Annotation Guidelines

Multi-source **O**bservational **S**afety study for **A**dvanced **I**nformation **C**lassification using **N**atural **L**anguage **P**rocessing (MOSAIC-NLP)

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Oracle Life Sciences (Cerner Enviza)

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Annotation Guidelines

MOSAIC-NLP

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History of Modifications

Version	Date	Modification	Author
1.0	09/26/2024	Original Version	John Snow Labs Oracle Life Sciences (Cerner Enviza)

1   Introduction

The goal of annotation for this project is to train machine learning models for natural language processing (NLP) focused on extracting medical terminology from unstructured clinical notes. The entities to be extracted are focused on neuropsychiatric findings and the NLP models created will be used to extract information for the development of the study Use of Natural Language Processing in a Pharmacoepidemiology Study: The Examination of Neuropsychiatric Events and Incident Use of Montelukast Among Patients with Asthma Protocol.

Annotation Guidelines (AG) define the entities to be extracted and the way they have to be extracted; with the aim of assuring consistency between annotators and to serve as a reference for the data scientists and other personnel involved in the project, as well as for the future users or reviewers of the models.

Extraction of entities, relations and assertions will be explained in these AG. Entities refer to specific and meaningful elements within a text that can be categorized into predefined types such as names of persons, organizations, locations, dates, monetary values, and more. relations are semantic or syntactic connections between two or more entities in a text. These relationships describe how entities interact, such as "works for" (Person-Organization), "located in" (Organization-Location), or "born in" (Person-Location). Assertion labels provide additional context to indicate an attribute of an entity. There are three main types of assertions: Certainty (present, possible, absent), Temporality (Present, Past, Planned, Hypothetical), and Person (Patient, Family, Someone Else). Relation labels identify semantic relations between clinical entities, such as whether an event happened before, in parallel, or after another event, including dates associated with specific events.

2 Taxonomy

Drugs

1. MON (montelukast)
2. ICS (inhaled corticosteroids)
3. ICS Combination
4. Antidepressant
5. Oral corticosteroid
6. Short-acting beta-agonists (SABA)

Neuro Psychiatric Symptoms and disorders

1. Aggressive behavior or hostility
2. Agitation
3. Attention problems
4. Attention-deficit/hyperactivity disorder (ADHD)
5. Confusion/ Disorientation
6. Depression
7. Dream abnormalities
8. Feeling anxious
9. Anxiety Disorder
10. Hallucinations
11. Delusion
12. Irritability
13. Memory problems
14. Obsessive-compulsive disorder or symptoms
15. Restlessness
16. Restless leg syndrome
17. Stuttering
18. Completed suicide
19. Suicide attempt
20. Suicidal ideation
21. Self-harm
22. Self-harm Ideation
23. Tremor or shakiness
24. Uncontrolled muscle movements
25. Trouble sleeping
26. Sleep disorder

Sociodemographic characteristics

1. Education
2. Employment
3. Exercise
4. Lives alone

Current health status

1. Alcohol use
2. Marijuana use
3. Substance abuse
4. Smoking

Respiratory symptoms and diseases

1. Cough
2. Snoring
3. Asthma
4. Chronic obstructive pulmonary disease (COPD)
5. Allergic rhinitis
6. Wheezing
7. Shortness of breath

Disease severity and control

1. Intermittent
2. Mild
3. Moderate
4. Severe
5. Alleviated
6. Worsened
7. Other Modifier (acute, chronic, etc.)

Test

1. FEV1 %
2. FEV1 % result
3. Score
4. Score Result

Assertions

1. Past
2. Absent
3. Family History
4. Someone else
5. Possible

6. Hypothetical
7. Planned
8. Present (default)

Relations

1. Is caused by
2. Is prescribed for
3. Is severity of
4. Is test result of
5. Is score value

3   Named Entity Recognition (NER) Labels

For each kind of entity, these guidelines provide a definition, specific extraction rules, examples, relations with other variables, and assertion labels. Examples only include the annotations that are relevant for the entity that is being explained plus its corresponding assertion labels. The NER label is placed on top of the entity, it is written in superscript, example, <mark>Montelukast ^{MON}</mark>

For examples of annotation, the words that represent an entity are highlighted. The following color reference is used:

- <mark>Green</mark>: Correct extraction.

- <mark>Grey</mark>: Incorrect extraction.

General extractions rules:

Every mention of an entity must be extracted, even if it is repeated or negated (i.e. She does not work, whereby "not" is the negation). Extractions should include as few words as possible.

Punctuation marks should not be extracted unless stated otherwise.

Extractions should neither start nor finish with a blank space.

3.1   Drugs

3.1.1   Montelukast
In NLP Lab: Mon

Definition: this entity contains mentions of the drug montelukast.

Extraction rules: extract mentions of generic or brand names.

Examples:

1. She is on the following medications: Aspirin Tablet 75mg Diltiazem Capsule 60 mg 1 Lansoprazole 30 mg Pravastatin Tablet 40 mg Montelukast ^{MON} Tablet 10 mg Prednisone Tablet 20 mg Fostair Nexthaler 100/6mg - Twice a day Spiriva Inhaler- Once every morning Salbutamol Inhaler- As needed.
2. She did get some vaginal irritation with Advair in the past but she is willing to retry that if it is necessary. May also need to consider Singulair ^{Mon Hypothetical}.
3. Montelukast ^{MON} 10 mg oral tablet, see instructions, 10 refills, take one tablet by mouth every evening
4. Montelukast ^{MON Planned} status: prescribed, ordered as mnemonic: montelukast ^{MON Planned} 10 mg oral tablet
5. Regular order: Advair ^{MON} 100 mcg-50 mcg inhalation powder 1 puff,(s), INH, Daily

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Planned, Present

Relations: Is prescribed for

3.1.2 Inhaled Corticosteroids

In NLP Lab: ICS

Definition: this entity contains mentions of drugs that belong to the category inhaled corticosteroids.

Extraction rules: extract mentions of generic or brand names. Do not extract drugs that are combinations of ICS and other type of drugs such as Long-Acting Beta Agonists (LABA), these are extracted with the entity ICS_Combination. Do not extract corticosteroids nasal sprays. Do not extract mentions of corticosteroids when the administration route is not mentioned.

Examples:

1. She's been on Asmanex Twisthaler ^{ICS} for one year without side effects.
2. Asmanex hfa ^{ICS} 100 mcg/inh inhalation aerosol: 1 puff, inh, bid, rinse mouth and throat after use, 13 gm, 0 refill,(s)
3. Flovent diskus ^{ICS} 100 mcg inhalation powder, (fluticasone ^{ICS}) take 1 puff(s) inhalation 2 times a day.
4. Flonase ^{ICS} 50 mcg/inh nasal spray, 1 spray,(s), nasal, daily, prn.
5. She is on the following medications: Aspirin Tablet 75mg Diltiazem Capsule 60mg1 Lansoprazole 30mg Pravastatin Tablet 40mg Montelukast Tablet 10mg

Prednisone Tablet 20mg Fostair Nexthaler ^{ICS} 100/6mg - Twice a day Spiriva Inhaler- Once every morning Salbutamol Inhaler- As needed.

6. FLONASE ^{ICS} 50 MCG/ACT SUSP (FLUTICASONE PROPIONATE ^{ICS}) 1 spray each nostril b.i.d
7. Pt has been on fluticasone ^{ICS} for five months.
8. We will prescribe budesonide ^{ICS}.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Planned, Present

Relations: Is prescribed for

3.1.3 ICS Combination

In NLP Lab: ICS_Combination

Definition: this entity contains mentions of drugs that contain a combination of ICS (inhaled corticosteroids) plus another drug type like LABAs.

Extraction rules: extract mentions of generic or brand names. Do not extract ICS that are not combined with another drug type.

Examples:

1. She is on the following medications: Aspirin Tablet 75mg Diltiazem Capsule 60mg1 Lansoprazole 30mg Pravastatin Tablet 40mg Montelukast Tablet 10mg Prednisone Tablet 20mg Fostair Nexthaler ^{ICS_Combination} 100/6mg - Twice a day Spiriva Inhaler- Once every morning Salbutamol Inhaler - As needed.
2. Home medications: Breo Ellipta ^{ICS_Combination} 100 mcg-25 mcg inhalation powder 1 puffs, Inhalation, DAILY.
3. Asmanex hfa ^{ICS_Combination} 100 mcg/inh inhalation aerosol: 1 puff, inh, bid, rinse mouth and throat after use, 13 gm, 0 refill,(s)
4. Flonase ^{ICS_Combination} 50 mcg/inh nasal spray, 1 spray,(s), nasal, daily, prn.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Planned, Present

Relations: Is prescribed for

3.1.4 **Antidepressant**

In NLP Lab: Antidepressant

Definition: this entity contains mentions of drugs that belong to the category antidepressants.

Extraction rules: extract mentions of generic or brand names. Extract all medications listed as antidepressant in the study's protocol. Extract mentions of drug classes such as "Antidepressant", "SSRI", "SNRI".

Examples:

1. The patient is currently taking fluvoxamine ^{Antidepressant} (50 mg/day) for the treatment of their anxiety and OCD symptoms.
2. The patient is currently taking trazodone ^{Antidepressant} (50 mg at bedtime) for the treatment of their insomnia and depressive symptoms.
3. Escitalopram ^{Antidepressant} 20 mg oral tablet, 30 mg= 1.5 tab,(s), oral, daily, per patient 30 mg daily
4. Amitriptyline ^{Antidepressant Planned} status: prescribed, ordered as mnemonic: amitriptyline ^{Antidepressant Planned} 25 mg oral tablet
5. She has shown improvement while on SSRI ^{Antidepressant} therapy.
6. Patient has been tolerating Ativan ^{Antidepressant} well and will not increase the dosage at this time.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Planned, Present

Relations: Is prescribed for

3.1.5 **Oral corticosteroid**

In NLP Lab: Oral_Corticosteroid

Definition: this entity contains mentions of drugs that belong to the category oral corticosteroids.

