT NAME CONFUSION TRANSCRIPTION MEDICATION ERROR</p> <p>Lower Level Terms: INTERCEPTED PRODUCT SELECTION ERROR INTERCEPTED WRONG DRUG PRODUCT SELECTED INTERCEPTED WRONG DRUG SELECTED PRODUCT SELECTION ERROR WRONG DEVICE DISPENSED WRONG DRUG ADMINISTERED WRONG DRUG DISPENSED WRONG DRUG PRESCRIBED WRONG DRUG PRODUCT SELECTED WRONG DRUG SELECTED WRONG PRODUCT SELECTED</p>
Date Limits	From July 5, 2001 to search date

Each report was reviewed for relevancy and duplication. The NCC MERP Taxonomy of Medication Errors was used to code the case outcome and error root causes when provided by the reporter.

After individual review, our search identified 48 cases, of which none are relevant for this proposed proprietary name review as they did not involve proprietary name confusion. Thus, we find the use of the root name Remodulin acceptable.

2.2.7 Communication of DMEPA’s Analysis at Midpoint of Review

DMEPA communicated our findings to the Division of Cardiovascular and Renal Product (DCRP) via e-mail on April 3, 2017. At that time we also requested additional information or concerns that could inform our review. Per e-mail correspondence from the DCRP on April 6, 2017, they stated no additional concerns with the proposed proprietary name, Implantable System for Remodulin.

3 CONCLUSIONS

The proposed proprietary name is acceptable.

If you have any questions or need clarifications, please contact Darrell Lyons, OSE project manager, at 301-796-4092.

3.1 COMMENTS TO THE APPLICANT

We have completed our review of the proposed proprietary name, Implantable System for Remodulin, and have concluded that this name is acceptable.

If any of the proposed product characteristics as stated in your December 15, 2016 submission are altered prior to approval of the marketing application, the name must be resubmitted for review.

REFERENCES

1. ***USAN Stems*** (<http://www.ama-assn.org/ama/pub/physician-resources/medical-science/united-states-adopted-names-council/naming-guidelines/approved-stems.page>)

USAN Stems List contains all the recognized USAN stems.

2. ***Phonetic and Orthographic Computer Analysis (POCA)***

POCA is a system that FDA designed. As part of the name similarity assessment, POCA is used to evaluate proposed names via a phonetic and orthographic algorithm. The proposed proprietary name is converted into its phonemic representation before it runs through the phonetic algorithm. Likewise, an orthographic algorithm exists that operates in a similar fashion. POCA is publicly accessible.

Drugs@FDA

Drugs@FDA is an FDA Web site that contains most of the drug products approved in the United States 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*; *therapeutic biological products*, *prescription* and *over-the-counter* human drugs; and *discontinued drugs* (see Drugs @ FDA Glossary of Terms, available at http://www.fda.gov/Drugs/InformationOnDrugs/ucm079436.htm#ther_biological).

RxNorm

RxNorm contains the names of prescription and many OTC drugs available in the United States. RxNorm includes generic and branded:

- Clinical drugs – pharmaceutical products given to (or taken by) a patient with therapeutic or diagnostic intent
- Drug packs – packs that contain multiple drugs, or drugs designed to be administered in a specified sequence

Radiopharmaceuticals, contrast media, food, dietary supplements, and medical devices, such as bandages and crutches, are all out of scope for RxNorm (<http://www.nlm.nih.gov/research/umls/rxnorm/overview.html#>).

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.

3. ***Electronic Drug Registration and Listing System (eDRLS) database***

The electronic Drug Registration and Listing System (eDRLS) was established to support the FDA's Center for Drug Evaluation and Research (CDER) goal to establish a common Structured Product Labeling (SPL) repository for all facilities that manufacture regulated drugs. The system is a reliable, up-to-date inventory of FDA-regulated, drugs and establishments that produce drugs and their associated information.

APPENDICES

Appendix A

FDA's Proprietary Name Risk Assessment evaluates proposed proprietary names for misbranding and safety concerns.

