

A Guide to RxNorm

I. Introduction and Overview

What is RxNorm?

RxNorm, a standardized nomenclature for clinical drugs, is produced by the National Library of Medicine. In this context, a *clinical drug* is a pharmaceutical product given to (or taken by) a patient with a therapeutic or diagnostic intent. In RxNorm, the name of a clinical drug combines its ingredients, strengths, and form.

In RxNorm, the *form* is the physical form in which the drug is administered or is specified to be administered in a prescription or order. The RxNorm clinical drug name does not refer to the size of the package, the form in which the product was manufactured, or its form when it arrived at the dispensary.

RxNorm's standard names for clinical drugs are connected to the varying names of drugs present in many different controlled vocabularies within the Unified Medical Language System (UMLS) Metathesaurus, including those in commercially available drug information sources. These connections are intended to facilitate interoperability among the computerized systems that record or process data dealing with clinical drugs.

A Simple Idea Implemented Rigorously

RxNorm is organized around normalized names for clinical drugs. These names contain information on ingredients, strengths, and dose forms. For example:

Acetaminophen 500 MG Oral Tablet for a generic drug name
Acetaminophen 500 MG Oral Tablet [Tylenol] for a branded drug name

Within RxNorm, generic and branded normalized forms are related to each other and to the names of their individual components by a well-defined set of named relationships. Thus, *Acetaminophen 500 MG Oral Tablet* is related to *Acetaminophen 500 MG Oral Tablet [Tylenol]*, and both have relationships to *Acetaminophen*, *Acetaminophen 500 MG*, and *Oral Tablet*. Within the UMLS Metathesaurus, *Acetaminophen 500 MG Oral Tablet* and *Acetaminophen 500 MG Oral Tablet [Tylenol]* will each be linked to different names that are used for these entities in other vocabularies.

Purpose

Because every drug information system that is commercially available today follows somewhat different naming conventions, a standardized nomenclature is needed for the smooth exchange of information, not only between organizations, but even within the same organization. For example, a hospital may use one system for ordering and another for inventory management. Still another system might be used to record dose adjustments or to check drug interactions. Several cooperating hospitals might have different systems, and find their data incomparable.

A standardized nomenclature that relates itself to terms from other sources can serve as a means for determining when names from different source vocabularies are synonymous. The goal of RxNorm is to allow various systems using different drug nomenclature to share data efficiently.

The Scope of RxNorm

RxNorm contains the names of prescription and many nonprescription formulations that exist in the United States, including the devices that administer the medications. It is the intent of RxNorm to cover all prescription medications approved for use in the United States. Prescription medications from other countries may be included as opportunities allow, with a principal consideration being that of an authoritative source of information about these drugs. OTC medications will be added and covered as well, when reliable information about the medications can be found, and when they appear to be represented in other UMLS source vocabularies. Medications, whether prescription or OTC, with more than three ingredients are not, at present time, fully represented. In some cases, e.g., multivitamins, it may not be possible to include all of them in a reasonable time frame. Additions to the vocabulary will be made as new products are put on the market (see Updates, below). Radiopharmaceuticals, because of the decay of their strength over time, and the requirement that they be ordered and prepared especially for a given time of administration, are listed only as ingredients.

The Elements of RxNorm

An RxNorm clinical drug name reflects the active ingredients, strengths, and dose form comprising that drug. When any of these elements varies, a new RxNorm drug name is created (a separate concept, as explained below). Thus, an RxNorm name should exist for every strength and dose of every combination of clinically significant ingredients available in the United States.

Each element of the RxNorm clinical drug name is also an individual RxNorm term related by formal criteria to the clinical drug name.

II. RxNorm in Detail: Structure and Operation

How RxNorm is Structured

Connections, in the form of predefined relationships, exist among the components of RxNorm and, additionally, between RxNorm data and data derived from other vocabularies also contained in the UMLS Metathesaurus.

RxNorm data is distributed in Metathesaurus Relational (MR) tables. The tables that will be of particular relevance in the following discussion are:

- MRCONSO, Concept and Source Information
- MRREL, Relationships
- MRSTY, Semantic Type

For detailed information about the fields, their formatting, and possible values or to learn about other UMLS tables, see the links in the following section.

Extracting RxNorm from the UMLS

MetamorphoSys is the program to install and subset the UMLS Metathesaurus using a variety of criteria such as source of data, semantic type, relationship types, etc. It allows users to extract only portions of the UMLS Metathesaurus that they are licensed to use and that will be useful to them in their applications.