Extraction rules: extract mentions of generic or brand names. Extract mentions of corticosteroids that are only available as oral forms even if the administration route is not mentioned. Do not extract mentions of corticosteroids, that have available forms other than oral, when the administration route is not mentioned.

Examples:

1. She is on the following medications: Aspirin tablet 75mg Diltiazem capsule 60 mg1 Lansoprazole 30mg Pravastatin tablet 40mg Montelukast tablet 10mg

Prednisone ^{OralCorticosteroid} tablet 20mg Fostair Nexthaler 100/6mg - Twice a day Spiriva inhaler - Once every morning Salbutamol inhaler- As needed.

2. He has been on Orapred ^{OralCorticosteroid} for one month.
3. Methylprednisolone ^{OralCorticosteroid} (medrol dosepak ^{OralCorticosteroid} 4 mg oral tablet) 1 packet(s) oral every day for 6 days
4. Patient is on Prednisolone ^{OralCorticosteroid}
5. The patient has been on Prednisone ^{OralCorticosteroid} for 4 months.
6. Pt was on dexamethasone ^{OralCorticosteroid} in the past.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Planned, Present

Relations: Is prescribed for

3.1.6 **Short-acting beta-agonists**

In NLP Lab: Short_Acting_Beta_Agonists

Definition: this entity contains mentions of drugs that belong to the category Short-acting beta-agonists.

Extraction rules: extract mentions of generic or brand names. Extract combinations drugs that contain a SABA.

Examples:

1. Tablet 20 mg Fostair Nexthaler 100/6mg - Twice a day Spiriva Inhaler- Once every morning Salbutamol Inhaler ^{SABA}- As needed.
2. Proair hfa ^{SABA} 90 mcg/inh inhalation aerosol, 2 puff, (s), inh, q4hr, prn, as needed
3. He uses Xopenex ^{SABA} as a rescue inhaler for asthma.
4. Albuterol ^{SABA} 90 mcg/inh inhalation aerosol, 1 to 2 puffs, neb, qid, 2 refills
5. Medications and immunizations administered during this visit xopenex ^{SABA},(levalbuterol ^{SABA})
6. Prescribed: DuoNeb ^{SABA Planned} inhalation solution 3 mL, INH, QID.
7. albuterol-ipratropium, 3 mL, INH, q6 hours, PRN.
8. albuterol-ipratropium ^{SABA}, 3 mL, INH, q6 hours, PRN.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Planned, Present

Relations: Is prescribed for

3.2 Neuro Psychiatric Symptoms and Disorders

3.2.1 Aggressive behavior or hostility

In NLP Lab: Aggressive_Behv_Hostility

Definition: this entity contains mentions of clinical findings related to aggressive behavior or hostility.

Extraction rules: Do not extract the word "aggressive" when it does not mean "aggressive behavior". Do not extract "intent to harm".

Examples:

1. There is an underlying hostile `Aggressive/Hostility` oppositional message in his communications.
2. Watch for these signs: feeling restless, agitated, or hopeless, having trouble concentrating or making decisions, having unexplained physical complaints, feeling irritable `Aggressive/Hostility`, angry `Aggressive/Hostility`, or aggressive `Aggressive/Hostility Hypothetical`
3. He continued to be aggressive `Aggressive/Hostility` and required administration of four-point soft restraints in addition to Haldol 1 mg intramuscularly.
4. There is no evidence of suicidal or homicidal ideations `Aggressive/Hostility Absent`.
5. He was diagnosed with oppositional defiant disorder `Aggressive/Hostility` in his teens.
6. Changed posture of care from aggressive `Aggressive/Hostility` full code status to terminal wean with comfort care measures.
7. Intent to Harm `Aggressive/Hostility` /Abuse
8. Are you thinking of harming `Aggressive/Hostility` or killing anyone else `Aggressive/Hostility` ?,: No

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.2 **Agitation**

In NLP Lab: Agitation

Definition: this entity contains mentions of clinical findings related to agitation.

Extraction rules: do not extract additional information to the agitation findings.

Examples:

1. Acute episode of agitation ^{Agitation}. She was complaining that she felt she might have been poisoned at her care facility.
2. No psychomotor agitation ^{Agitation Absent} or retardation. Speech is normal. No pressure of speech. No thought disorder.
3. Watch for these signs: having fatigue or low energy, eating too much or too little, sleeping too much or too little, feeling restless, agitated ^{Agitation Hypothetical}, or hopeless.
4. Acute episode of agitation ^{Agitation}. She was complaining that she felt she might have been poisoned at her care facility.
5. No psychomotor agitation ^{Agitation Absent} or retardation. Speech is normal. No pressure of speech. No thought disorder.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.3 **Attention problems**

In NLP Lab: Attention_Problems

Definition: this entity contains mentions of clinical findings related to attention problems.

Extraction rules: extract only symptoms related to attention problems, but not ADHD since it is extracted under a different entity.

Examples:

1. Trouble concentrating ^{AttentionProblems Absent}: not at all
2. Trouble concentrating ^{AttentionProblems}: more than half the days

3. Her mother refers she ==struggles with attention== **AttentionProblems** in school.
4. He complains of brain fog and ==attention difficulties== **AttentionProblems** as side effects.
5. Watch for these signs: feeling restless, agitated, or hopeless, having ==trouble concentrating== **AttentionProblems Hypothetical** or making decisions, having unexplained physical complaints, feeling irritable, angry, or aggressive.
6. Attention: ==Easily distracted== **AttentionProblems** ., Thought Content: Appropriate.
7. The patient will also be advised to make certain lifestyle modifications, such as creating a structured routine and avoiding excessive screen time, to manage the symptoms of ADHD **ADHD**
8. Family History: The patient reports a family history of ADHD **ADHD FamilyHistory**.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.4 **Attention deficit hyperactivity disorder (ADHD)**

In NLP Lab: ADHD

Definition: this entity contains mentions of diagnosis of attention deficit hyperactivity disorder (ADHD).

Extraction rules: do not extract symptoms, only diagnosis of ADHD.

Examples:

1. Family History: The patient reports a family history of ==ADHD== **ADHD FamilyHistory**.
2. The patient will also be advised to make certain lifestyle modifications, such as creating a structured routine and avoiding excessive screen time, to manage the symptoms of ==ADHD== **ADHD**

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.5 **Confusion/ Disorientation**

In NLP Lab: Confusion_Disorientation

Definition: this entity contains mentions of clinical findings related to confusion or disorientation.

Extraction rules: extracted only text that contains confusion and/or disorientation. Do not extract sleep disorder, hallucination, and other conditions with this entity.

Examples:

1. The patient's wife notes that her husband might be confused ^{Confusion/Disorientation Possible} and disoriented ^{Confusion/Disorientation Possible} due to being in the hospital environment.
2. Chief Complaint: Confusion ^{Confusion/Disorientation} and hallucinations.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.6 **Depression**

In NLP Lab: Depression

Definition: this entity contains mentions of clinical findings related to depression.

Extraction rules: Extract symptoms of diagnosis, include terms like "sadness" or "feeling down". Extract dysthymic disorder, dysthymic and dysthymia. Extract together "major depression disorder" or "depression disorder". In "depression screening tool" do not extract "depression", this is extracted as Score.

Examples:

1. Depression ^{Depression Hypothetical} screening tool ebp entered on: <date> 8:26 pst.
2. Feeling down ^{Depression Absent}, depressed ^{Depression Absent}, hopeless ^{Depression Absent}: not at all.
3. Mood is mildly depressed ^{Depression}. Speech is normal in rate, rhythm and volume.
4. Living with depression ^{Depression Hypothetical}: everyone experiences occasional disappointment, sadness ^{Depression Hypothetical}, and loss in their lives, when you are feeling down ^{Depression Hypothetical}, blue ^{Depression Hypothetical}, or sad ^{Depression}

Hypothetical for at least 2 weeks in a row, it may mean that you have depression **Depression Hypothetical**.

5. Description: Psychiatric Consultation of patient with major depression disorder **Depression**.
6. Psych: depressed **Depression** mood, excessive anxiety.
7. Status: home payor: medi-cal mc grouper: <id> ms-drg psychoses admit dx: f32.9 major depressive disorder **Depression.**
8. Final dx: principal: f32.0 major depressive disorder **Depression**, single episode, mild.
9. She has been with dysthymic disorder **Depression**, for 3 years.
10. Dysthymic **Depression**, but appropriately reactive.
11. Dysthymia **Depression** (Dysthymic disorder **Depression**, F34.1)
12. Feeling Bad **Depression**, About Yourself? No.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.7 Dream abnormalities

In NLP Lab: Dream_Abnormalities

Definition: this entity contains mentions of clinical findings related to dream abnormalities.

Extraction rules: include nightmares, bad dreams, vivid dreams. Do not include findings related to sleep issues different from dreams.

Examples:

1. She reports abnormal dreams **DreamAbnormalities** when she sleeps in supine position.
2. He reports that after taking quetiapine he has been having weird dreams **DreamAbnormalities**.
3. He is supposed to be taking b.i.d. but has nightmares **DreamAbnormalities** with increased dosing.
4. She was tried on various medications, which caused sweating, nightmares **DreamAbnormalities** and perhaps other side effects.
5. She reports frequent vivid dreams **DreamAbnormalities** after she was put on the medication.
6. The patient reports feeling fatigued during the day as a result of these sleep disturbances **DreamAbnormalities**.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.8 **Feeling anxious**

In NLP Lab: Feeling_Anxious

Definition: this entity contains mentions of symptoms of anxiety.

Extraction rules: extract only symptoms of anxiety but not anxiety disorder diagnosis, this is extracted under a separate entity. Include symptoms of nervousness.