1. **Misbranding Assessment:** For prescription drug products, OPDP assesses the name for misbranding concerns. . For over-the-counter (OTC) drug products, the misbranding assessment of the proposed name is conducted by DNDP. OPDP or DNDP evaluates proposed proprietary names to determine if the name is false or misleading, such as by making misrepresentations with respect to safety or efficacy. For example, a fanciful proprietary name may misbrand a product by suggesting that it has some unique effectiveness or composition when it does not (21 CFR 201.10(c)(3)). OPDP or DNDP provides their opinion to DMEPA for consideration in the overall acceptability of the proposed proprietary name.
2. **Safety Assessment:** The safety assessment is conducted by DMEPA, and includes the following:
 - a. **Preliminary Assessment:** We consider inclusion of USAN stems or other characteristics that when incorporated into a proprietary name may cause or contribute to medication errors (i.e., dosing interval, dosage form/route of administration, medical or product name abbreviations, names that include or suggest the composition of the drug product, etc.) See prescreening checklist below in Table 2*. 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.^b

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

***Table 2- Prescreening Checklist for Proposed Proprietary Name**

	Answer the questions in the checklist below. Affirmative answers to any of these questions indicate a potential area of concern that should be carefully evaluated as described in this guidance.
Y/N	Is the proposed name obviously similar in spelling and pronunciation to other names?
	Proprietary names should not be similar in spelling or pronunciation to proprietary names, established names, or ingredients of other products.
Y/N	Are there medical and/or coined abbreviations in the proprietary name?
	Proprietary names should not incorporate medical abbreviations (e.g., QD, BID, or others commonly used for prescription communication) or coined abbreviations that have no established meaning.
Y/N	Are there inert or inactive ingredients referenced in the proprietary name?
	Proprietary names should not incorporate any reference to an inert or inactive ingredient in a way that might create an impression that the ingredient's value is greater than its true functional role in the formulation (21 CFR 201.10(c)(4)).
Y/N	Does the proprietary name include combinations of active ingredients?
	Proprietary names of fixed combination drug products should not include or suggest the name of one or more, but not all, of its active ingredients (see 21 CFR 201.6(b)).
Y/N	Is there a United States Adopted Name (USAN) stem in the proprietary name?
	Proprietary names should not incorporate a USAN stem in the position that USAN designates for the stem.
Y/N	Is this proprietary name used for another product that does not share at least one common active ingredient?
	Drug products that do not contain at least one common active ingredient should not use the same (root) proprietary name.
Y/N	Is this a proprietary name of a discontinued product?
	Proprietary names should not use the proprietary name of a discontinued product if that discontinued drug product does not contain the same active ingredients.

- b. **Phonetic and Orthographic Computer Analysis (POCA):** Following the preliminary screening of the proposed proprietary name, DMEPA staff evaluates the proposed name against potentially similar names. In order to identify names with potential similarity to the proposed proprietary name, DMEPA enters the proposed proprietary name in POCA and queries the name against the following drug reference databases, Drugs@fda, CernerRxNorm, and names in the review pipeline using a 50% threshold in POCA. DMEPA reviews the combined orthographic and phonetic matches and group the names into one of the following three categories:
- Highly similar pair: combined match percentage score $\geq 70\%$.
 - Moderately similar pair: combined match percentage score $\geq 50\%$ to $\leq 69\%$.
 - Low similarity: combined match percentage score $\leq 49\%$.

Using the criteria outlined in the check list (Table 3-5) that corresponds to each of the three categories (highly similar pair, moderately similar pair, and low similarity), DMEPA evaluates the name pairs to determine the acceptability or non-acceptability of a proposed proprietary name. The intent of these checklists is to increase the transparency and predictability of the safety determination of whether a proposed name is vulnerable to confusion from a look-alike or sound-alike perspective. Each bullet below corresponds to the name similarity category cross-references the respective table that addresses criteria that DMEPA uses to determine whether a name presents a safety concern from a look-alike or sound-alike perspective.

