

i2b2 Medication Extraction Challenge

Preliminary Annotation Guidelines

As of 6/11

(Subject to change, with notice)

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1. Overview:

The medication extraction challenge is inspired by the NIST QA Track. This challenge resembles the list questions of the QA track. For each patient report provided, the goal is to extract information about all of the medications that are known to be taken by the patient. Some of the medications of the patient are provided in semi-structured (list) form, e.g., sections labeled as “medications on admission” or “medications at discharge”. The final output of medications of the patient should include these; however, the real interest is in extracting medications that are mentioned in the narratives of records.

The input to the medication challenge will be discharge summaries from Partners Healthcare. These records are semi-structured. While a lot of medications are mentioned by name in lists of medications, a lot of them are also discussed in the narrative text.

The output to be created from these files will be a list of medications. For all of the listed medications, the patient must be the experiencer. For each listed medication, the following information needs to be included:

1. medication name and its offset
2. dosage and its offset
3. mode/route of administration and its offset
4. frequency and its offset
5. duration and its offset
6. reason and its offset
7. event
8. temporal marker
9. certainty
10. found in list/narrative of the text

Each entry should consist of the above 10 fields. Each entry should be printed on its own line. The fields are separated by the “||” (double pipe) character:

```
Medication name & offset||dosage & offset||mode & offset||frequency &
offset||duration & offset||reason & offset||event|| temporal
marker||certainty||list/narrative
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Each field follows the format:

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...||m=“medication name” line number:start token position of medication
name line number:end token position of medication name ||...
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Line numbers start from 1 on the first line of the file and indicate the line number at which the field is found. Token positions start with 0 at

the beginning of each line and mark the first and last tokens of the field. Tokens are determined by white space.

For fields that are not mentioned in the text, the field should be set to "nm" and there should be no offset.

Continuous partial entry for single token frequency on line 5 (including the period at the end):

- "DrugA, 20 mg, b.i.d."
 - o ...||f="b.i.d." 5:3 5:3||...

Continuous partial entry for a two-token frequency on line 5 (please use white space to tokenize):

- "DrugA, 20 mg, b.i.d. p.r.n.,..."
 - o ...||f="b.i.d. p.r.n." 5:3 5:4||...

If a field has multiple offsets then the offsets are separated by commas.

We allow discontinuous entries to be extracted when such discontinuity is necessary to correctly mark, for example, the frequency of administration of a single dose:

- "DrugA 20mg x1 p.o. q.d"
 - o Frequency: "x1...q.d"
 - Partial entry: m="DrugA" ofst ||do="20mg" ofst || mo="p.o" ofst ||f="x1...q.d" ofst,ofst || ..."

In the above example, the string ofst is used as place holder for actual offsets. We use the same notation in the rest of the examples.

- o "DrugA 20mg twice p.o. per day"
 - o Frequency: "twice...per day"

Discontinuous information should be marked with three dots (...) that connect the two components of the field. The offsets for the field should be specified separately for each component of the field.

Discontinuous partial offset entry for a two-token frequency on line 5:

- "DrugA, 20 mg, x1 p.o. q.d."
 - o ...||f="x1...q.d." 5:3 5:3,5:5 5:5||...

Discontinuous partial entry for a four-token frequency on line 5:

- "DrugA, 20 mg, x1 p.o. q.d. as needed"
 - o ...||f="x1...q.d. as needed" 5:3 5:3,5:5 5:7||...

Offset entry for a medication name (DrugA) and dose field ("nm") that is not mentioned in the text and mode "po" on line 5:

"DrugA po"

...||m="DrugA" 5:0 5:0||do="nm"||mo="po" 5:1 5:1||...

With the exception of the event, temporal marker, certainty, and list/narrative fields, the text for each of the fields should be an exact quote from the narrative. The extracted text should not be changed,

corrected, or normalized in any way. For fields that are not mentioned in the text, value is "nm" for "not mentioned." Medication name is the only field that can never be nm. For the rest of the fields, the necessary information must be within +/- 2 line window of the medication name, otherwise it is considered "not mentioned".

2. Medication:

Medications for which the patient is the experiencer.

What should be marked?

Medications include:

- Prescription substances:
 - o Brand name medications, e.g., Lasix
 - o Generics
 - o Ingredients, e.g., furosemide
 - o Collective name for a group of medications, e.g., diuretics
- Over the counter medications:
 - o Brand names, e.g., Aspirin
 - o Ingredients, e.g., vitamin E
 - o Collective name for a group of medications, e.g, vitamins
- Biological substances required or suggested by doctors
 - o TPN (total parenteral nutrition)
 - o Ingredients in TPN if listed individually
 - o Blood for transfusion and its components, e.g., red blood cells (if listed individually)
 - o IV fluid and saline
- Pronouns that refer to any of the above

Medications exclude:

- o Food
- o Water
- o Diet
- o Tobacco
- o Alcohol
- o Illicit drugs

In order for medications to be marked, the text has to include an explicit statement indicating that the patient either took this medication, is taking the medication, is prescribed the medication, is suggested to take the medication, or is otherwise the (past / current / future) experiencer of the medication. Medications taken by other people, and medications that are mentioned but whose experiencer is not known should be excluded. For example, include Lasix for "Patient takes Lasix" but exclude anti-hypertensives for "patient's brother has been on anti-hypertensives for 10 years". Also exclude medications mentioned because they cause allergic reactions, even if the patient took them in the past. E.g, "patient is allergic to penicillin." Or "tetanus immunization in the past has led to arm swelling".