Examples:

1. The patient was consulted by Psychiatry for anxiety ^{FeelingAnxious}. I know this patient from a previous consult.
2. The patient had been severely anxious ^{FeelingAnxious} and freely admitted that she was depressed at home.
3. The patient states that they wake up feeling anxious ^{FeelingAnxious}, and sometimes they are unable to fall back asleep.
4. Medical history: depression ^{Depression} and anxiety disorder ^{FeelingAnxious}.
5. Generalized anxiety disorder ^{FeelingAnxious} screening

gad7 nervousness ^{FeelingAnxious}: over half the days

gad7 unable to control worry ^{FeelingAnxious}: nearly every day

gad7 worrying too much ^{FeelingAnxious}: nearly every day

gad7 trouble relaxing ^{FeelingAnxious}: several days

gad7 restlessness ^{FeelingAnxious}: several days

gad7 irritable ^{FeelingAnxious}: several days

gad7 fear ^{FeelingAnxious}: several days

gad7 score: 12

gad7 problem severity: very difficult

6. Not being able to stop worrying ^{FeelingAnxious Absent}: Not at all.
7. Name of problem: anxiety ^{FeelingAnxious};,recorder: <doctor> cma;,confirmation: confirmed
8. Constitutional: (-) body aches, (-) night sweats, (-) fatigue, (-) weight change hent (-) headaches, (-) sinus congestion respiratory: (-) shortness of breath, (-) cough breast: (-) breast pain (-) anxiety ^{FeelingAnxious Absent}, (-) depression.
9. feeling nervous ^{FeelingAnxious} or worried for no reason ^{FeelingAnxious}
10. social anxiety ^{FeelingAnxious} Progress towards treatment goals: Patient's symptoms have remained stable since last session.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, is caused by

3.2.9 **Anxiety Disorder**

In NLP Lab: Anxiety_Disorder

Definition: this entity contains mentions of diagnosis of anxiety disorder.

Extraction rules: extract only diagnosis of anxiety disorder but not anxiety symptoms, since these are extracted under a different entity. In "anxiety disorder screening" extract "anxiety disorder" plus Hypothetical assertion. Extract panic disorder or episodic paroxysmal anxiety.

Examples:

1. Unspecified abnormal findings in urine f41.9 anxiety disorder ^{AnxietyDisorder}, unspecified f17.200 nicotine dependence.
2. Anxiety disorder ^{AnxietyDisorder Hypothetical} screening
3. Name of problem: anxiety disorder ^{AnxietyDisorder}, depression ^{Depression}; recorder: <doctor>; confirmation: confirmed
4. Generalized anxiety disorder ^{AnxietyDisorder Hypothetical} screening

gad7 nervousness ^{AnxietyDisorder}: over half the days

gad7 unable to control worry ^{AnxietyDisorder}: nearly every day

gad7 worrying too much ^{AnxietyDisorder}: nearly every day

gad7 trouble relaxing ^{AnxietyDisorder}: several days

gad7 restlessness ^{Restlessness}: several days

gad7 irritable ^{Irritability}: several days

gad7 fear: several days

gad7 score: 12

gad7 problem severity: very difficult

5. Name of problem: anxiety ^{Anxiety}; recorder: <doctor> cma; confirmation: confirmed
6. Panic disorder ^{AnxietyDisorder} (Panic disorder ^{AnxietyDisorder} [episodic paroxysmal anxiety ^{AnxietyDisorder}])

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, is caused by

3.2.10 **Hallucinations**

In NLP Lab: Hallucinations

Definition: this entity contains mentions of clinical findings related to hallucinations.

Extraction rules: extract all types of hallucinations, like tactile, visual, auditory. Include the words "visual", "auditory", "tactile". Extract "seeing and hearing things", "hear voices", etc.

Examples:

1.　　　Perception: wnl ==hallucinations== ^{**Hallucinations Absent**}?,no if yes, type?,_ _ __ comments/observations
2.　　　The patient reports experiencing ==auditory hallucinations== ^{**Hallucinations**} for the past several months.
3.　　　Chief Complaint: Patient reports experiencing ==visual hallucinations== ^{**Hallucinations**} that have been causing distress and affecting their daily life.
4.　　　Since infancy and began having episodes of "==seeing and hearing things== ^{**Hallucinations**}"
5.　　　I also ==hear voices== ^{**Hallucinations**}, voices say they hate me, that I am worthless, that they will kill me, that they want to kill my kids/wife.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.11 **Delusion**

In NLP Lab: Delusion

Definition: this entity contains mentions of clinical findings related to delusions.

Extraction rules: extract texts that contains expressions related to the delusional state. Do not extract confusion, hallucination, disorientation.

Examples:

1. None noted; ==Delusions== ^{**Delusion Absent**}: none noted; Perceptual disturbance: not responding to internal stimuli Insight/Judgment: fair.
2. Thought Content: no auditory or visual hallucinations; patient is not ==delusional== ^{**Delusion Absent**}
3. No reports or evidence of obsession, phobias, paranoia, ==delusions== ^{**Delusion Absent**}, or perceptual disturbances.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.12 **Irritability**

In NLP Lab: Irritability

Definition: this entity contains mentions of clinical findings related to irritability.

Extraction rules: Extract "feeling irritable" together, do not extract "anger" or "angry".

Examples:

1. Denies suicidal thoughts, reports sleep changes, denies confusion, reports <mark>irritability **Irritability**</mark> or anger.
2. Denies suicidal thoughts, reports sleep changes, denies confusion, reports irritability or <mark>anger ^{Irritability}</mark>.
3. Secondary: r45.4 <mark>irritability **Irritability**</mark> and anger z63.9 problem related to primary support group.
4. Watch for these signs: feeling restless, agitated, or hopeless, • having trouble concentrating or making decisions, • having unexplained physical complaints, • <mark>feeling irritable **Irritability Hypothetical**</mark>, angry, or aggressive.
5. Watch for these signs: feeling restless, agitated, or hopeless, • having trouble concentrating or making decisions, • having unexplained physical complaints, • feeling irritable, <mark>angry ^{Irritability Hypothetical}</mark>, or aggressive.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.13 Memory problems

In NLP Lab: Memory_Problems

Definition: this entity contains mentions of clinical findings related to memory problems.

Extraction rules: include only symptoms but not diagnosis like Alzheimer or dementia.

Examples:

1. Not listening to instructions, losing things often, forgetting things **MemoryProblems** often, being easily distracted.
2. A middle-aged male with increasing memory loss **MemoryProblems** and a history of Lyme disease.
3. The patient reports experiencing difficulties with memory **MemoryProblems**, such as forgetting appointments **MemoryProblems** or important details.
4. He had a consultation with an outside neurologist and was told that she likely has Alzheimer disease **MemoryProblems Possible** and was prescribed Aricept
5. Patient with a history of mesothelioma and likely mild dementia **MemoryProblems**.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.14 **Obsessive-compulsive disorder or symptoms**

In NLP Lab: Obsessive_Compulsive

Definition: this entity contains mentions of clinical findings related to OCD or symptoms of compulsion or obsession.

Extraction rules: extract both diagnoses and symptoms.

Examples:

1. She denies any obsession **OCDOrSymptom Absent**, compulsion **OCDOrSymptom Absent** or phobia. She is alert and oriented.
2. The patient describes engaging in repetitive behaviours or mental acts **OCDOrSymptom**.
3. Based on the patient's symptoms and history, a diagnosis of obsessive-compulsive disorder **OCDOrSymptom Posible** (OCD **OCDOrSymptom Posible**) is suspected.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.15 **Restlessness**

In NLP Lab: Restlessness

Definition: this entity contains mentions of clinical findings related to restlessness.

Extraction rules: do not include restless leg syndrome, since it is extracted under a different entity, include only symptoms of restlessness.

Examples:

1. May cause physical symptoms such as ==restlessness== ^{Restlessness Hypothetical}, trouble concentrating, sleep problems, frequent sweating, nausea, diarrhea, headaches, and trembling or muscle twitching.
2. Watch for these signs: having fatigue or low energy, eating too much or too little, sleeping too much or too little, feeling ==restless== ^{Restlessness Hypothetical}, agitated, or hopeless.
3. The patient states ==being unable to sit still== ^{Restlessness} and has a ==constant need to move== ^{Restlessness}.
4. Documented history of ==Akathisia== ^{Restlessness}.
5. Assessment and Plan: Based on the patient's symptoms and history, a diagnosis of restless leg syndrome ^{Restlessness} was done.
6. History of Present Illness: The patient reports experiencing involuntary movements ^{Restlessness} of the arms and legs for several months.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.16 **Restless leg syndrome**

In NLP Lab: Restless_Leg

Definition: this entity contains mentions of diagnosis of restless leg syndrome.

Extraction rules: include only restless leg syndrome diagnosis, do not include symptoms of restlessness, these are extracted with a different entity.

Examples:

1. Assessment and Plan: Based on the patient's symptoms and history, a diagnosis of ==restless leg syndrome== ^{RestlessLegSyndrome} was done.
2. Assessment: pt with history of ==restless leg syndrome== ^{RestlessLegSyndrome} (==RLS== ^{RestlessLegSyndrome}), also known as ==Willis-Ekbom disease== ^{RestlessLegSyndrome}.

3. May cause physical symptoms such as restlessness ^{RestlessLegSyndrome Hypothetical}, trouble concentrating, sleep problems, frequent sweating, nausea, diarrhea, headaches, and trembling or muscle twitching.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.17 **Stuttering**

In NLP Lab: Stuttering

Definition: this entity contains mentions of clinical findings related to stuttering.

Examples:

1. Chief Complaint: Difficulty speaking fluently and involuntary disruptions in speech **Stuttering**.
2. The patient will be referred to behavioral therapy to address any underlying psychological issues related to the stuttering **Stuttering**.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.18 **Completed suicide**

In NLP Lab: Completed_Suicide

Definition: this entity contains mentions of clinical findings related to completed suicide.

Extraction rules: do not extract suicidal ideation or attempt.