- For highly similar names, differences in product characteristics often cannot mitigate the risk of a medication error, including product differences such as strength and dose. Thus, proposed proprietary names that have a combined score of ≥ 70 percent are at risk for a look-alike sound-alike confusion which is an area of concern (See Table 3).
- Moderately similar names with overlapping or similar strengths or doses represent an area for concern for FDA. The dosage and strength information is often located in close proximity to the drug name itself on prescriptions and medication orders, and it can be an important factor that either increases or decreases the potential for confusion between similarly named drug pairs. The ability of other product characteristics to mitigate confusion (e.g., route, frequency, dosage form, etc.) may be limited when the strength or dose overlaps. We review such names further, to determine whether sufficient differences exist to prevent confusion. (See Table 4).
- Names with low similarity that have no overlap or similarity in strength and dose are generally acceptable (See Table 5) unless there are data to suggest that the name might be vulnerable to confusion (e.g., prescription simulation study suggests that the name is likely to be misinterpreted as a marketed product). In these instances, we would reassign a low similarity name to the moderate similarity category and review according to the moderately similar name pair checklist.

- c. FDA Prescription Simulation Studies: DMEPA staff also conducts a prescription simulation studies using FDA health care professionals.

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

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

- d. Comments from Other Review Disciplines: DMEPA requests the Office of New Drugs (OND) and/or Office of Generic Drugs (OGD), ONDQA or OBP for their comments or concerns with the proposed proprietary name, ask for any clinical issues that may impact the DMEPA review during the initial phase of the name review. Additionally, when applicable, at the same time DMEPA requests concurrence/non-concurrence with OPDP's decision on the name. The primary Safety Evaluator addresses any comments or concerns in the safety evaluator's assessment.

The OND/OGD Regulatory Division is contacted a second time following our analysis of the proposed proprietary name. At this point, DMEPA conveys their decision to accept or reject the name. The OND or OGD Regulatory Division is requested to provide any further information that might inform DMEPA's final decision on the proposed name.

Additionally, other review disciplines opinions such as ONDQA or OBP may be considered depending on the proposed proprietary name.

When provided, DMEPA considers external proprietary name studies conducted by or for the Applicant/Sponsor and incorporates the findings of these studies into the overall risk assessment.

The DMEPA primary reviewer assigned to evaluate the proposed proprietary name is responsible for considering the collective findings, and provides an overall risk assessment of the proposed proprietary name.

Table 3. Highly Similar Name Pair Checklist (i.e., combined Orthographic and Phonetic score is $\geq 70\%$).

<p>Answer the questions in the checklist below. Affirmative answers to some of these questions suggest that the pattern of orthographic or phonetic differences in the names may render the names less likely to confusion, provided that the pair does not share a common strength or dose.</p>			
<u>Orthographic Checklist</u>		<u>Phonetic Checklist</u>	
Y/N	<p>Do the names begin with different first letters?</p> <p><i>Note that even when names begin with different first letters, certain letters may be confused with each other when scripted.</i></p>	Y/N	<p>Do the names have different number of syllables?</p>
Y/N	<p>Are the lengths of the names dissimilar* when scripted?</p> <p><i>*FDA considers the length of names different if the names differ by two or more letters.</i></p>	Y/N	<p>Do the names have different syllabic stresses?</p>
Y/N	<p>Considering variations in scripting of some letters (such as <i>z</i> and <i>f</i>), is there a different number or placement of upstroke/downstroke letters present in the names?</p>	Y/N	<p>Do the syllables have different phonologic processes, such as vowel reduction, assimilation, or deletion?</p>
Y/N	<p>Is there different number or placement of cross-stroke or dotted letters present in the names?</p>	Y/N	<p>Across a range of dialects, are the names consistently pronounced differently?</p>
Y/N	<p>Do the infixes of the name appear dissimilar when scripted?</p>		
Y/N	<p>Do the suffixes of the names appear dissimilar when scripted?</p>		

Table 4: Moderately Similar Name Pair Checklist (i.e., combined score is $\geq 50\%$ to $\leq 69\%$).