How to mark?

Mark the complete noun phrase that corresponds to the name of the medication, e.g., Caltrate plus D, Novolog. Include words such as

"tablet", "cream", "nebulizers", "solution" as part of the medication name when they appear immediately **after** the medication name, e.g., niferex tablet, fluocinonide cream.¹ Include numeric information as part of the medication when necessary, e.g., Tylenol 3, Nitroglycerin 1/150.

Extract medication names as they appear in the text, without any normalization or correction. Misspelled words should be left misspelled.

Examples:

Single mention of a single medication results in a single entry:

- "Patient was taking Caltrate plus D".
 - Medication: "Caltrate plus D".
- "Endo: DM II--CZI ss , cont. micronase".
 - Medication: "CZI"
- (Record 166436, lines 27-28) "Override Notice: Override added on 0/26/01 by RONERO , QUINTON I NICHOLAS , M.D. on order for KCL IMMEDIATE REL. PO (ref # 08069267)".
 - Medication: "KCL IMMEDIATE REL".
- "CITALOPRAM HYDROBROMIDE"
 - Medication: "CITALOPRAM HYDROBROMIDE"
- "NIFEREX TABLET 50 MG PO BID".
 - Medication: "NIFEREX TABLET"
- "fluocinonide 0.5% cream"
 - Medication: "fluocinonide 0.5% cream"
- "Saline solution"
 - Medication: "Saline solution"
- "NITROGLYCERIN 1/150 (0.4 MG) 1 TAB SL q5min x 3"
 - Medication: "NITROGLYCERIN 1/150"

Single medication but two names, when one of the names is parenthetical, results in a single entry:

- "TYLENOL (ACETAMINOPHEN) 650 MG PO Q6H PRN Pain"
 - Medication: "TYLENOL (ACETAMINOPHEN)"
- ECASA (ASPIRIN ENTERIC COATED) 81 MG PO QD"
 - Medication: "ECASA (ASPIRIN ENTERIC COATED)"

A single medication referred to with different names on different occasions requires separate entries for each mention. Do not try to resolve NP co-reference or synonymy.

¹We understand that the terms "solution", "tablet", etc in fact describe the form of the medication and are closer to mode than name. However, for ease of annotation, we ask that they be annotated as part of the name of the medication, when they appear immediately after the name of the medication.

- "The patient was started on TYLENOL (ACETAMINOPHEN) 650 MG PO Q6H PRN Pain. Acetaminophen was to be used for five days... Tylenol was stopped."

- o Medication for entry 1: "TYLENOL (ACETAMINOPHEN)"
- o Medication for entry 2: "Acetaminophen"
- o Medication for entry 3: "Tylenol"

A single mention of medication can require multiple entries if the mention implies multiple doses, modes, frequencies, durations, reasons, events, temporal markers, or certainty.

- "Lasix 40 mg p.o. daily for five days and then discontinue"
- o Medication for entry 1: "Lasix 5:0 5:0" (assuming it appears on line 5)
- o Medication for entry 2: "Lasix 5:0 5:0" (Same offset for medication name)

List each mention of a medication on its own, even if simple reasoning would allow the use of one mention to provide details on an earlier mention.

- "Lasix is prescribed. Lasix is taken two times a day".
- o Medication for entry 1: "Lasix 5:0 5:0" (Medication name's offset on line 5)
- o Medication for entry 2: "Lasix 5:3 5:3" (Medication name's offset for the second mention of "Lasix" on line 5)

Lists of multiple medications result in multiple entries:

- "POTENTIALLY SERIOUS INTERACTION: LISINOPRIL & POTASSIUM CHLORIDE Reason for override: aware , will check K daily"
- o Medication for entry 1: "LISINOPRIL"
- o Medication for entry 2: "POTASSIUM CHLORIDE"
- "vitamins C , D , A , and E"
- o Medication for entry 1: "vitamins C"
- o Medication for entry 2: "vitamins D"
- o Medication for entry 3: "vitamins A"
- o Medication for entry 4: "vitamins E"
- "nephrotoxic meds (atenolol , lasix , avapro , glucophage) held"
- o Medication for entry 1: "nephrotoxic meds"
- o Medication for entry 2: "atenolol"
- o Medication for entry 3: "lasix"
- o Medication for entry 4: "avapro"
- o Medication for entry 5: "glucophage"
- "Cont ASA , plavix , BB , NTG prn , long acting nitrate , fasting lipids sent."
- o Medication for entry 1: "asa"

- o Medication for entry 2: "plavix"
- o Medication for entry 3: "bb"
- o Medication for entry 4: "NTG"
- o Medication for entry 5: "long acting nitrate"
- o Medication for entry 6: "fasting lipids sent"

For medications that are referred to with pronouns, the anaphora should be resolved.