Examples:

1. Based on the circumstances and the patient's history of depression and previous suicide attempt ^{CompletedSuicide}, the patient's death has been determined to be a completed suicide **CompletedSuicide**.
2. Despite receiving treatment for major depressive disorder and suicidal ideation, the patient committed suicide **CompletedSuicide**.
3. Family history: two of his uncles committed suicide **Completed suicide FamilyHistory**
4. Suicidality Questionnaire: Suicide ^{SuicidalIdeation} Age: Yes.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is caused by

3.2.19 **Suicide attempt**

In NLP Lab: Suicide_Attempt

Definition: this entity contains mentions of clinical findings related to suicide attempt.

Extraction rules: extract mentions of attempted suicide, attempting to take one's life, etc; do not extract suicidal ideation or completed suicide.

Examples:

1. Two months ago, one of her friends was attempting suicide ^{SuicideAttempt} ^{SomeoneElse}
2. The patient is a 21-year-old Caucasian male, who attempted suicide ^{SuicideAttempt} by trying to jump from a moving car.
3. This is a 52-year-old white woman with Huntington disease, who presents with the third suicide attempt ^{SuicideAttempt} in the past two months.
4. Based on the circumstances and the patient's history of depression and previous suicide attempt ^{SuicideAttempt Past}, the patient's death has been determined to be a completed suicide ^{SuicideAttempt}.
5. Despite receiving treatment for major depressive disorder and suicidal ideation ^{SuicideAttempt}, the patient committed suicide ^{SuicideAttempt}
6. Suicidality Questionnaire: Suicide ^{SuicidalIdeation} Age : Yes.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is caused by

3.2.20 **Suicidal ideation**

In NLP Lab: Suicidal_Ideation

Definition: this entity contains mentions of clinical findings related to suicidal ideation.

Extraction rules: extract mentions of thoughts of suicide, taking one's life, etc. Do not extract suicide attempt or completed suicide. Mentions of "hurting yourself" should be extracted as the entity Self-harm.

Examples:

1. Thoughts better off dead ^{SuicidalIdeation Absent} or hurting self: not at all
2. Thoughts better off dead ^{SuicidalIdeation} or hurting self: several days
3. Get help right away if: you have thoughts of hurting yourself ^{SuicidalIdeation Hypothetical} or others, if you ever feel like you may hurt yourself ^{SuicidalIdeation Hypothetical} or others or have thoughts about taking your own life ^{SuicidalIdeation Hypothetical}.

4. The patient denied any suicidal ideation ^{SuicidalIdeation Absent} or homicidal ideation. Insight and judgment fair, and cognitive examination was unremarkable.
5. Safety: continue to monitor risk of suicide ^{SuicidalIdeation Hypotethical} and self harm.
6. <NAME> a current danger to self ^{SuicidalIdeation} or others, or risk of significan property destruction
7. Suicidality Questionnaire: Suicide ^{SuicidalIdeation} Age : Yes.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is caused by

3.2.21 **Self-harm**

In NLP Lab: Self-harm

Definition: this entity contains mentions of clinical findings related to patient's self-harm.

Extraction rules: extract mentions of self-harm behaviors, self-injury, cutting, burning, etc. Do not extract mentions of "killing myself" or "taking my life" since these are extracted with the entity Suicidal Ideation. Do not extract "intent to harm".

Examples:

1. He has four days' worth of medications and agrees to no self-harm ^{Self-harm Hypothetical} or harm of others.
2. Get help right away if: you have thoughts of hurting yourself^{Self-harm Hypothetical} or others, if you ever feel like you may hurt yourself ^{Self-harm Hypothetical} or others or have thoughts about taking your own life ^{Self-harm Hypothetical}.
3. Patient has no history of suicide attempt or self-injurious behavior ^{Self_Harm Absent}., Limited social support
4. The patient has multiple self-inflicted cuts ^{Self-harm} on their arms and legs.
5. <NAME> a current danger to self ^{Self-harm} or others, or risk of significan property destruction.
6. Intent to Harm ^{Self-harm} /Abuse

    Are you thinking of harming ^{Self-harm} or killing yourself?,: No

    Are you thinking of harming ^{Self-harm} or killing anyone else?,: No

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present.

Relations: Is caused by

3.2.22 **Self-Harm Ideation**

In NLP Lab: SelfHarm_Ideation

Definition: this entity contains mentions of clinical findings related to patient's self-harm ideation.

Extraction rules: extract mentions of self-harm ideation, self-injury, cutting, burning, etc. Do not extract mentions of "killing myself" or "taking my life" since these are extracted with the entity Suicidal Ideation. Do not extract "intent to harm".

Examples:

1. The patient indicated that she has been thinking of cutting herself **Self-harm_Ideation**: lately.
2. Thoughts better off dead **Self-harm_Ideation** or hurting self **Self-Harm_Ideation**: several days.
3. Are you thinking of harming **Self-Harm_Ideation Absent** or killing yourself **Self-Harm_Ideation Absent**?: No
4. Intent to Harm **Self-   Harm_Ideation** /Abuse

   Are you thinking of harming **Self-Harm_Ideation Absent** or killing yourself? **Self-Harm_Ideation Absent**,: No

   Are you thinking of harming **Self-Harm_Ideation Absent** or killing anyone else?,: No

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present.

Relations: Is caused by

3.2.23   **Tremor or shakiness**

In NLP Lab: Tremor_Shakiness

Definition: this entity contains mentions of clinical findings related to tremors or shakiness.

Extraction rules: do not include mentions of restlessness or uncontrolled muscle movements, since these are extracted under different entities.

Examples:

1. Tingling or numbness around the mouth, lips, or tongue, tremors **TremorOrShakiness Hypothetical** or shakes **TremorOrShakiness Hypothetical,** irritability
2. You sweat excessively, you have tremors **TremorOrShakiness Hypothetical,** you feel anxious
3. Extremities: no joint deformities, neurologic: alert and oriented x3. no tremors **TremorOrShakiness Absent**, skin: no skin rash. Psych: cooperative.
4. Chief Complaint: Involuntary shaking **TremorOrShakiness** of hands.
5. Watch for these signs: having fatigue or low energy, eating too much or too little, sleeping too much or too little, feeling restless **TremorOrShakiness** l, agitated, or hopeless.
6. History of Present Illness: The patient reports experiencing involuntary movements **TremorOrShakiness** of the arms and legs for several months.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.24   **Uncontrolled muscle movements**

In NLP Lab: Uncontrolled_Muscle_Movements

Definition: this entity contains mentions of clinical findings related to uncontrolled muscle movements.

Extraction rules: do not extract mentions of restlessness, tremor or shakiness, since these are extracted under a different entity. Extract only symptoms such as Involuntary/spontaneous/ abnormal/repetitive/rhythmic movements, twitching,

jerking, and blinking, tics; also extract Tourette Syndrome, but do not extract disorders like Parkinson's disease, Willson's disease, etc.

Examples:

1. Diagnosis of tardive dyskinesia **UncontrolledMuscleMovements** is suspected, which is a potential side effect of antipsychotic medication.
2. History of Present Illness: The patient reports experiencing involuntary movements **UncontrolledMuscleMovements** of the arms and legs for several months.
3. Name of Problem: Transient tic disorder **UncontrolledMuscleMovements** ;,Recorder: <DOCTOR>
4. The patient has been diagnosed with Tourette's syndrome **UncontrolledMuscleMovements**
5. No nystagmus, ataxia **UncontrolledMuscleMovements Absent**, or tremor noted.
6. No vocal or motor tics **UncontrolledMuscleMovements Absent**,, extrapyramidal side effects **UncontrolledMuscleMovements Absent**, (EPS **UncontrolledMuscleMovements Absent**,) or tardive dyskinesia **UncontrolledMuscleMovements Absent**, (TD **UncontrolledMuscleMovements Absent**)
7. Father: Deceased at age <AGE> year,(s); Parkinson's disease **UncontrolledMuscleMovements FamilyHistory**
8. The patient states being unable to sit still **UncontrolledMuscleMovements** and has a constant need to move **UncontrolledMuscleMovements**.
9. Chief Complaint: Involuntary shaking **UncontrolledMuscleMovements** of hands.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.25 Trouble sleeping

In NLP Lab: Trouble_Sleeping

Definition: this entity contains mentions of clinical findings related to trouble sleeping.

Examples:

1. Trouble falling or staying asleep **TroubleSleeping Absent**: not at all
2. Sunken eyes, sleepiness **TroubleSleeping**, weakness
3. The patient states that they wake up feeling anxious, and sometimes they are unable to fall back asleep **TroubleSleeping**.
4. Chief Complaint: Difficulty falling asleep **Trouble Sleeping**.
5. The patient presents with symptoms of excessive daytime sleepiness **TroubleSleeping** and difficulty staying awake **TroubleSleeping** during normal waking hours.

6. Sleeping concerns **TroubleSleeping Absent**: No.
7. They stated having sleeplessness **Trouble Sleeping** and hadn't slept **Trouble Sleeping** for roughly 2 weeks.
8. Contact a health care provider if: you stop taking your antidepressant medicines, and you have any of these symptoms, difficulty falling asleep **TroubleSleeping Hypothetical**, not being able to sleep **TroubleSleeping Hypothetical**.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.2.26 Sleep disorder

In NLP Lab: Sleep_Disorder

Definition: this entity contains mentions of diagnosis of sleep disorders.

Extraction rules: extract only diagnosis, for symptoms, there are entities like Trouble sleeping and Dream abnormalities.