MetamorphoSys comes preconfigured with a plug-in filter to extract only concepts that participate in the RxNorm graph of connections. Users that desire the RxNorm subset can easily extract the information of interest using this tool. Selecting the options for the RxNorm filter preconfigures MetamorphoSys to include only concepts that meet one of the following criteria:

- a) RxNorm atoms, e.g., SCD
- b) HL7 dose form atoms (TTY=DF), or
- c) the Semantic Type "Drug Delivery Device".

Futhermore, the default setting in MetamorphoSys is to include in these extracted concepts only content from level 0 restricted sources and SNOMED CT, i.e., Source Restriction Level (SRL) of 0 or 4. Users that have licenses for other sources, for example the different drug vocabularies, many of which have a non-zero restriction level, can add them to the sources to include.

The output of MetamorphoSys is a set of files like the Metathesaurus itself in either the Rich Release Format (RRF) or the original (MR) release format as selected in the MetamorphoSys output option. The resulting data can be loaded into a database or otherwise processed by user applications. MetamorphoSys can currently output Oracle and MySQL load scripts to assist users who use these database products.

Details of UMLS Structure

- Complete information on the structure of the UMLS system, its data elements, and its tables can be found in the *UMLS Documentation*, available online at www.nlm.nih.gov/research/umls/umlsdoc.html
- Information on the structure of individual tables may be found in Section 2.7 on File Format:
- Information on specific fields and the values they may take is in Appendix B:
- Abbreviations for the source vocabularies for strings found in the UMLS Metathesaurus and RxNorm may be found in Appendix A:
- Sample files showing table structure and sample field values are found at umlsinfo.nlm.nih.gov/MR+sample

These samples may show updates to the file formats that are not yet reflected in *UMLS Knowledge Sources*.

The Elements of Normalized Form

RxNorm follows a standard format in the naming of clinical drugs. Drugs named in disparate ways in various other vocabularies are normalized according to RxNorm's naming conventions.

The normalized form of the name of a clinical drug may be thought of as being composed of a number of elements, each a concept in its own right. Each element of the normalized form can be identified by the value of the TTY [Term Type] field of MRCONSO. The possible values are:

IN ingredient
 (i.e., active ingredient—a compound or moiety which gives to the drug its distinctive clinical properties. The preferred name is usually the USAN name)

Examples: *Fluoxetine; Insulin, Isophane, Human*

DF dose form
 (see the Appendix for a list of dose forms available in RxNorm)

Example: *Oral Solution*

SCDC semantic clinical drug component

(ingredient plus strength—see section on Rules and Conventions, pages 7-9 below, for units of measurement and for rules pertaining to the calculation of strengths)

Example: *Fluoxetine 4 MG/ML*

SCDF semantic clinical drug form
(ingredient plus dose form)

Example: *Fluoxetine Oral Solution*

SCD semantic clinical drug
(ingredient plus strength and dose form)

Example: *Fluoxetine 4 MG/ML Oral Solution*

BN brand name

(a proprietary name for a family of products containing a specific active ingredient)

Example: *Prozac*

SBDC semantic branded drug component

N.B. In the current UMLS release this TTY form is not present. It will be present in future releases.

(branded ingredient plus strength)

Example: *Prozac 4 MG/ML*

SBDF semantic branded drug form
(branded ingredient plus dose form)

Example: *Prozac Oral Solution*

SBD semantic branded drug
(ingredient, strength, and dose form plus brand name)

Example: *Fluoxetine 4 MG/ML Oral Solution [Prozac]*

SY synonym of another TTY, given for clarity

Example: *Prozac 4 MG/ML Oral Solution*

A Concept Orientation: RxNorm's Links to Other Vocabularies

Like the UMLS Metathesaurus as a whole, RxNorm is organized by concept. A *concept*, is a collection of names identical in meaning at this level of abstraction. It serves as a means whereby strings of characters from disparate sources may be taken to name things that are the same.

For example, *Accuneb, 0.042% inhalation solution* and *Albuterol 0.417 MG/ML Inhalant Solution [Accuneb]* name the same concept. In RxNorm, the second of these is designated as the preferred form of the name (by means of its association with the TS [Term Status] field in MRCONSO). The concept is assigned a *concept unique identifier*

(CUI) of C1169664. This CUI always designates the same concept, no matter the form of the name and no matter in what table it is found. Drugs whose names map to the same CUI are taken to be the same drug—identical as to ingredients, strengths, and dose forms. Conversely, drugs that differ in any of these particulars are conceptually distinct and will have different CUIs.

For those times when it might be necessary to refer to the individual variants of the concept names, there are also unique identifiers for these variants at two different levels. At a very basic level, each string of characters with any deviation from any other such string, no matter how slight, will have its own *string unique identifier* (SUI). At a higher level but still below the level of the concept, groups of strings with minor variations, such as a difference in case, are grouped together by means of a *term (or lexical) unique identifier* (LUI). Strings are linked to terms, and both strings and terms are linked to concepts.