- "patient is to take lasix for ten days but then should stop it"
 - o Medication for entry 1: "lasix 5:4 5:4" (Offset for medication name "lasix" on line 5)
 - o Medication for entry 2: "lasix 5:4 5:4" (Offset for the pronoun resolution)

NP co-references need not be resolved. NP co-reference resolution is outside the scope of this challenge. For pronoun resolution, the offset is that of the resolved medication name and not that of the unresolved pronoun.

- "patient takes lasix for ten days. She will then stop this medication".
 - o Medication for entry 1: "lasix"
 - o Medication for entry 2: "this medication"

3. Dosage:

The amount of a single medication used in each administration, e.g., one tab, 4 units, 30 mg.

What should be marked?

The numeric and/or the textual information that mark the amount and the unit of administration of a medication used in a single administration.

Includes:

- 1 TAB
- One tablet
- 0.4 mg
- 0.5 m.g.
- 100 MG
- 100 mg x 2 tablets
- 1 TAB 04 mg
- 1 bag
- One unit

Excludes:

References to cumulative amount to be used by the patient.

- NIFEREX TABLET 50 MG PO BID Number of Doses Required(approximate): 30"
 - o Dose: 50 MG (not "30")

How to mark?

List all mentioned dosages of all medications for which the patient is the past/current/future experiencer.

- "Aspirin, 1 tablet per day"
 - o Dose: "1 tablet"
- "Lasix, 50mg q.d."
 - o Dose: "50 mg"
- If pain does not subside after 3 nitroglycerin , call your doctor or go to the ER."
 - o Dose: "3".

Two ways of referring to the same dosage are treated as one entry if they are immediately adjacent to each other.

- "NITROGLYCERIN 1/150 (0.4 MG) 1 TAB SL Q5MIN X 3 doses PRN"
 - o Dose: "(0.4 MG) 1 TAB"

List different ways of referring to the same dosage in separate entries when the two dosages are not immediately adjacent to each other.

- "Please note that your atenolol has been increased to 75 mg. Please take one and a half tablets each day."
 - o Dose for entry 1: "75 mg."

- Partial Entry 1: m="atenolol" ofst||do="75 mg" ofst|| ...
- o Dose for entry 2: "one and a half tablets"
- Partial entry 2: m="atenolol" ofst || do="one and a half tablets" ofst|| ...

List different dosages of the same medication as separate entries. (The +/- 2 line window limitation is lifted for cases where multiple doses are listed within a list structure in order to indicate variations in the dose of a single medication.)

- "Insulin on sliding scale. Take 6 units if BS > 185. Take 4 units if BS > 140."
 - o Dose for entry 1: "6 units"
 - Partial entry 1: m="insulin" ofst || do="6 units" ofst || ...
 - o Dose for entry 2: "4 units"
 - Partial entry 2: m="insulin" ofst|| do="4 units" ofst || ...
- "Take upto three sublingual NTG. If 3 tablets do not help, then stop and call your doctor."
 - o Dose for entry 1: "upto three" (see discussion on ranges, below)
 - Partial entry 1: m="NTG" ofst|| do="upto three" ofst || ...
 - o Dose for entry 2: "3 tablets"
 - Partial entry 2: m="NTG" ofst || do="3 tablets" ofst || ...

An exception to the rule for including separate entries for each dosage is when two dosages are mentioned in order to specify a range.

- "oxycodone 5-10 mg p.o. q.4 h. as needed for pain."
 - o Dose: "5-10 mg"
 - Partial entry: m="oxycodone" ofst|| do="5-10 mg" ofst||...

Cases where one dosage applies to multiple medications need to be handled properly.

- "Take oxycodone and heparin, one tablet each, once a day"
 - o Dose 1: "one tablet"
 - Partial entry 1: m="oxycodone" ofst ||do="one tablet" ofst || ...
 - o Dose 2: "one tablet"
 - Partial entry 2: m="heparin" ofst ||do="one tablet" ofst || ...

Use locality to guide the annotation of samples that are not clear.

- "Give one bag of saline solution and red blood cells during the next hour"
 - o Dose 1: "one bag"
 - Partial entry 1: m="saline solution" ofst ||do="one bag" ofst || ...
 - o Dose 2: "nm"

- Partial entry 2: m="red blood cells" ofst ||do="nm"|| ...

For medications (for which the patient is the experiencer), lack of mention of dosages should be entered as "nm" for "not mentioned".

- "If you develop chest pain, please take sublingual nitroglycerin as instructed."

- o Dose: "nm"

- Partial entry: m="nitroglycerin" ofst ||do="nm"|| ...

Offset for each dosage is to be calculated : ||Line number for starting token:token position Line number for ending token:token position ||

4. Mode/route of administration:

Describes the method for administering the medication.

What should be marked?

Text that expresses mode/route of administration, when it is not expressed as part of the medication name.