Examples:

1. Denies sleep walking **SleepDisorder Absent**
2. Chief Complaint: Patient complains of engaging in sleepwalking **SleepDisorder** behaviors.
3. Ambient and other sleep medications can cause sleepwalking **SleepDisorder Hypothetical**.
4. Integumentary: no rash, psychiatric: no anxiety, depression or insomnia **SleepDisorder Absent**, physical exam.
5. Problems and health issues: acid reflux, anxiety, chronic back pain, cyst of ovary, endometriosis, (clinical) insomnia **SleepDisorder**, irritable bowel syndrome, characterized by constipation, major depressive disorder.
6. Contact a health care provider if: you stop taking your antidepressant medicines, and you have any of these symptoms not being able to sleep **SleepDisorder Hypothetical**, (insomnia **SleepDisorder Hypothetical**)
7. Watch for these signs: having fatigue or low energy, eating too much or too little, sleeping too much **SleepDisorder Hypothetical** or too little, feeling restless, agitated, or hopeless.
8. The polysomnography test revealed an average sleep latency of less than 8 minutes and a total sleep time of more than 10 hours, confirming the diagnosis of hypersomnia **SleepDisorder**.
9. The patient underwent polysomnogram, multiple sleep latency test (MSLT), and actigraphy that revealed a mean sleep latency of less than 8 minutes on the MSLT, indicating idiopathic hypersomnia without long sleep time **SleepDisorder**

10. The patient underwent a sleep study, which revealed a ==delayed sleep-wake phase disorder== **SleepDisorder**.
11. Diagnosis: Based on the patient's medical history, physical examination, and diagnostic test results, the patient has been diagnosed with a ==circadian rhythm disorder== **SleepDisorder**.
12. She arrived to Europe 8 days ago and reports that still being ==jet lagged== **SleepDisorder**
13. The sleep study revealed episodes of ==parasomnia== **SleepDisorder**, confirming the diagnosis of ==parasomnia disorder== **SleepDisorder**.
14. The sleep study revealed recurrent ==isolated sleep paralysis== **SleepDisorder** indicating a sleep disorder.
15. The patient suffers from occasional ==bedwetting== **SleepDisorder**.
16. Based on the recount of the episodes it relates to ==exploding head syndrome== **SleepDisorder**.
17. The patient underwent a sleep study, which revealed episodes of rhythmic masticatory muscle activity (RMMA) during sleep, confirming the diagnosis of ==sleep-related bruxism== **SleepDisorder**.
18. There is a history of ==sleep behavior disorder== **SleepDisorder** caused by Zolpidem.
19. The patient's video-EEG monitoring study showed evidence of ==nocturnal epilepsy== **SleepDisorder**, with epileptiform discharges on the EEG during sleep.
20. Follow-up of moderate-to-severe ==sleep apnea== **SleepDisorder**. The patient returns today to review his response to CPAP.

Assertions: Past, Absent, Family History, Someone Else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.3 **Sociodemographic characteristics**

3.3.1 **Education**

In NLP Lab: Education

Definition: this entity contains mentions of the education level of the patient.

Extraction rules: extract mentions of academic degrees, qualifications, profession, or education level. Do not include employment position names. Do not extract "healthcare provider".

Examples:

1. Social history: lives with family. She has high school ^{Education} level education and works as a clerk ^{Education}.
2. She is 19 and is currently a college student ^{Education}.
3. Social history. Does not use alcohol or tobacco. She is a nurse ^{Education}. and is currently pursuing a master's degree ^{Education}. in health education. She works at MA hospital.
4. The patient works as a manager ^{Education}. at Amazon's warehouse.
5. Make sure you discuss any questions you have with your healthcare provider ^{Education}.

Assertions: Past, Absent, Someone else, Possible, Hypothetical, Present

Relations: None

3.3.2 **Employment**

In NLP Lab: Employment

Definition: this entity contains mentions of patient's employment status.

Extraction rules: include also information about unemployment. Extract terms such as "work", "works", "employed" apart from the job tittle. Do not extract mentions of education level such as degrees or professions. Do not extract "healthcare provider".

Examples:

1. Social history: lives with family. She has high school level education and works ^{Employment}. as a clerk ^{Employment}.
2. He is an accountant ^{Employment} and works ^{Employment}. at a bank ^{Employment}.
3. She is 19 and is currently a college student ^{Employment}.
4. Social history. Does not use alcohol or tobacco. She is a nurse ^{Employment}. and is currently pursuing a master's degree in health education. She works ^{Employment} at MA hospital ^{Employment}.
5. The patient works as a manager ^{Employment} at Amazon's warehouse ^{Employment}.
6. Pt works ^{Employment} full time at a pet shop ^{Employment}.
7. Employment status: Employed ^{Employment}. Works ^{Employment} as receiver ^{Employment} at a co family not familiar with.
8. Originally from Tx where he now works ^{Employment}, and family resides.
9. She currently does not work ^{Employment Absent}.
10. Employment status: unemployed ^{Employment Absent}.
11. Make sure you discuss any questions you have with your healthcare provider ^{Employment}.

Assertions: Past, Absent, Someone else, Possible, Hypothetical, Present

Relations: None

3.3.3 Exercise

In NLP Lab: Exercise

Definition: this entity contains mentions of patient's exercise habits.

Extraction rules: include mentions of practiced sports.

Examples:

1. She attends activities, such as `exercise` ^{Exercise} daily.
2. Pt. has dermatomyositis and loses muscle in legs very easily if she does not `exercise` ^{Exercise Hyptotethical}
3. Previously he participated in outpatient cardiac rehab, and engaged in some `exercise` ^{Exercise Past}, such as `walking` ^{Exercise Past} in his neighborhood.
4. Pt is eager to hear the team's recommendations about dietary changes and `exercise` ^{Exercise Hyptotethical} regimen.
5. She has an active life and practices `soccer` ^{Exercise} and `basketball` ^{Exercise}.
6. She does not `work` ^{Exercise}.

Assertions: Past, Absent, Someone else, Possible, Hypothetical, Present

Relations: None

3.3.4 Lives alone

In NLP Lab: Lives_Alone

Definition: this entity contains mentions referring to the patient living alone.

Extraction rules: extract specific mentions of the patient living alone and do not extract information about patient living with others.

Examples:

1. `Lives with alone` ^{LivesAlone},\- comments: single
2. Previous living situation: `Home alone` ^{LivesAlone}
3. She has few supports and is currently `living alone` ^{LivesAlone}.
4. Current living situation: `lives with his family` ^{LivesAlone}.

Assertions: Past, Absent, Someone else, Possible, Hypothetical, Present

Relations: None

3.4 Current health status

3.4.1 Alcohol use
In NLP Lab: Alcohol_Use

Definition: this entity contains mentions of findings of alcohol drinking habit.

Extraction rules:

Terms include "drink", "alcohol", "beer", "wine", "whiskey", "alcoholic", "alcoholism". Include the terms "use" and "abuse" when they are adjacent.

Extract "drink" and "alcohol" separately. Extract "sober" with Absent assertion.

This entity can be assigned two assertion labels at the same time in cases where it is associated with family or someone else but it is negated, in which case, it is also necessary to use Absent assertion.

Examples:

1. She does smoke cigarettes regularly but does not drink **AlcoholUse Absent** alcohol **AlcoholUse Absent**
2. She does smoke cigarettes regularly but does not drink alcohol **AlcoholUse Absent**
3. Alcohol **AlcoholUse** : current, 1-2 times per month
4. Alcohol use **AlcoholUse** : current: beer **AlcoholUse**, wine **AlcoholUse**, liquor **Alcoholuse**, 1-2 times per month, <date>
5. Social history: pt does not drink **AlcoholUse Absent** or smoke.
6. Social history: she does not smoke. She drinks **AlcoholUse** a few pints of beer **AlcoholUse** on the weekends.
7. Comment: Has been sober **AlcoholUse Absent** for 5 years.
8. Household alcohol **AlcoholUse Someone_Else Absent** concerns: No

Assertions: Past, Present, Absent, Hypothetical, Possible, Family History, Someone else

Relations: None

3.4.2 **Marijuana use**
In NLP Lab: Marijuana_Use

Definition: this entity contains mentions of findings of marijuana use. Both recreational and medical marijuana are annotated.

Extraction rules: mentions of other recreational drugs are extracted under the Substance abuse entity. Include the terms "use" and "abuse" when they are adjacent. **Do not extract** "sober" for Marijuana Use.

This entity can be assigned two assertion labels at the same time in cases where it is associated with family or someone else, but it is negated, in which case, it is also necessary to use Absent assertion.

Examples:

1. She occasionally uses marijuana ^{MarijuanaUse} but no other drug use ^{MarijuanaUse}
2. Lives with children, maternal grandmother, substance abuse ^{MarijuanaUse Past} past, marijuana ^{MarijuanaUse} \- comments: (+) uds <date>
3. She said that she has used weed ^{MarijuanaUse} since age 16.
4. He has a history of marijuana use ^{MarijuanaUse}.
5. Are there concerns of marijuana use ^{MarijuanaUse Someone_Else Absent}. in the household? No.

Assertions: Past, Present, Absent, Hypothetical, Possible, Family History, Someone else

Relations: None

3.4.3 **Substance abuse**
In NLP Lab: Substance_Abuse

Definition: this entity contains mentions of findings of substance abuse.

Extraction rules: Terms include "drugs", "substance", "illegal drug", "methamphetamine", "illicit drug", "cocaine", "recreational drug", "heroine," etc. Include prescription drugs that are abused. Include also substances that can create dependency like caffeine and tea. Do not extract marijuana use, since it is extracted under the Marijuana use entity. Include the terms "use" and "abuse" when they are adjacent. **Do not extract** "sober" for Substance abuse.
This entity can be assigned two assertion labels at the same time in cases where it is associated with family or someone else but it is negated, in which case, it is also necessary to use Absent assertion.

Examples:

1. Substance abuse ^{SubstanceAbuse Absent}: never (last updated: <date>
2. Regular, caffeine ^{SubstanceAbuse} intake amount: coffee ^{SubstanceAbuse}
3. Substance abuse ^{SubstanceAbuse Absent}: never.

4. She refers cocaine ^{SubstanceAbuse}. and crystal meth use ^{SubstanceAbuse}..
5. Pt admitted to heroin use ^{SubstanceAbuse}.
6. Substance abuse ^{SubstanceAbuse Someone_Else Absent} in household: No.
7. Social history: tobacco smoking and amphetamine use ^{SubstanceAbuse}.
8. There is history of marijuana smoking ^{SubstanceAbuse past} in the past, quitted 5 years ago.
9. She occasionally uses marijuana ^{SubstanceAbuse}

Assertions: Past, Present, Absent, Hypothetical, Possible, Family History, Someone else

Relations: None

3.4.4 Smoking
In NLP Lab: Smoking

Definition: this entity contains mentions of findings of tobacco smoking.