Acetaminophen 500 MG Oral Tablet and *Acetaminophen 500 MG Oral Tablet [Tylenol]*, on the other hand, name two different concepts, with CUIs C0691089 and C0711228, respectively. The first of these bears the relationship “has_tradename” to the second, and the second bears the reciprocal relationship “tradename_of” to the first.

Similarly, two drugs, identical in their generic components, may still refer to different concepts if they differ in brand name. For instance,

Fluoxetine 20 MG Oral Capsule [Prozac] and
Fluoxetine 20 MG Oral Capsule [Sarafem].

RxNorm Relationships

Relationships between concepts in RxNorm are reciprocal. Each direction of the relationship is represented as a separate row in the MRREL file of the UMLS Metathesaurus. A clinical drug consists of components, and the components constitute the clinical drug. That is to say, a concept with a TTY field value of SCD bears the relationship “consists_of” to certain other concepts with a TTY value of SCDC, and each of these, in turn, bears the relationship “constitutes” to the first concept. This is shown graphically in Figure 1.

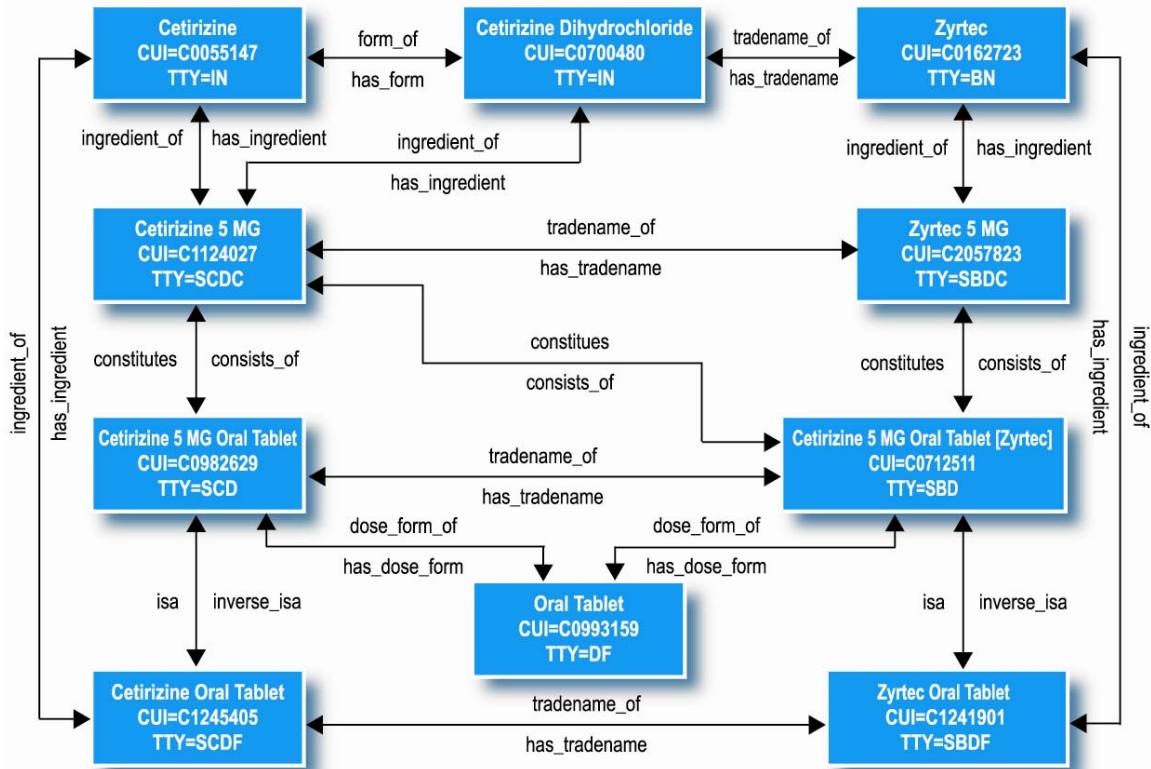


Figure 1. RxNorm Concepts and Relationships. CUI is the concept unique identifier. TTY is the term type. See the section The Elements of Normalized Form for an explanation of the TTY values. Note that the CUI for the SBDC is hypothetical.