Includes:

- orally
- Intravenous
- Topical
- Sublingual
- Abbreviations of the above

Excludes:

Terms that describe the nature of the medication and are mentioned as a part of the medication name (usually collocate with the name).

- fluocinonide 0.5% cream applied b.i.d
 - o mode: "nm" (not "cream")
- Lasix Tablet
 - o Mode: "nm" (not "Tablet")
- Saline solution
 - o Mode: "nm" (not "solution")
- Albuterol nebulizers
 - o Mode: "nm" (not "nebulizers")

How to mark?

Mark one mode for each medication

- "Lasix 40 mg p.o. daily"
 - o Mode: "p.o."
 - Partial entry: m="Lasix" ofst ||do="40 mg" ofst ||mo="p.o." ofst || ...
- "intravenous (IV) Lasix"
 - o Mode: "intravenous (IV)"
 - Partial entry: m="Lasix" ofst ||do="nm"||mo="intravenous (IV)" ofst || ...
- "Sublingual NTG"
 - o Mode: "Sublingual"
 - Partial entry: m="NTG" ofst ||do="nm"||mo="Sublingual" ofst|| ...

If there are multiple modes, then include an entry for each one.

- "The patient was given Lasix both p.o. and IV"

- o Mode for entry 1: "p.o."
 - Partial entry 1: m="Lasix" ofst ||do="nm"|| mo="p.o." ofst ...
- o Mode for entry 2: "IV"
 - Partial entry: m="Lasix" ofst ||do="nm"||mo="IV" ofst ||...

Different ways of referring to the same mode of administration should be included in separate entries.

Changes in mode of administration of a drug should be included as separate entries.

- "The patient's Lasix was switched from p.o. to IV"
 - o Mode for entry 1: "p.o."
 - Partial entry 1: m="Lasix" ofst ||do="nm"||mo="p.o." ofst || ...
 - o Mode for entry 2: "IV"
 - Partial entry: m="Lasix" ofst ||do="nm"||mo="IV" ofst || ...

Cases where one mode applies to multiple medications need to be handled properly. Use locality to guide the annotation of samples that are unclear.

- "Take oxycodone and heparin, one tablet p.o. each, once a day"
 - o Mode 1: "p.o."
 - Partial entry 2: m="oxycodone" ofst ||do="one tablet" ofst ||mo="p.o." ofst || ...
 - o Mode 2: "p.o."
 - Partial entry 2: m="heparin" ofst ||do="one tablet" ofst ||mo="p.o." ofst || ...

If no mode is mentioned for a medication (for which the patient is the experiencer), then enter mode as "nm" for "not mentioned".

- "Take Lasix daily"
 - o Mode: "nm"
 - Partial entry: m="Lasix" ofst ||do="nm"||mo="nm"|| ...

5. Frequency:

Terms, phrases, or abbreviations that describe how often each dose of the medication should be taken.

What should be marked?

Any expression that indicates the frequency of administering a single dose of a medication should be marked.

Includes:

Frequency:

- b.i.d.
- twice a day
- Each day
- Once a day
- Daily
- x 1
- Once a month
- 3 times a day
- X 3 q.d.
- X 3 daily

Expressions that mean "as needed" when these expressions appear on their own or immediately adjacent to a frequency expression:

- Prn
- As necessary
- As needed
- Three times a day as needed
- As needed three times a day

Temporal phrases that specify when a medication should be taken (These tend to be prepositional phrases. Preposition should be included in the extracted information):

- After meal
- Before dinner
- At 4pm
- With every meal
- Before bed

Combinations of the above:

- once a day as needed
- as needed twice
- as needed after meal

- three times before meal
- x3 before meal
- x3 a day after meal as needed

Excludes:

"As needed" when it appears after a duration (not a frequency) expression.

- "Patient is to take Lasix, 50mg, p.o., daily, for one month as needed"
 - o Frequency: "daily"
 - Partial entry: m="Lasix" ofst ||do="50mg" ofst ||mo="p.o." ofst ||f="daily" ofst || ...

How to mark?

Apply the same basic principles that you use for tagging dose and mode. If frequency is not mentioned, the entry should be "nm".

- "Patient is to take Lasix, 50mg x 3, p.o."
 - o Frequency: "x3"
 - Partial entry: m="Lasix" ofst ||do="50mg" ofst ||mo="p.o." ofst ||f="x3" ofst || ...
- "Patient is to take Lasix, 50mg, p.o., daily"
 - o Frequency: "daily"
 - Partial entry: m="Lasix" ofst ||do="50mg" ofst ||mo="p.o." ofst ||f="daily" ofst || ...
- "Patient is to take Lasix, 50mg, p.o., at 4:30pm daily, for one month as needed"
 - o Frequency: "at 4:30pm daily"
 - Partial entry: m="Lasix" ofst ||do="50mg" ofst ||mo="p.o." ofst ||f="at 4:30pm daily" ofst || ...
- "Patient is to take Lasix, 50mg, p.o., at 4:30pm pre-dinner, for one month as needed"
 - o Frequency: "at 4:30pm pre-dinner"
 - Partial entry: m="Lasix" ofst ||do="50mg" ofst ||mo="p.o." ofst ||f="at 4:30pm pre-dinner" ofst || ...