Extraction rules: extract mentions of tobacco smoking but not tobacco chewing, or smokeless tobacco. Include the words "use", "abuse", "dependence" when they are adjacent to "smoking" or "tobacco". Extract electronic cigarette use. Do not extract mentions of nicotine taken as a medication.

Examples:

1. Unspecified abnormal findings in urine f41.9 anxiety disorder, unspecified f17.200 nicotine dependence ^{Smoking}.
2. Tobacco ^{Smoking Absent}: never (less than 100 in lifetime) tobacco use ^{Smoking Absent}: previous treatment: none
3. Electronic cigarette use ^{Smoking Absent}: never., previous treatment: none
4. Substances that irritate the lungs, including smoke ^{Smoking Hypothetical} from cigarettes ^{Smoking Hypothetical} and other forms of tobacco ^{Smoking Hypothetical}., dust and pollen.
5. Tobacco ^{Smoking Past} former smoker ^{Smoking Past}, quit more than 30 days ago.
6. Post-menopausal | nicotine dependence ^{Smoking}
7. Nicotine ^{Smoking Past} – started at 13 years old; quit last year;,was smoking 1 pack per day.
8. Stay away from cigarette smoke ^{Smoking Hypothetical}.
9. Smoking ^{Smoking Absent} tobacco use ^{Smoking Absent}: Never (less than 100 in lifetime).
10. Nicotine ^{Smoking} 2 mg oral transmucosal lozenge: 2 mg = 1 LOZENG.
11. There is history of marijuana smoking ^{Smoking Past} in the past, quitted 5 years ago.
12. Is patient exposed to tobacco smoke ^{Smoking Absent}?,: None

Assertions: Past, Present, Absent, Hypothetical, Possible, Family History, Someone else

Relations: None

3.5 Respiratory symptoms and diseases

3.5.1 Cough
In NLP Lab: Cough

Definition: this entity contains mentions of findings of cough.

Extraction rules: in "cough products" or "cough medicine", extract only "cough" plus Hypothetical assertion.

Examples:

1. Respiratory pattern description: regular

    Cough ^{Cough}: hacking

2. Respiratory pattern description: regular

    Cough ^{Cough Absent}: none

3. Acute bronchitis is sudden or acute inflammation of the air tubes (bronchi) between the windpipe and the lungs. This can make it hard to breathe and can cause coughing ^{Hypothetical} or loud breathing, (wheezing)., in children, acute bronchitis may last several weeks, and coughing ^{Cough Hypothetical} may last longer.
4. Using a device that gets medicine into your child's lungs, (inhaler) to help improve breathing and control coughing ^{Cough Hypothetical}.
5. Do not give honey or honey-based cough ^{Cough Hypothetical} products to children who are younger than 1 year of age.
6. Do not give your child cough ^{Cough Hypothetical} suppressant medicines unless your child's health care provider says that it is okay, in most cases, cough medicines should not be given to children who are younger than 6 years of age.
7. Get help right away if your child: coughs ^{Cough Hypothetical} up blood.
8. Constitutional: (-) body aches, (-) night sweats, (-) fatigue, (-) weight change hent (-) headaches, (-) sinus congestion respiratory: (-) shortness of breath, (-) cough ^{Cough Absent} breast: (-) breast pain (-) anxiety, (-) depression.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.5.2 Snoring

In NLP Lab: Snoring

Definition: this entity contains mentions of findings of snoring.

Examples:

1. Chronic snoring ^{**Snoring Hypothetical**} in children can be associated with obstructive sleep apnea or upper airway resistant syndrome.
2. The patient initially presented with loud obnoxious snoring ^{**Snoring**} that disrupted the sleep of his bed partner.
3. The patient reports that the CPAP has limited his snoring ^{**Snoring**} at night.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.5.3 Asthma

In NLP Lab: Asthma

Definition: this entity contains mentions of findings of asthma.

Extraction rules: extract reactive airways, reactive airways disease, RAD as Asthma. Do not extract the modifiers together with asthma. In "asthma attack" extract "asthma" as Asthma and "attack" as Worsened.

Examples:

1. Nomenclature: asthma ^{**Asthma Absent**}; value: negative.
2. Unspecified asthma ^{**Asthma**}, uncomplicated procedures doctor name date note:
3. She says her asthma ^{**Asthma**} has been worse over the last three months. She has been using her inhaler daily.
4. MEDICATIONS: This patient with diabetes is taking omeprazole, aspirin, and lisinopril 10 mg but is not taking albuterol anymore as his asthma ^{**Asthma Past**} has resolved.
5. There are symptoms of reactive airways ^{**Asthma**}.
6. The patient is diagnosed with mild intermittent asthma ^{**Asthma**} and the prescriptions were sent to her pharmacy.
7. Positive for reactive airways disease ^{**Asthma**} (RAD ^{**Asthma**})
8. Assessment/Plan

status asthmaticus ^{**Asthma**}

9. CHIEF COMPLAINT: Asthma ^{**Asthma**} attack, respiratory distress.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.5.4 **Chronic obstructive pulmonary disease (COPD)**
In NLP Lab: COPD

Definition: this entity contains mentions of diagnosis of COPD.

Extraction rules: extract only specific diagnosis of COPD.

Examples:

1. The patient is known by the nursing staff here to have a long history of ==chronic obstructive pulmonary disease== ^{COPD} and emphysema.
2. DIAGNOSIS AT ADMISSION: ==Chronic obstructive pulmonary disease== ^{COPD} (==COPD== ^{COPD}) exacerbation and acute bronchitis.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.5.5 **Allergic rhinitis**
In NLP Lab: Allergic_Rhinitis

Definition: this entity contains mentions of findings of allergic rhinitis.

Extraction rules: in "seasonal allergic rhinitis" extract only, "allergic rhinitis".

Examples:

1. l50.8 other urticaria j30.2 other seasonal ==allergic rhinitis== ^{AllergicRhinitis}
2. SUBJECTIVE: This 23-year-old white female presents with complaint of ==allergic rhinitis== ^{AllergicRhinitis}. She used to have allergies when she lived in Seattle, but she thinks they are worse here.
3. HISTORY: The patient is here for follow-up of seasonal perennial ==allergic rhinitis== ^{AllergicRhinitis}, on immunotherapy.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.5.6 **Wheezing**

In NLP Lab: Wheezing

Definition: this entity contains mentions of findings of wheezing.

Extraction rules: Extract the adjectives, such as; inspiratory, expiratory, audible etc when they are adjacent to the entity.

Examples:

1. Lungs: no cough, no sob, no `wheezing` **Wheezing Absent**
2. Inhalation aerosol: simple display line: 2 puff(s), inh, q6hr, prn: for `wheezing` **Wheezing Hypothetical**
3. Friendly as always, visibly upset, not `wheezing` **Wheezing Absent** or dyspneic, assessment/plan asthma j45.909
4. A cough, `wheezing` **Wheezing** chest congestion, shortness of breath.
5. Acute bronchitis is sudden or acute inflammation of the air tubes (bronchi) between the windpipe and the lungs. This can make it hard to breathe and can cause coughing or `loud breathing` **Wheezing Hypothetical**, (`wheezing` **Wheezing Hypothetical**), in children, acute bronchitis may last several weeks, and coughing may last longer.
6. What are the signs or symptoms? symptoms of this condition include: lung and breathing problems, such as: a cough, this may bring up clear, yellow, or green mucus from your child's lungs (sputum), a `wheeze` **Wheezing Hypothetical**, too much mucus in your child's lungs (chest congestion), shortness of breath.
7. rml : `inspiratory wheeze` **Wheezing**

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.5.7 **Shortness of breath**

In NLP Lab: Shortness_Breath

Definition: this entity contains mentions of findings of shortness of breath.

Extraction rules: extract mentions of shortness of breath (SOB), dyspnea, difficulty breathing.

Examples:

1. <date> 19:56 pdt chief complaint chest pain with sob **ShortnessOfBreath** x 1 week. pt relocated
2. Chief complaint: pt states sob **ShortnessOfBreath** x 1 week, cough after having covid
3. Respiratory: shortness of breath **ShortnessOfBreath**, no cough
4. What are the signs or symptoms? Symptoms of this condition include: lung and breathing problems, such as: a cough, this may bring up clear, yellow, or green mucus from your child's lungs, (sputum), a wheeze **ShortnessOfBreath**, too much mucus in your child's lungs (chest congestion), shortness of breath **ShortnessOfBreath**.
5. Problems and health issues: acute sinusitis, angina pectoris, bronchospasm, congenital postural scoliosis, dyspnea **ShortnessOfBreath**.
6. Constitutional: (-) body aches, (-) night sweats, (-) fatigue, (-) weight change hent (-) headaches, (-) sinus congestion respiratory: (-) shortness of breath **ShortnessOfBreath Negative**, (-) cough breast: (-) breast pain (-) anxiety, (-) depression.
7. diagnosis: doe (dyspnea on exertion **ShortnessOfBreath**)
8. Patient usually has lots of snoring and congestion so mom thought it was just normal for patient to have difficulty breathing **ShortnessOfBreath**.
9. Denies shortness of br **ShortnessOfBreath Absent**, wheezing, cough.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is severity of, Is caused by

3.6 **Disease severity and control**

3.6.1 **Intermittent**
In NLP Lab: Intermittent

Definition: this entity contains mentions of disease severity being intermittent.

Extraction rules: extract mentions of intermittent related to any disease or symptom, even if they are not in the taxonomy.

Examples:

1. Principal: j30.9 allergic rhinitis, unspecified secondary: j45.20 mild ^{intermittent} intermittent ^{**Intermittent**} asthma, uncomplicated.
2. Concussion injury of body structure exacerbation of asthma, hyperlipidemia mild ^{Intermittent} intermittent ^{**Intermittent**} asthma.
3. Intermittent ^{**Intermittent**} symptoms of stomach pain, they are nonspecific.
4. Patient with intermittent ^{**Intermittent**} episodes of severe nausea and abdominal pain.