These relationships are represented as follows in the UMLS data tables: To use the example in Figure 1, the field CUI1 in the table MRREL contains the value C0982629, which the table MRCONSO shows to be the CUI for *Cetirizine 5 MG Oral Tablet*, which has a TTY value of SCD. The field CUI2 in MRREL has the value C1124027, which is the CUI for *Cetirizine 5 MG*, and which has a TTY value of SCDC. The RELA field, which shows the relationship of CUI2 to CUI1, has the value “constitutes”.

When the values of CUI1 and CUI2 in MRREL are interchanged, in the above example, the value of the RELA field will be “consists_of”.

RxNorm contains the following relationships:

constitutes / consists_of

These relationships obtain between an SCD and an SCDC and between an SBD and an SBDC or SCDC.

contains / contained_in

These relationships hold between concepts naming clinical drugs and those naming the devices that dispense them (the latter being those concepts that have an STY [Semantic Type] field value of “Drug Delivery Device” in the table MRSTY).

dose_form_of / has_dose_form

These relationships obtain between an SCD or SBD and a DF.

form_of / has_form

These relationships hold between two INs, which may designate different salts of the same active ingredient.

ingredient_of / has_ingredient

These relationships obtain between an IN and an SCDC or SCDF and between a BN and an SBDC or SBDF.

isa / inverse_isa

These relationships hold between an SCD and an SCDF and between an SBD and an SBDF.

tradename_of / has_tradename

These relationships obtain between a BN and an IN, between an SBDC and an SCDC, between an SBD and an SCD, or between an SBDF and an SCDF.

Rules and Conventions Used to Generate the Data

Naming Conventions

The SCD—the semantic clinical drug, or normalized form of the generic drug name—always contains the ingredient(s), the strength, and the dose form, in that order. The components and forms of an SCD—its SCDCs and SCDFs—contain the ingredient and strength and the ingredient and dose form, respectively. The SBD follows a similar convention, with the addition of the brand name in brackets at the end of the name.

The ingredients named in the SCD, SBD, etc., are the active ingredients. Thus, in the example illustrated in Figure 1, Cetirizine is used as the ingredient name. Though *Cetirizine* and *Cetirizine Dihydrochloride* are separate concepts, and though both are related to *Cetirizine 5 MG* as ingredients, the normalized form of the drug name does not include the precise ingredient name since, in this case, the difference is without clinical significance.

Similarly, RxNorm makes no distinction between amoxicillin trihydrate, amoxicillin monosodium salt, or amoxicillin potassium salt, because the differences among them are not clinically significant. When there are significant differences among components, as is the case of *Penicillin G, Benzathine* and *Penicillin G, Procaine*, the entire compound name is always included as the ingredient.

Strengths

The strengths are based on the active ingredient. In cases where there is more than one active ingredient, there will be a strength associated with each ingredient, as in the SCD below:

Ascorbic Acid 100 MG / Calcium Carbonate 625 MG / Ferrous Fumarate 122 MG / Folic Acid 1 MG Oral Tablet

In this example, the SCD bears the relationship “consists_of” to each of the several ingredient-strength pairs (essentially SCDCs) separated by slashes.

Units of Measurement

In RxNorm only a few units are used, in order to standardize the expressions of strength. Where strengths are expressed as ratios, the ratio is given with a denominator value of 1 of the appropriate units. Thus, 100 mg in 5 ml would be expressed as 20 mg/ml.

The following units of measurement are used in RxNorm:

MEQ

Milliequivalent.

MG

Milligram.

ML

Milliliter.

MMOL

Millimole.

UNT

Unit.

%

Used only with gases, otherwise percentages are converted into ratios.

The following units appear only in ratios:

ACTUAT

Actuation. Refers to a measured dose per activation of a dispensing device: e.g., in an inhaler, the strength of the clinical drug is given by how much is dispensed with each actuation.

GTT

Drop.

MIN

Minim.

PNU

Protein nitrogen units. Used for allergenic extracts.

The following ratios of units have been used in RxNorm:

MEQ/MG
MEQ/ML
MG/ACTUAT
MG/GTT

MG/MG
MG/ML
MIN/ML
ML/ML

PNU/ML
UNT/MG
UNT/ML

Conversion of Units

In making the RxNorm forms, other expressions of units are converted into the RxNorm standards. The rules followed are:

Standard conversion factors are used between metric units.

One liquid ounce is taken to be equivalent to 25 milliliters.

A grain is 65 milligrams.

If a variable amount of diluent can be used, the minimum amount is used in RxNorm to calculate the concentration that determines the strength. For example, in the case of a drug that can be dissolved in 3 to 5 ml of diluent, RxNorm would use 3 ml. For intravenous solutions, only the initial dilution is used to calculate the strength. For example, a vial containing 50 mg of a drug to be dissolved in 2 ml of water, then added to an IV solution, is expressed as having strength of 25 mg/ml.