Cases where one frequency applies to multiple medications need to be handled properly. Use locality to guide the annotation of samples that are unclear.

- o "Take oxycodone and heparin, one tablet p.o. each, once a day"
 - o Frequency 1: "once a day"
 - Partial entry 1: m="oxycodone" ofst ||do="one tablet" ofst ||mo="p.o." ofst ||f="once a day" ...
 - o Frequency 2: "once a day"

- Partial entry 2: m="heparin" ofst ||do="one tablet" ofst ||
mo="p.o." ofst ||f="once a day" ...

We allow discontinuous entries to be extracted:

- "Lasix 20mg x1 p.o. q.d"
 - o Frequency: "x1...q.d"
 - Partial entry: m="Lasix" ofst ||do="20mg" ofst ||mo="p.o"
ofst ||f="x1...q.d" ofst,ofst || ...
- o "Lasix 20mg twice p.o. per day"
 - o Frequency: "twice...per day"

6. Duration:

Expressions that indicate for how long the medication is to be administered. Such expressions are often noun phrases, prepositional phrases, or clauses.

What should be marked?

Expressions that describe the total time period for which the medication should be taken at a given dose. In case of medications that are stopped, the duration indicates for how long the medication has been stopped.

Includes:

Time expressions:

- x10 days
- 10-day course
- For ten days
- For a month
- During spring break
- Until the symptom disappears
- As long as needed

Vague time expressions that indicate the duration of a course of medication:

- temporarily

Cumulative dosages:

- 30 pack
- Number of Doses Required (approximate): 30
- 1 pack

As needed, when it follows a duration expression:

- For one month as needed

Excludes:

Time expressions that indicate when each dose should be taken. Include these under frequency.

- "The patient should take medication during physical activity."
 - o Duration: "nm".
- "The patient should take medication whenever they engage in physical activity."
 - o Duration: "nm"

Cumulative dosages for a single administration (not the cumulative dosages for a single course)

- "take upto three tablets and call your doctor if they do not help"
 - o Duration: "nm"

How to mark?

Follow the same basic principles as for marking frequency. Include the complete prepositional phrase or the clause.

- "Lasix 40 mg p.o. daily x5 days"
 - Duration: "x5 days"
 - Partial entry: m="Lasix" ofst ||do="40 mg" ofst ||mo="p.o." ofst ||f="daily" ofst ||du="x5 days" ofst ||...
- "Lasix 40 mg p.o. daily for five days"
 - Duration: "for five days"
 - Partial entry: m="Lasix" ofst ||do="40 mg" ofst ||mo="p.o." ofst ||f="daily" ofst ||du="for five days" ofst ||...
- "Lasix 40 mg p.o. daily during spring break"
 - Duration: "during spring break".
- "The patient's hospital stay was complicated by frequent PVCs on cardiac monitor , for which he was temporarily treated with Lidocaine"
 - Duration: "temporarily"
 - Partial entry: m="Lidocaine" ofst ||do="nm" ||mo="nm" ||f="nm" ||du="temporarily" ofst ||...
- "use one pack of Lidocaine"
 - Duration: "one pack"
 - Partial entry: m="lidocaine" ofst ||do="nm" ||mo="nm" ||f="nm" ||du="one pack" ofst ||...
- "NIFEREX TABLET 50 MG PO BID. Number of Doses Required (approximate): 30"
 - Duration: "Number of Doses Required (approximate): 30"
- "use one pack of Lidocaine until it is finished"
 - Duration: "one pack ... until it is finished"
 - Partial entry: m="lidocaine" ofst ||do="nm" ||mo="nm" ||f="nm" ||du="one pack ... until it is finished" ofst, ofst ||...
- "holding oral meds until ready for d/c home"
 - Duration: "until ready for d/c home"
 - Partial entry: m="oral meds" ofst ||do="nm" ||mo="nm" ||f="nm" ||du="until ready for d/c home" ofst ||...

Cases where one duration applies to multiple medications need to be handled properly. Use locality to guide the annotation of examples that are unclear.

- "Take oxycodone and heparin, one tablet p.o. each, once a day, for one month"
 - Duration 1: "for one month"
 - Partial entry 1: m="oxycodone" ofst ||do="one tablet" ofst ||mo="p.o." ofst ||f="once a day" ofst ||du="for one month" ofst ||...

- o Duration 2: "for one month"
 - Partial entry 2: m="heparin" ofst ||do="one tablet" ofst ||mo="p.o." ofst ||f="once a day" ofst ||du="for one month" ofst || ...

7. Reasons/Indications:

The medical reason for which the medication is stated to be given. Indications for which the medication would normally be given but which are not asserted by the text to be the reason for administering a medication are not included. Reasons/indications are usually given by adjective phrases or noun phrases. They usually correspond to diseases, signs or symptoms, and information related to other medications.

What should be marked?

Medical reasons asserted to be the reason for administering a medication.