Assertions: None

Relations: IsSeverityOf

3.6.2 **Mild**

In NLP Lab: Mild

Definition: this entity contains mentions of disease severity being mild.

Extraction rules: extract mentions of mild severity related to any disease or symptom, even if they are not in the taxonomy.

Examples:

1. Chronic idiopathic constipation; cold sores; copd, mild ^{**Mild**}; endometriosis
2. Diagnosis: 3. mild ^{**Mild**} persistent asthma
3. <patient> severity of symptoms are mild ^{**Mild**} to moderate ^{Moderate}, associated symptoms as documented in review of systems
4. Final dx: principal: f32.0 major depressive disorder single episode, mild ^{**Mild**}.
5. Patient with a history of mesothelioma and likely mild ^{**Mild**} dementia.
6. Her asthma symptoms have been mild ^{**Mild**} -to-moderate ^{Moderate}.
7. Her asthma symptoms have been mild-to-moderate ^{Moderate}.

Assertions: None

Relations: IsSeverityOf

3.6.3 **Moderate**
In NLP Lab: Moderate

Definition: this entity contains mentions of disease severity being moderate.

Extraction rules: extract mentions of moderate severity related to any disease or symptom, even if they are not in the taxonomy.

Examples:

1. If you have a moderate **Moderate** or severe asthma attack.
2. Major depressive disorder, recurrent, moderate **Moderate** f33
3. Follow-up of moderate **Moderate**-to-severe severe sleep apnea. The patient returns today to review his response to CPAP.
4. \<patient\> severity of symptoms are mild **Mild** to moderate **Moderate**, associated symptoms as documented in review of systems

Assertions: None

Relations: IsSeverityOf

3.6.4 **Severe**
In NLP Lab: Severe

Definition: this entity contains mentions of disease severity being severe.

Extraction rules: extract mentions of severe disease related to any disease or symptom, even if they are not in the taxonomy.

Examples:

1. If you have a moderate **Moderate** or severe **Severe** asthma attack
2. Clinic note if asthma is mild **Mild**, mod **Moderate** or severe **Severe**, also if intermittent **Intermittent** or persistent
3. Exercise or activity, such as lifting, severe **Severe** coughing.
4. The patient had been severely **Severe** anxious and freely admitted that she was depressed at home.
5. Patient with intermittent episodes of severe **Severe** nausea and abdominal pain.

Assertions: None

Relations: IsSeverityOf

3.6.5 **Alleviated**
In NLP Lab: Alleviated

Definition: this entity contains mentions of disease or symptoms being alleviated.

Extraction rules: extract mentions of alleviated or improved disease related to any disease or symptom, even if they are not in the taxonomy.

Examples:

1. The patient feels their condition has improved **Alleviated** by 50% since the last visit.
2. Condition: improved **Alleviated**, stable, disposition: medically cleared, discharged: to home.
3. His allergic rhinitis symptoms have been alleviated **Alleviated** ever since she moved to Fl.
4. Pt's asthma symptoms have been better **Alleviated** with the new medication.

Assertions: None

Relations: IsSeverityOf

3.6.6 **Worsened**
In NLP Lab: Worsened

Definition: this entity contains mentions of disease or symptoms being worsened.

Extraction rules: extract mentions of worsened disease related to any disease or symptom, even if they are not in the taxonomy. Extract "exacerbation" and "flare ups".

Examples:

1. Concussion injury of body structure exacerbation **Worsened** of asthma hyperlipidemia mild **worsened** intermittent **worsened** asthma.
2. Showed asthma flare up **Worsened**, per Mother's recollection.
3. Patient have worsening **Worsened** shortness of breath, chest pain.
4. If not significantly improved in a few days or if worse **Worsened**, the patient will contact her primary physician's office.
5. His shortness of breath episodes have been worse **Worsened**.
6. CHIEF COMPLAINT: Asthma attack **Worsened**, respiratory distress.

Assertions: None

Relations: IsSeverityOf

3.6.7 **Other Modifier**

In NLP Lab: OtherModifier

Definition: this entity contains mentions of modifiers of disease severity or status.

Extraction rules: extract only the modifiers *acute, chronic, refractory, recurrent* and *persistent*.

Examples:

1. Acute ^{OtherModifier} bronchitis is sudden or acute inflammation of the air tubes (bronchi) between the windpipe and the lungs.
2. Problems and health issues: acid reflux, anxiety, chronic ^{OtherModifier} back pain, cyst of ovary, endometriosis, (clinical) insomnia, irritable bowel syndrome.
3. PROBLEM LIST: 1. Refractory ^{OtherModifier} hypertension, much improved. 2. History of cardiac arrhythmia and history of pacemaker secondary to AV block.
4. Medical history: recurrent ^{OtherModifier} persistent ^{OtherModifier} asthma.

Assertions: None

Relations: IsSeverityOf

3.7 Test

3.7.1 **FEV1 %**

In NLP Lab: FEV1

Definition: this entity contains mentions of the test forced expiratory volume in one second (FEV1%)

Extraction rules: extract only the name of the test, the result is extracted with the entity FEV1%Result

Examples:

1. SPIROMETRY: Spirometry reveals the FVC to be adequate. FEV1 ^{FEV1%} is also adequate 93% ^{FEV1%}
2. FEV1 ^{FEV1%} was 45%. FEV1/FVC ratio was 52%. The predicted was 67%. FEF 25/75% was 22%, improved about 400-cc

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Planned, Present.

Relations: IsTestResultOf

3.7.2 **FEV1 % result**

In NLP Lab: FEV1_Result

Definition: this entity contains mentions of the test result for forced expiratory volume in one second (FEV1%).

Extraction rules: extract only the result, since the test name is extracted under the entity FEV1%.

Examples:

1. SPIROMETRY: Spirometry reveals the FVC to be adequate. FEV1 is also adequate 93% ^{FEV1%Result}
2. FEV1 was 45% ^{FEV1%Result}. FEV1/FVC ratio was 52%. The predicted was 67%. FEF 25/75% was 22%, improved about 400-cc

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: IsTestResultOf

3.7.3 **Score**

In NLP Lab: Score

Definition: this entity contains mentions of the names of psychiatric scores.

Extraction rules: extract only *psychiatric* scores like CSSRS, PHQ-9, GAD-7. Extract Initial/Detailed/Total Depression Screen Score.

Examples:

- CSSRS ^{Score} – suicide: Score:,1 ^{Score}.
- CSSRS ^{Score} – suicide: Score:,0 ^{Score}
- PHQ-9 ^{Score} depression: Score:,27 ^{Score}.
- PHQ-9 ^{Score} depression: Score:,0 ^{Score}.
- PHQ-2 ^{Score} negative

- GAD-7 **Score** anxiety: Score:,21 **Score**
- GAD-2 **Score** Result : Negative
- Detailed depression Screening Score **Score** : 0
- Initial Depression Screen Score **Score** : 2
- Depression Screening **Score** able to complete.
- Depression screening tool **Score** ebp entered on: <date> 8:26 pst.

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is score result

3.7.4 **Score Result**

In NLP Lab: Score_Result

Definition: this entity contains mentions of psychiatric scores' values.

Extraction rules: extract the value of *psychiatric* scores like CSSRS, PHQ-9, GAD-7.

Examples:

- CSSRS – suicide: Score:,1 **Score_Result**.
- CSSRS – suicide Score:,0 **Score_ Result**
- PHQ-9 depression: Score:,27 **Score_ Result**.
- PHQ-9 depression: Score:,0 **Score_ Result**.
- GAD-7 anxiety: Score:,21 **Score_ Result**
- Depression screening positive **Score_ Result**

Assertions: Past, Absent, Family History, Someone else, Possible, Hypothetical, Present

Relations: Is score value

4   **Assertion Labels**

Assertion labels are used to indicate an attribute of an entity. The assertion label is placed on top of the entity label, it is written in superscript, example, Entity **Assertion**

The following are considerations when adding assertions:

- Entities with no assertion label are considered to have the assertion label Present by default.
- Entities should only be assigned one assertion label except for Smoking, Alcohol use, Marijuana Use, and Substance Abuse that can have two.
- For the annotation of Assertion, it should be considered only the information found in the sentence that includes the asserted entity.
- Not all the combinations of entity and assertion are possible.

Assertion labels to be used in this model are explained along with some examples.

A table of all the entities and possible assertions is included.

4.1.1 **Present**
In NLP Lab: no entity label.

Definition: Entities that are currently present and not negated.

Extraction rules: No assertion label has to be added, entities are considered to have the present assertion by default if they do not have other assertion label. For entities appearing in the psychiatric score's sections present assertion should be used even if the score value is greater than zero.

Examples:

1. Montelukast ^{MON}; status: prescribed, ordered as mnemonic: montelukast ^{MON} 10 mg oral tablet
2. Trouble concentrating ^{AttentionProblems}: more than half the days
3. Chief Complaint: Patient complains of engaging in sleepwalking ^{Sleepwalking} behaviors.
4. The patient will be referred to behavioral therapy to address any underlying psychological issues related to the stuttering ^{Stuttering}.
5. CSSRS – suicide ^{Suicidal_Ideation}: Score:,1
6. CSSRS – suicide ^{Suicidal_Ideation} Score:,0
7. CSSRS – suicide ^{Suicidal_Ideation Absent} Score:,0
8. PHQ-9 depression ^{Depression} Score:,27.
9. PHQ-9 depression ^{Depression Absent}: Score:,0.
10. PHQ-9 depression ^{Depression Absent}: Score:,0

11. GAD-7 ==anxiety== **Anxiety**: Score:,21

4.1.2 **Past**
In NLP Lab: Past

Definition: This label is assigned to entities that happened in the past.