Strengths are expressed to three significant digits. Thus, nearly equal strengths, which may be expressed differently in different drug vocabularies, are treated as being equivalent. That is, when drug names derived from different source vocabularies would be taken to express the same concept (i.e., to name the same substance), except for a discrepancy in the strengths, and if the strengths given, upon conversion to common units, are identical to three significant digits, RxNorm treats the names as equivalent and assigns the same CUI to each string.

Special Cases

Two somewhat special cases have been discussed already. The distinction made among the salts of an active ingredient—in those cases in which that difference has clinical significance—was discussed as it affects the naming of clinical drugs in RxNorm. Drugs that contain multiple active ingredients were discussed in relation to the specification of the relative strengths of those ingredients.

Another special case is the treatment of what are often referred to by other systems as “biphasic” or “triphasic” drugs (often sequential oral contraceptives). Since “biphasic” and “triphasic” tablets are not entities, but represent names for drugs given sequentially, RxNorm treats these, not as unique classes of drugs, but as separate SCDs contained in a drug delivery device. Thus, for example,

Ethinyl Estradiol 0.035 MG / Norethindrone 0.5 MG Oral Tablet and
Ethinyl Estradiol 0.035 MG / Norethindrone 1 MG Oral Tablet

are distinct concepts in RxNorm. Both of these SCDs bear the relationship “contained_in” to the concept *Ortho-Novum 7/7/7 21 Tablets*. The latter, reciprocally, bears the relationship “contains” to each of them. The concept *Ortho-Novum 7/7/7 21 Tablets* has a semantic type (i.e., field STY in table MRSTY) of “Drug Delivery Device”.

Going Beyond RxNorm

The case just cited is illustrative of RxNorm's linkage to terms from other vocabularies. *Ortho-Novum 7/7/7 21 Tablets* is a term from the Systematized Nomenclature of Medicine (SNOMED) vocabulary and is not strictly found within RxNorm at all.

Updates

All of the RxNorm files will be available through the UMLS Knowledge Source Server (KSS). The full set of files will be included in the UMLS Metathesaurus as the primary distribution mechanism. The extraction subsetter of the UMLS, known as MetamorphoSys, can be run to extract an RxNorm subset of the Metathesaurus. Between releases of the UMLS, RxNorm update files will be made available at the KSS. These files will be consistent with the latest extant release of the UMLS, but will contain additional naming information available since that release. The goal is to make the files available weekly, with a cumulative monthly release as well. A user might choose to obtain the files and add them to the system weekly or monthly. In either case, the files can be viewed as an addition to the existing RxNorm files.

At the time of a new release of the UMLS Metathesaurus, some of the earlier releases will not have been included in that version of the Metathesaurus. An additional file, containing all new naming information obtained since closure of the UMLS Metathesaurus editing process, and consistent with the new release of the Metathesaurus, will be created and released as an RxNorm update. Tracking of changes between versions of the Metathesaurus is accomplished through the MRCUI file and other Metathesaurus change files, which should be used to track changes in the RxNorm concepts as well.

RxNorm in Use

1. Identification of Relationships

The following sample questions and algorithmic solutions illustrate the retrieval of RxNorm information using UMLS data tables.

In what follows, field labels are given in capital letters on the left side of the equals sign; field values are given within quotation marks; and field descriptive names, when provided for clarity, are given in square brackets.

Taking amoxicillin as exemplar throughout, we can first find all RxNorm concepts related to amoxicillin. In general, other algorithms than the ones shown here may also be available to achieve the same results.

1. In MRCONSO

- Find any record with STR[String]=“amoxicillin”.
- Retrieve CUI [Concept Unique Identifier].
- *NOTE: All strings containing only the word “amoxicillin” will map to the same concept, regardless of capitalization or source vocabulary. That concept, expressed by the CUI, will have TTY[Term Type]=“IN” when SAB[Source Abbreviation]=“RXNORM”.*

2. In MRREL

- Using the CUI retrieved from step 1 as the value of CUI1, find any record(s) with RELA[Relationship Attribute]=“form_of”.
- *NOTE: RELA is the relationship of CUI2 to CUI1.*
- Retrieve CUI2.
- *NOTE: This step is not strictly necessary in the case of amoxicillin. Its purpose is to retrieve any variants of the active ingredient that might affect the form of the SCD, SCDC, SCDF, SBD, SBDC, or*

SBDF (i.e., any variants that might be clinically significant. See discussion above under Rules and Conventions: Naming Conventions).