Includes:

- Dizziness
- Dizzy
- Fever
- Diabetes

Excludes:

Non-medical reasons for which a medication is administered.

- Financial or insurance reasons

How to mark?

Always mark the most informative **base** adjective phrase or the longest **base** noun phrase as the reason for the medication. Longest base noun phrase has the form (det* adj* N+). Longest adjective phrase often occurs as (adj+). Do not include complex phrases, do not include coordinated phrases. Instead, extract from these phrases the base phrase, even when this means you will end up with multiple reasons.

- "He was given DrugA for presumed pneumonia"
 - o Reason: "presumed pneumonia"
- "he was given DrugB for a 50-point hematocrit drop"
 - o Reason: "a 50-point hematocrit drop."
- "The patient's hospital stay was complicated by frequent PVCs on cardiac monitor, for which he was temporarily treated with Lidocaine"
 - o Reason: "frequent PVCs".
- "patient felt dizzy and took medication to feel better"
 - o Reason: "dizzy"
- "V6. He had only rare angina since then treated with sublingual nitroglycerin or rest. On 0/4/91 , he had a positive ETT which was.."
 - o Reason: "rare angina"
- "DrugA p.o. t.i.d. (this is day 3 of a 7-day course for reported history of sinusitis). Patient was discharged to home with followup."
 - o Reason: "sinusitis"

- His blood sugar was at 185, so we gave 6 units of insulin

Reason: "blood sugar¹"

The indication for a medication can be in a separate line than the medication. However, any indication that is not mentioned within a +/-2 line window (two lines before & two lines after) of the medication should be omitted.

- "the patient noted that he had a recurrence of this vague chest discomfort as he was sitting and talking to friends. He took a sublingual Nitroglycerin without relief."
 - o Reason: "this vague chest discomfort"
 - Partial entry: m="Nitroglycerin" ofst ||do="nm"|| mo="sublingual" ofst ||f="nm"||du="nm"||r="this vague chest discomfort"...

Different ways of referring to the same reason for medication should be treated as separate reasons.

- "On the 8 of September , the patient was at a party and , again , developed a similar anxious sensation which was similar to the feeling that he experienced prior to his myocardial infarction. He took two sublingual Nitroglycerin again , without relief , and his discomfort resolved after two hours."
 - o Reason 1: "a similar anxious sensation"
 - Partial entry 1: m="Nitroglycerin" ofst ||do="nm"|| mo="sublingual" ofst ||f="nm"||du="two" ofst ||r="a similar anxious sensation"...
 - o Reason 2: "his discomfort"
 - Partial entry 2: m="Nitroglycerin" ofst ||do="nm"|| mo="sublingual" ofst ||f="nm"||du="two" ofst ||r="his discomfort" ofst...

If there are multiple reasons mentioned for the same medication then include one entry per reason; each entry should be complete with its medication, dose, mode, frequency, duration, reason, event, temporal marker, and certainty.

- "Aspirin for headache and for leg pain"
 - o Reason 1: "headache"
 - Partial entry 1: m="aspirin" ofst ||do="nm"||mo="nm"||f="nm"||du="nm"||r="headache" ofst || ...
 - o Reason 2: "leg pain"
 - Partial entry 2: m="aspirin" ofst ||do="nm"||mo="nm"||f="nm"||du="nm"||r="leg pain" ofst ||...

1: We understand that the clause "his blood sugar was at 185" is a more complete description of the medical reason but because of the limitation for NP or Adjective as acceptable reason, extract "blood sugar".

- "morning of admission when she had onset of left-sided CP which she describes as tightness with radiation to arm while brushing her teeth. Accompanied by racing heart , dyspnea. Somewhat better with SL NTG x 3. Completely alleviated by nitrospray. In ED pain free , no EKG"
 - o Reason 1: "left-sided CP"
 - Partial entry 1: m="NTG" ofst ||do="3" ofst ||mo="SL" ofst ||f="nm" ||du="nm" ||r="left-sided CP" ofst ||...
 - o Reason 2: "racing heart"
 - Partial entry 2: m="NTG" ofst ||do="3" ofst ||mo="SL" ofst ||f="nm" ||du="nm" ||r="racing heart" ofst || ...
 - o Reason 3: "dyspnea"
 - Partial entry 3: m="NTG" ofst ||do="3" ofst ||mo="SL" ofst ||f="nm" ||du="nm" ||r="dyspnea" ofst ||...

Do not try to resolve scope of adjectives or quantifiers.

- "24-48 hours of severe confusion and agitation after extubation requiring four point restraints and Haldol. He gradually resolved"
 - o Reason 1: "severe confusion"
 - o Reason 2: "agitation"

In cases where multiple medications are given for a single reason, list the reason with all of the medications.

- "apparently in respiratory distress, and treated with oxygen , nitroglycerin , aspirin , Lasix , CPAP , and morphine. Chest x-ray , by ..."
 - Partial entry 1: m="oxygen" ofst ||do="nm" ||mo="nm" ||f="nm" ||du="nm" ||r="respiratory distress" ofst || ...