<p>Step 1</p>	<p>Review the DOSAGE AND ADMINISTRATION and HOW SUPPLIED/STORAGE AND HANDLING sections of the prescribing information (or for OTC drugs refer to the Drug Facts label) to determine if strengths and doses of the name pair overlap or are very similar. Different strengths and doses for products whose names are moderately similar may decrease the risk of confusion between the moderately similar name pairs. Name pairs that have overlapping or similar strengths or doses have a higher potential for confusion and should be evaluated further (see Step 2). Because the strength or dose could be used to express an order or prescription for a particular drug product, overlap in one or both of these components would be reason for further evaluation.</p> <p>For single strength products, also consider circumstances where the strength may not be expressed.</p> <p>For any i.e. drug products comprised of more than one active ingredient, consider whether the strength or dose may be expressed using only one of the components.</p> <p>To determine whether the strengths or doses are similar to your proposed product, consider the following list of factors that may increase confusion:</p> <ul style="list-style-type: none"> • Alternative expressions of dose: 5 mL may be listed in the prescribing information, but the dose may be expressed in metric weight (e.g., 500 mg) or in non-metric units (e.g., 1 tsp, 1 tablet/capsule). Similarly, a strength or dose of 1000 mg may be expressed, in practice, as 1 g, or vice versa. • Trailing or deleting zeros: 10 mg is similar in appearance to 100 mg which may potentiate confusion between a name pair with moderate similarity. • Similar sounding doses: 15 mg is similar in sound to 50 mg
<p>Step 2</p>	<p>Answer the questions in the checklist below. Affirmative answers to some of these questions suggest that the pattern of orthographic or phonetic differences in the names may reduce the likelihood of confusion for moderately similar names with overlapping or similar strengths or doses.</p>

	<p>Orthographic Checklist (Y/N to each question)</p> <ul style="list-style-type: none"> Do the names begin with different first letters? Note that even when names begin with different first letters, certain letters may be confused with each other when scripted. Are the lengths of the names dissimilar* when scripted? *FDA considers the length of names different if the names differ by two or more letters. Considering variations in scripting of some letters (such as <i>z</i> and <i>f</i>), is there a different number or placement of upstroke/downstroke letters present in the names? Is there different number or placement of cross-stroke or dotted letters present in the names? Do the infixes of the name appear dissimilar when scripted? Do the suffixes of the names appear dissimilar when scripted? 	<p>Phonetic Checklist (Y/N to each question)</p> <ul style="list-style-type: none"> Do the names have different number of syllables? Do the names have different syllabic stresses? Do the syllables have different phonologic processes, such as vowel reduction, assimilation, or deletion? Across a range of dialects, are the names consistently pronounced differently?
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Table 5: Low Similarity Name Pair Checklist (i.e., combined score is $\leq 49\%$).

In most circumstances, these names are viewed as sufficiently different to minimize confusion. Exceptions to this would occur in circumstances where, for example, there are data that suggest a name with low similarity is nonetheless misinterpreted as a marketed product name in a prescription simulation study. In such instances, FDA would reassign a low similarity name to the moderate similarity category and review according to the moderately similar name pair checklist.

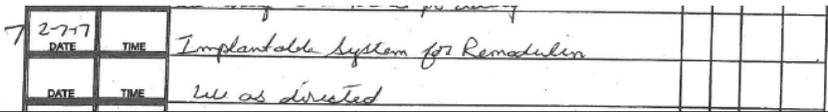
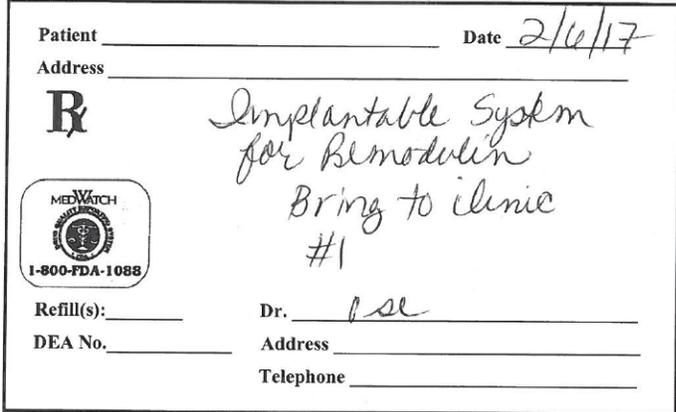
Appendix A1: Description of FAERS