3. Let $\{\Omega\}$ stand for the set containing all the CUIs retrieved in steps 1 and 2.

Q. What trade names is amoxicillin sold under?

In MRREL

- Taking CUI1= $\{\Omega\}$, retrieve the CUI2 value for all records with RELA="tradename_of".

In MRCONSO

- Using the retrieved value as the CUI in MRCONSO, find all records with SAB="RXNORM".
- Retrieve STR.
- *NOTE: This retrieves the normalized form of all amoxicillin concepts with TTY= "BN".*

Q. What strengths are available?

In MRREL

- Taking CUI1= $\{\Omega\}$, retrieve the CUI2 value for all records with RELA="has_ingredient".

In MRCONSO

- Using the retrieved value as the CUI in MRCONSO, find the records with TTY="SCDC" for which SAB="RXNORM".
- Retrieve STR.

Q. What dose forms?

In MRREL

- Taking CUI1= $\{\Omega\}$, retrieve the CUI2 value for all records with RELA="has_ingredient".

In MRCONSO

- Using the retrieved value as the CUI in MRCONSO, find the records with TTY="SCDF" for which SAB="RXNORM".
- Retrieve STR.

Q. What drug class is it?

In MRSTY

- Using the CUI retrieved from step 1 as the value of CUI1, find the values of the field STY.

Q. What is the National Drug Data File (NDDF) code for amoxicillin?

In MRCONSO

- Using the CUI retrieved from step 1 as the value of CUI1 and SAB="NDDF," find the value of the field CODE.

Q. Given the NDDF code, how can I find the code for SNOMED, Version 3.5?

In MRCONSO

- Search for a record having SAB="NDDF" and the given value for the CODE field.
- Retrieve CUI.
- Find a record having that CUI and SAB="SNMI" [*abbreviation for SNOMED International from UMLS Knowledge Sources, Appendix A. See page 3 above*].
- Retrieve CODE.

Q. Is Amoxicillin 250 MG Oral Tablet a penicillin?

In MRCONSO

- Find the CUI for which STR=“*Amoxicillin 250 MG Oral Tablet*”.

In MRREL

- Using the CUI retrieved from MRCONSO as the value for CUI2 in MRREL, retrieve all values of CUI1 for which RELA=“isa”.

In MRCONSO

- Using the retrieved values for CUI1 from MRREL as values for CUI in MRCONSO, retrieve the value of the STR field for each of these.
- *NOTE: The answer to this question again takes us beyond the normalized records of RxNorm to strings and relationships defined in other vocabularies. In addition to the RxNorm SCDF, “Amoxicillin Oral Tablet,” there will also be an “isa” relationship between the original string and a Veterans Administration National Drug File record whose STR= “PENICILLINS, AMINO DERIVATIVES”.*

2. Use in Electronic Prescribing and Computerized Order Entry

The representation of the relationships between names of drugs in various drug information sources, ingredients, strengths, and dose forms should provide a necessary structure for support of electronic prescription writing and physician order entry. However, in some instances this set of relationships may not be sufficient to convey all of the desired attributes of an order. Some ingredients not active may still be of interest, e.g., lactose, dextrose, alcohol, flavorings, and dyes. Where packaging of products may be of particular interest, e.g., dose packs, the link between the drug delivery device and the RxNorm form will represent the necessary information. In other cases, e.g., vial size, or in making up intravenous solutions, the person preparing the solution will be obligated to review what material is at hand, and choose appropriately.

Radiopharmaceuticals create a special case. Since they must be specially ordered to have the appropriate radioactivity at a given time, they will not be represented except as a range of approximate activities.

Appendix RxNorm Dose Forms with Definitions

Only forms whose names are given in bold are used. Additional terms for the same form (not necessarily synonymous, and in some cases ambiguous) are listed in parentheses after the term. Some additional hierarchical nodes are given to aid in finding the correct form .

Forms	Definition
Gas	
Inhalant	
Gas for Inhalation	a gas that can be breathed into the nose or mouth
Inhalant Solution (Aerosol;Inhalation Solution)	an finely dispersed liquid medication propelled by gas(es)
Inhalant Powder	a powdered medication that is intended to be inhaled
Nasal Inhalant	a medication intended to be inhaled through the nose
Spray	a substance propelled by gas(es)