 - Partial entry 2: m="nitroglycerin" ofst ||do="nm" ||mo="nm" ||f="nm" ||du="nm" ||r="respiratory distress" ofst || ...
 - Partial entry 3: m="aspirin" ofst ||do="nm" ||mo="nm" ||f="nm" ||du="nm" ||r="respiratory distress" ofst || ...
 - Partial entry 4: m="Lasix" ofst ||do="nm" ||mo="nm" ||f="nm" ||du="nm" ||r="respiratory distress" ofst || ...
 - Partial entry 5: m="CPAP" ofst ||do="nm" ||mo="nm" ||f="nm" ||du="nm" ||r="respiratory distress" ofst || ...
 - Partial entry 6: m="morphine" ofst ||do="nm" ||mo="nm" ||f="nm" ||du="nm" ||r="respiratory distress" ofst || ...

8. Event, temporal marker, and certainty:

Information that indicates whether the medication is started, stopped, or continued, when these events are to take place, and whether they are factual, suggested, or conditional.

Event: Information on whether the medication is started, stopped, or continued. This information is usually expressed in the main verb of the sentence. Mark the event indicated by the main verb or the verb related to the medication.

What should be extracted?

Nothing.

How to mark?

Choose from possible values: start, stop, continue, start-continue, or nm.

- Start: start a medication, or start at a new dose, mode, frequency, or duration of an old medication.
- Stop: stop a medication
- Continue: The medication continues to be administered.
- Start-Cont: When we can NOT decide if the medication is new (start) or continue of an old medication (continue).
- Nm: there is no event.
- "We started him on DrugA"
 - Event: start
- "We stopped his DrugA"
 - Event: stop
- "We keep him on DrugA."
 - Event: continue
- We increased his DrugA to 50mg.
 - Event: Stop (entry 1)
 - Event: start (entry 2)
- "Being on DrugA helped him."
 - Event: start-continue

Switching one medication for another includes two events. One medication is stopped and another one is started.

- "We switched him from DrugA to DrugB."
 - Partial entry 1: m="DrugA" ofst
||do="nm"||mo="nm"||f="nm"||du="nm"||r="nm"||e="stop"|| ...
 - Partial entry 2: m="DrugB" ofst
||do="nm"||mo="nm"||f="nm"||du="nm"||r="nm"||e="start"|| ...
- "the patient was started on intravenous Heparin on admission , and was then converted to oral Coumadin."

- Partial entry 1: m="Heparin" ofst ||do="nm"||
mo="intravenous" ofst ||f="nm"||du="nm"||r="nm"
||e="start"|| ...
- Partial entry 2: m="Heparin" ofst ||do="nm"||
mo="intravenous" ofst ||f="nm"||du="nm"||r="nm"
||e="stop"|| ...
- Partial entry 3: m="Coumadin" ofst ||do="nm"|| mo="oral"
ofst ||f="nm"||du="nm"||r="nm" ||e="start"|| ...

Treat changes in dose as if they are change in medication.

- "we decreased his dose of Heparin from 50 mg to 25 mg"
 - Partial entry 1: m="Heparin" ofst ||do="50 mg" ofst ||
mo="intravenous" ofst ||f="nm"||du="nm"||r="nm"||e="stop"||
...
 - Partial entry 2: m="Heparin" ofst ||do="25 mg" ofst ||
mo="intravenous" ofst ||f="nm"||du="nm"||r="nm"||e="start"||
...
- "start tomorrow"
 - o Event: start
- "wean slowly"
 - o Event: stop
- "continues when he returns home"
 - o Event: continue
- "He was given drugA."
 - o Event: start-continue
- "He took drugA"
 - o Event: start-continue
- "If you feel sick, take drugA"
 - o Event: start-continue
- "He was recommended to take drugA"
 - o Event: start-continue

If there are two events for a medication, include two separate entries. Make each entry as specific and complete as possible.

- "He is to continue diuresis with Lasix 40 mg p.o. daily for five days and then discontinue until his re-evaluation"
 - Partial entry 1: m="Lasix" ofst ||do="40 mg" ofst
||mo="p.o." ofst ||f="daily" ofst || du="for five days"
ofst || r="diuresis" ofst ||e="continue"|| ...
 - Partial entry 2: m="Lasix" ofst ||do="40 mg" ofst
||mo="p.o." ofst ||f="daily" ofst || du="for five days"
ofst || r="diuresis" ofst ||e="stop"|| ...
- Lasix 40 mg p.o. daily for five days
 - o Event: nm

- "Lasix is not working"

- o Event: nm

Since there is no text to be extracted, there is no offset for event.

Temporal marker: Information about whether the medication was administered in the past, is being administered currently, or will be administered in the future, to the extent that this information is expressed in the tense of the verbs and auxiliary verbs used to express events. One temporal marker for each event.

What should be extracted?

Nothing.

How to mark?

Choose from possible values for each event: past, present, future.

Past: The event for the medication is mentioned in past tense.

Present: The event for the medication is mentioned in the present.

Future: The event for the medication is mentioned in future tense.

nm: If there is no event, then there is no temporal marker.