The FDA Adverse Event Reporting System (FAERS) is a database that contains information on adverse event and medication error reports submitted to FDA. The database is designed to support the FDA's postmarket safety surveillance program for drug and therapeutic biologic products. The informatic structure of the FAERS database adheres to the international safety reporting guidance issued by the International Conference on Harmonisation. FDA's Office of Surveillance and Epidemiology codes adverse events and medication errors to terms in the Medical Dictionary for Regulatory Activities (MedDRA) terminology. Product names are coded using the FAERS Product Dictionary. More information about FAERS can be found at:

<http://www.fda.gov/Drugs/GuidanceComplianceRegulatoryInformation/Surveillance/AdverseDrugEffects/default.htm>.

Appendix B: Prescription Simulation Samples and Results

Figure 1. Implantable System for Remodulin Study (Conducted on 2-8-2017)

Handwritten Medication Order/Prescription	Verbal Prescription
<p>Medication Order:</p>  <p>Outpatient Prescription:</p> 	<p>Implantable System for Remodulin</p> <p>Bring to Clinic</p> <p>Dispense #1</p>

FDA Prescription Simulation Responses (Aggregate 1 Rx Studies Report)

Study Name: Implantable System for Remodulin

As of Date 2/28/2017

299 People Received Study
87 People Responded

Study Name: Implantable System for Remodulin

Total	36	24	27		
INTERPRETATION	OUTPATIENT	VOICE	INPATIENT	TOTAL	
BEMODULIN	1	0	0	1	
BEMODULIN IMPLANTABLE SYSTEM	1	0	0	1	
EMPLANTABLE SYSTEM FOR REMODULIN	0	1	0	1	
EMPLANTIBLE SYSTEM FOR FOR ROMODULIN	0	1	0	1	
IIMPLANTABLE SYSTEM FOR BEMODULIN	1	0	0	1	
IMPLANTABELL SYSTEM	0	0	1	1	

FOR REMODULIN				
IMPLANTABLE SYSTEM FOR BEMODULIN	17	0	0	17
IMPLANTABLE SYSTEM FOR BLMODVLIN	1	0	0	1
IMPLANTABLE SYSTEM FOR BOMODULIN	1	0	0	1
IMPLANTABLE SYSTEM FOR IMODULIN	0	1	0	1
IMPLANTABLE SYSTEM FOR OMOGILIN	0	1	0	1
IMPLANTABLE SYSTEM FOR RAMODGELYN	0	1	0	1
IMPLANTABLE SYSTEM FOR REMAJOLIN	0	1	0	1
IMPLANTABLE SYSTEM FOR REMDULIN	1	0	0	1
IMPLANTABLE SYSTEM FOR REMODJULIN	0	1	0	1
IMPLANTABLE SYSTEM FOR REMODULEM	0	1	0	1
IMPLANTABLE SYSTEM FOR REMODULIN	8	9	20	37
IMPLANTABLE SYSTEM FOR REMODVLIN	2	0	0	2
IMPLANTABLE SYSTEM FOR RENODULIN	1	0	0	1
IMPLANTABLE SYSTEM FOR RIMODULIN	1	0	0	1
IMPLANTABLE SYSTEM FORMODULIN	0	1	0	1
IMPLANTABLE SYSTEME FOR REMODULIN	0	0	1	1
IMPLANTIBLE SYSTEM	0	1	0	1
INPLANTABLE SYSTEM FOR REMODULIN	0	1	0	1
MODULIN	0	1	0	1
OMPLANTABLE SYSTEM FOR RUMODULIN	1	0	0	1

REMADULIN IMPLANTABLE SYSTEM	0	0	1	1
REMODULIN	0	1	4	5
REMODULIN IMPLANTABLE SYSTEM	0	2	0	2

Appendices C-I: N/A

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

/s/

SARAH E THOMAS
04/07/2017

CHI-MING TU
04/07/2017

DANIELLE M HARRIS
04/07/2017