	Mucosal Spray	a spray intended for use on the mucous membranes
	Nasal Spray	a nasal solution intended for use in the nasal cavity delivered by spray
	Oral Spray	a spray intended to be applied into the oral cavity
	Powder Spray	a powder delivered as a spray
	Rectal Spray	a spray intended to be used in or around the rectum
	Topical Spray (Dermal Spray)	a spray intended for use on the skin
	Vaginal Spray	a spray intended to be used in or around the vagina
Liquid		
Cream	Nasal Cream	a homogenous mixture that contains two liquid phases usually oil in water or water in oil
	Ophthalmic Cream	a cream intended for use on or in the nasal cavity
	Oral Cream	a cream intended for use in the eye
	Otic Cream	a cream intended for use on or in the mouth
	Rectal Cream	a cream intended to be used on or in the ear
	Topical Cream	a cream intended for use in or around the rectum
	Vaginal Cream	a cream intended to be used on the skin
Foam	Oral Foam	a cream intended for use in or around the vagina
	Rectal Foam	bubbles of gas that are introduced into a liquid
	Topical Foam	a foam intended to be administered into the mouth
	Vaginal Foam	a foam intended for use in the rectum
Liquid Cleanser	Medicated Liquid Soap	a foam intended for use on the skin
	Medicated Shampoo	a foam intended for use in the vagina
Oil	Topical Oil	a liquid containing a detergent
Solution	Inhalant Solution (Aerosol; Inhalation Solution)	a liquid containing a detergent and a medication
	Injectable Solution	a medicated liquid soap intended for use on hair
	Intraperitoneal Solution	a fatty liquid
	Irrigation Solution	an oil intended to be applied on the skin
	Douche	a homogenous mixture of one or more solutes completely dissolved in a liquid solvent
	Enema	a solution intended to be inhaled
	Ophthalmic Irrigation Solution	a solution intended to be injected
	Nasal Solution (Nasal Drops; Nose Drops)	a solution intended for use in the peritoneal cavity
	Nasal Spray	a solution intended for use as a flushing or rinsing agent
	Ophthalmic Solution (Ophthalmic Drops; Eye Drops)	an irrigation solution intended for use in the vagina
	Ophthalmic Irrigation Solution	an irrigation solution intended for use in the rectum and colon
	Oral Solution (Oral Drops)	an irrigation solution intended for use in the eye
	Elixir	a solution intended for use on the nasal mucosa
	Mouthwash (Oral Rinse)	a nasal solution intended for use in the nasal cavity delivered by spray
	Syrup	a solution intended for use in the eye
	Otic Solution (Otic Drops; Ear Drops)	an irrigation solution intended for use in the eye
	Rectal Solution	a solution intended to be taken by mouth
	Topical Solution (Tincture; Liniment)	an oral solution containing alcohol
	Mucus Membrane Topical Solution	an oral solution intended to be used as a rinsing or irrigating solution
Suspension	Injectable Suspension	a sweetened oral solution
	Lotion	a solution intended for use in the ear
	Topical Lotion	a solution intended for use in or around the rectum
	Nasal Suspension (Nasal Drops; Nose Drops)	a solution intended for use on a surface
	Ophthalmic Suspension (Ophthalmic Drops; Eye Drops)	a topical solution intended for use on the mucous membranes
	Oral Suspension (Oral Drops)	a non-homogenous mixture of one or more substances not completely dissolved in a liquid
	Extended-Release Suspension	a suspension administered by injection
	Otic Suspension (Otic Drops; Ear Drops)	a viscous liquid suspension
	Rectal Suspension	a lotion intended for use on the skin
Solid		
Bar	Bar Soap	a suspension intended for use in the nose
	Medicated Bar Soap	Ophthalmic Suspension (Ophthalmic Drops; Eye Drops) a suspension intended for use in the eye
	Chewable Bar	Oral Suspension (Oral Drops) a suspension intended to be taken by mouth
Beads		Extended-Release Suspension a suspension that allows for a timed or controlled release of the solute
Cake		Otic Suspension (Otic Drops; Ear Drops) a suspension intended for use in the ear
Capsule	Oral Capsule	Rectal Suspension a suspension intended for use in the rectum
	Enteric Coated Capsule	a block of solid material that is longer in length than width
dosage form in the stomach by stomach acid	Extended Release Enteric Coated Capsule	a bar intended to be used to cleanse the body
at a controlled rate	Extended Release Capsule	a bar of soap containing medication
rate	12 hour Extended Release Capsule	a bar that can be broken down and crushed using the teeth
	24 Hour Extended Release Capsule	small ball-shaped objects
	Extended Release Enteric Coated Capsule	a block of compressed or firm matter
at a controlled rate		a contained dosage form
	Cement	a capsule taken by mouth
	Chewing Gum	a coated capsule to ensure its arrival in the small intestines by preventing the degradation of the
	Crystals	an enteric coated capsule that allows medication to be released over an extended period of time
		a capsule that allows medication to be released over an extended period of time at a controlled rate
		a capsule that allows medication to be released over a 12 hour period
		a capsule that allows medication to be released over a 24 hour period
		an enteric coated capsule that allows medication to be released over an extended period of time
		a material that holds one or more objects together
		insoluble material that is chewed to release medication
		solid, transparent and colorless matter formed by a chemical element compound or mixture