- "We started him on DrugA"
 - Temporal marker: past
- "We stopped his DrugA"
 - Temporal marker: past
- "We keep him on DrugA."
 - Temporal marker: present
- "Being on DrugA helped him."
 - Temporal marker: present

Switching one medication for another includes two events. One medication is stopped and another one is started.

- "We switched him from DrugA to DrugB."
 - Partial entry 1: m="DrugA" ofst ||do="nm"|| mo="nm" ofst ||f="nm"||du="nm"||r="nm" ||e="stop"|| t="past"...
 - Partial entry 2: m="DrugB" ofst ||do="nm"|| mo="nm" ofst ||f="nm"||du="nm"||r="nm" ||e="start"|| t="past"...
- "the patient was started on intravenous Heparin on admission , and was then converted to oral Coumadin."
 - Partial entry 1: m="Heparin" ofst ||do="nm"|| mo="intravenous" ofst ||f="nm"||du="nm"||r="nm" ||e="start"|| t="past"...
 - Partial entry 2: m="Heparin" ofst ||do="nm"|| mo="intravenous" ofst ||f="nm"||du="nm"||r="nm" ||e="stop"|| t="past"...
 - Partial entry 3: m="Coumadin" ofst ||do="nm"|| mo="intravenous" ofst ||f="nm"||du="nm"||r="nm" ||e="start"|| t="past"...
- "start tomorrow"
 - Temporal marker: present

- "wean slowly"
 - o Temporal marker: present
- "continues when he returns home"
 - o Temporal marker: present
- "He was given drugA."
 - o Temporal marker: past
- "He took drugA"
 - o Temporal marker: past
- "If you feel sick, take drugA"
 - o Temporal marker: present
- "He was recommended to take drugA"
 - o Temporal marker: past

If there are two events for a medication, include two separate entries. Make each entry as specific and complete as possible.

- "He is to continue diuresis with Lasix 40 mg p.o. daily for five days and then discontinue until his re-evaluation"
 - Partial entry 1: m="Lasix" ofst ||do="40 mg" ofst ||mo="p.o." ofst ||f="daily" ofst || du="for five days" ofst || r="diuresis" ofst ||e="continue"||t="present"...
 - Partial entry 2: m="Lasix" ofst ||do="40 mg" ofst ||mo="p.o." ofst ||f="daily" ofst || du="for five days" ofst || r="diuresis" ofst ||e="stop"|| t="present"...
- Lasix 40 mg p.o. daily for five days
 - o Temporal marker: nm
- "Lasix is not working"
 - o Temporal marker: nm

Since there is no text to be extracted, there is no offset for tense.

Certainty: information on whether the event occurs. Certainty can be expressed by uncertainty words, e.g., "suggested", or via modals, e.g., "should" indicates suggestion. One certainty for each event.

What should be extracted?

Nothing.

How to mark?

Choose from possible values: conditional, suggestion, factual, nm.

Conditional: The event for the medication occurs only under certain conditions as mentioned in the text.

Suggestion: The event for the medication is/was suggested and it is not dependent on a condition.

Factual: The event is not marked as conditional or suggestion, it is factual. This is the default value for certainty.

Nm: There is no event.

- "If his blood sugar is within 125-150 then give him DrugA in 25 mg dose."
 - Certainty: conditional
- "Patient should take Coumadin."
 - Certainty: suggested
- "Patient may take Coumadin."
 - Certainty: factual
- "Patient will take Coumadin."
 - Certainty: factual
- "Patient should take Coumadin if symptoms return."
 - Certainty: conditional
- "Patient may/can/could/will/would/might take Coumadin if symptoms return."
 - Certainty: conditional
- "The cardiologist consult suggested DrugA for his arrhythmia."
 - Certainty: suggested
- "He took drugA. He is given drugA. He will be taking drugA."
 - Certainty 1: factual
 - Certainty 2: factual
 - Certainty 3: factual
- "He is to continue diuresis with Lasix 40 mg p.o. daily for five days and then discontinue until his re-evaluation"
 - Certainty 1: factual
 - Certainty 2: factual

Since there is no text to be extracted, there is no offset for certainty.

9. List/Narrative:

If the entry is extracted from a medications list, this value should be set to "list". If the entry is extracted from narrative text, then it should be set to "narrative". This field will make separate evaluation of list and narrative information possible. Medication lists, medications on admission, medications on discharge are all considered lists.

Odds and Ends:

In cases where the entries for various fields are misspelled in a way that they cannot be separated, include the extracted text in the first relevant field. E.g., "Increase torsemide to 80BID" should be annotated as `m="torsemide" ofst || do="80BID" ofst || mo="nm" || f="nm" ...`.

The narrative/list field needs to be set based on which part of text you identified the entry. If the entry was already in a list, e.g., "medications on admission", "medications on discharge", "medications", etc. or in a similar list of medications, then the list/narrative field is set to list. If the entry comes from running free text, then the list/narrative field is set to narrative.

Before you turn in your output:

- Lower case your entire output file.
- Check that you have included offsets for all fields, except for event, tense, certainty, and list/narrative.