Disk	a flat, round, solid shape
Flakes	small, flat, thin, pieces of matter
Gel (Jelly)	fine particles dispersed in a medium resulting in a solid substance
Nasal Gel (Nasal Jelly)	a gel intended for use on or in the nasal cavity
Oral Gel (Oral Jelly)	a gel intended for use on or in the oral cavity
Ophthalmic Gel (Ophthalmic Jelly)	a gel intended for use in the eye
Rectal Gel (Rectal Jelly)	a gel intended for use in or around the rectum
Topical Gel (Topical Jelly)	a gel intended for use on the skin
Urethral Gel (Urethral Jelly)	a gel intended to be used in the urethra
Vaginal Gel (Vaginal Jelly)	a gel intended for use in or around the vagina
Granules	small bits that in large numbers form a larger entity
Drug Implant	a solid form inserted into the body which releases medication over time
Lozenge (Oral Troche)	a solid mass intended to be held in the mouth to allow for slow dissolution
Ointment	a viscous occlusive mixture
Nasal Ointment	an ointment intended for use in or on the nose
Ophthalmic Ointment	an ointment intended for use in or on the eye
Oral Ointment	an ointment intended for use on or in the mouth
Otic Ointment	an ointment intended for use on or in the ear
Rectal Ointment	an ointment intended for use on or in the rectum
Topical Ointment	an ointment intended for use on or in the skin
Vaginal Ointment	an ointment intended for use on or in the vagina
Paste	a smooth, viscous mixture of material. semisolid in nature
Oral Paste	a paste to be taken or used orally
Pudding	a paste, often eaten
Toothpaste	a paste intended to be used in cleaning teeth
Patch	Some type of material that can be used to cover or repair an affected area
Transdermal Patch	releasing medication that is absorbed through the skin and into the bloodstream
16 Hour Transdermal Patch	transdermal patch to release medication over a period of 16 hours
24 Hour Transdermal Patch	transdermal patch to release medication over a period of 24 hours
72 Hour Transdermal Patch	transdermal patch to release medication over a period of 72 hours
Weekly Transdermal Patch	transdermal patch to release medication over a period of 1 week
Biweekly Transdermal Patch	transdermal patch to release medication over a period of 2 weeks
Pellet	a small rounded body
Powder	loose state of particulate matter
Oral Powder	a powder given orally, often sprinkled on or mixed with food. Not for powders mixed with
liquids	
Rectal Powder	powder intended for use in or around the rectum
Topical Powder	powder intended for use on the outside surface of the body
Vaginal Powder	powder intended for use in or around the vagina.
Suppository	a solid drug delivery vehicle which melts at normal body temperature
Rectal Suppository	a suppository intended to be inserted into the rectum
Vaginal Suppository	a suppository intended to be inserted into the vagina
Urethral Suppository	a suppository intended to be inserted into the urethra
Tablet	a solid, compressed dosage form
Oral Tablet	a tablet containing medicated materials to be taken by mouth
Buccal Tablet	a tablet held in the hollow pockets of the cheek until dissolved
Sustained Release Buccal Tablet	a tablet held in the hollow pockets of the cheek while the slowed delivery system allows the
drug to be released over an extended period of time at a controlled rate	
Caplet	a solid, oral, compressed, dosage form with the appearance of a coating
Chewable Tablet	a tablet taken by mouth and crushed into smaller pieces before swallowing
Disintegrating Tablet	a tablet dissolved in the mouth to release medication
Enteric Coated Tablet	a coated tablet to ensure arrival in the small intestines by preventing the degradation of the
dosage form in the stomach by stomach acid	
Extended Release Enteric Coated Tablet	an enteric coated tablet with a slowed delivery system that allows medication to be released over
an extended period of time at a controlled rate	
Extended Release Tablet	a tablet whose contents are slowly released over an extended period of time at a controlled rate
12 hour Extended Release Tablet	a tablet whose contents are slowly released over a 12 hour period at a controlled rate
24 Hour Extended Release Tablet	a tablet whose contents are slowly released over a 24 hour period at a controlled rate
Extended Release Enteric Coated Tablet	an enteric coated tablet with a slowed delivery system that allows medication to be released
over an extended period of time at a controlled rate	
Sublingual Tablet	a tablet held under the tongue until dissolved
Vaginal Tablet	a tablet that contains medicated materials to be inserted vaginally
Wafer	a thin, cookie-like, baked form