Extraction rules: Past entities are found in phrases in past tense or that include words such as *past, before, remote, previously, former etc.*

Examples:

1. Lives with children, maternal grandmother, ==substance abuse== **SubstanceAbuse Past** past.
2. ==Tobacco== **Smoking Past** former ==smoker== **Smoking Past**, quit more than 30 days ago.
3. Based on the circumstances and the patient's history of depression and previous ==suicide attempt== **SuicideAttempt Past**, the patient's death has been determined to be a completed suicide.
4. Previously he participated in output cardiac rehab, and engaged in some ==exercise== **Exercise Past**, such as ==walking== **Exercise Past** in his neighborhood.

4.1.3 **Absent**
In NLP Lab: Absent

Definition: Label added to negated entities

Extraction rules: Absent or negated entities are found in phrases that include words such as no, without, lack, etc. Two assertion labels at the same time can be used in cases, when it is associated with family or someone else and is negated, thus it is necessary to use Absent assertion as well.

Examples:

1. Respiratory: shortness of breath **ShortnessOfBreath Absent**, no ==cough== **Cough Absent**.
2. ==Tobacco== **Smoking Absent**: never (less than 100 in lifetime) ==tobacco use== **Smoking Absent**: previous treatment: none.

3. She does smoke cigarettes regularly but does not drink **AlcoholUse Absent** alcohol **AlcoholUse Absent**.
4. Constitutional: (-) body aches, (-) night sweats, (-) fatigue, (-) weight change hent (-) headaches, (-) sinus congestion respiratory: (-) shortness of breath, (-) cough **Cough Absent** breast: (-) breast pain (-) anxiety, (-) depression.
5. There is no family history of ADHD **ADHD Absent**.
6. Family history: negative for depression **Depression Absent**.

4.1.4 **Family History**
In NLP Lab: Family_History

Definition: this label is assigned to entities that represent medical history conditions linked to a family member of the patient.

Extraction rules: Only consanguinity relations are to be asserted as family history. Two assertion labels at the same time can be used in cases, when it is associated with family or someone else and is negated, thus it is necessary to use Absent assertion as well.

Examples:

1. Family history (as of: <date> 10:53:49 pdt) mother: relation: mother; gender: female; - nomenclature: Depression **Depression FamilyHistory**; value: positive
2. Family history: two of his uncles committed suicide **CompletedSuicide FamilyHistory**.
3. Family History: The patient reports a family history of ADHD **ADHD FamilyHistory**.
4. Her husband suffers from depression Depression FamilyHistory, and it makes the situation worse.
5. His girlfriend is not available for support at all times since she also struggles with her own issues of alcohol abuse AlcoholUse FamilyHistory.
6. There is no family history of ADHD ADHD FamilyHistory.
7. Family history: negative for depression Depression FamilyHistory.

4.1.5 **Someone else**
In NLP Lab: Someone_Else

Definition: This label includes entities that are present but do not refer to the patient.

Extraction rules: It applies to significant other/spouse as well as non-relatives. Two assertion labels at the same time can be used in cases, when it is associated with family or someone else and is negated, thus it is necessary to use Absent assertion as well.

Examples:

1. Her husband suffers from depression ^{**Depression SomeoneElse**}, and it makes the situation worse.
2. His girlfriend is not available for support at all times since she also struggles with her own issues of alcohol abuse ^{**AlcoholUse SomeoneElse**}.
3. One of his friends attempted suicide ^{**SuicideAttempt SomeoneElse**} two months ago.
4. Family history (as of: <date> 10:53:49 pdt) mother: relation: mother; gender: female; - nomenclature: Depression ^{Depression SomeoneElse}; value: positive
5. Family history: two of his uncles committed suicide ^{CompletedSuicide SomeoneElse}.

4.1.6 **Possible**
In NLP Lab: Possible

Definition: This label is assigned to entities that are possible but not confirmed.

Extraction rules: Possible entities are found in phrases that include words such as *might, maybe, perhaps, could, likely, unlikely, to rule out, suspects* etc.

Use Hypothetical assertion instead of Possible when a general description of a disease is provided, like in patient information forms, or when literature quotations are made.

Examples:

1. I will also order other tests, including tests to rule out other conditions, such as COPD ^{**COPD Possible**}
2. Additional tests will be done to rule out other possible causes of your symptoms such as GAD ^{**Anxiety Disorder Possible**}
3. It has not been confirmed yet, but the staff suspects it was a suicide attempt ^{**Suicide attempt Possible**}.
4. Based on the symptoms, circadian rhythm disorder ^{**circadian rhythm disorder Possible**} is suspected.
5. Acute bronchitis is sudden or acute inflammation of the air tubes (bronchi) between the windpipe and the lungs. This can make it hard to breathe and can cause coughing or loud breathing ^{Wheezing Possible}, (wheezing ^{Wheezing Possible}), in children, acute bronchitis may last several weeks, and coughing may last longer.
6. Substances that irritate the lungs, including smoke ^{Smoking Possible} from cigarettes ^{Smoking Possible} and other forms of tobacco ^{Smoking Possible}, dust and pollen.

4.1.7 **Hypothetical**
In NLP Lab: Hypothetical

Definition: This label is assigned to entities involved in a hypothetical assumption.

Extraction rules: Include possible risks, complications and side effect of procedures, drugs and treatments. Hypothetical entities are found in phrases in conditional tenses or that include words such as *If, would, risks, may* etc.

Use Hypothetical assertion instead of Possible when a general description of a disease is provided, like in patient information forms, or when literature quotations are made.

Examples:

1. Acute bronchitis is sudden or acute inflammation of the air tubes (bronchi) between the windpipe and the lungs. This can make it hard to breathe and can cause coughing or loud breathing **Wheezing Hypothetical** (wheezing **Wheezing Hypothetical**), in children, acute bronchitis may last several weeks, and coughing may last longer.
2. Substances that irritate the lungs including: smoke **Smoking Hypothetical** from cigarettes **Smoking Hypothetical** and other forms of tobacco **Smoking Hypothetical**, dust and pollen.
3. It has not been confirmed yet, but the staff suspects it was a suicide attempt **Suicide attempt Hypothetical**.
4. Based on the symptoms, circadian rhythm disorder **circadian rhythm disorder Hypothetical** is suspected.

4.1.8 **Planned**
In NLP Lab: Planned

Definition: This label is assigned to entities that will happen in the future.

Extraction rules: Planned entities are found in phrases of future tenses or that include words such as *plan, planned, will, future, prescribed, will start*, etc.

Examples:

1. Diagnosis: generalized anxiety disorder comment: will start Escitalopram **Antidepressant Planned** 10 mg oral tablet once daily at bedtime, follow up in 1 month
2. Montelukast **MON Planned** status: prescribed, ordered as mnemonic: montelukast **MON Planned** 10 mg oral tablet.
3. We will add flovent **ICS Planned** 44 mcg puffs p.o.b.i.d. May need to increase the dose.
4. As part of her asthma follow up an FEV1 **FEV1% Planned** will be done in the next visit.

4.1.9 **Assertions Table**

Entity	Past	Absent	Family History	Someone Else	Possible	Hypothetical	Planned	Present
Mon	Y	Y	Y	Y	Y	Y	Y	Y
ICS	Y	Y	Y	Y	Y	Y	Y	Y
ICS_Combination	Y	Y	Y	Y	Y	Y	Y	Y
Antidepressant	Y	Y	Y	Y	Y	Y	Y	Y
OralCorticosteroid	Y	Y	Y	Y	Y	Y	Y	Y
SABA	Y	Y	Y	Y	Y	Y	Y	Y
Aggressive/Hostility	Y	Y	Y	Y	Y	Y	N	Y
Agitation	Y	Y	Y	Y	Y	Y	N	Y
AttentionProblems	Y	Y	Y	Y	Y	Y	N	Y
ADHD	Y	Y	Y	Y	Y	Y	N	Y
Confusion/ Disorientation	Y	Y	Y	Y	Y	Y	N	Y
Depression	Y	Y	Y	Y	Y	Y	N	Y
DreamAbnormalities	Y	Y	Y	Y	Y	Y	N	Y
FeelingAnxious	Y	Y	Y	Y	Y	Y	N	Y
AnxietyDisorder	Y	Y	Y	Y	Y	Y	N	Y
Hallucinations	Y	Y	Y	Y	Y	Y	N	Y
Irritability	Y	Y	Y	Y	Y	Y	N	Y
MemoryProblems	Y	Y	Y	Y	Y	Y	N	Y
OCDOrSymptoms	Y	Y	Y	Y	Y	Y	N	Y
Restlessness	Y	Y	Y	Y	Y	Y	N	Y
RestlessLegSyndrome	Y	Y	Y	Y	Y	Y	N	Y
Stuttering	Y	Y	Y	Y	Y	Y	N	Y
CompletedSuicide	Y	Y	Y	Y	Y	Y	N	Y
SuicideAttempt	Y	Y	Y	Y	Y	Y	N	Y
SuicidalIdeation	Y	Y	Y	Y	Y	Y	N	Y
Self-harm	Y	Y	Y	Y	Y	Y	N	Y
TremorOrShakiness	Y	Y	Y	Y	Y	Y	N	Y
UncontrolledMuscleMovements	Y	Y	Y	Y	Y	Y	N	Y
TroubleSleeping	Y	Y	Y	Y	Y	Y	N	Y
SleepDisorder	Y	Y	Y	Y	Y	Y	N	Y
Education	Y	Y	N	Y	Y	Y	N	Y
Employment	Y	Y	N	Y	Y	Y	N	Y
Exercise	Y	Y	N	Y	Y	Y	N	Y
LivesAlone	Y	Y	N	Y	Y	Y	N	Y
AlcoholUse	Y	Y	Y	Y	Y	Y	N	Y
MarijuanaUse	Y	Y	Y	Y	Y	Y	N	Y

SubstanceAbuse	Y	Y	Y	Y	Y	Y	N	Y
Smoking	Y	Y	Y	Y	Y	Y	N	Y
Cough	Y	Y	Y	Y	Y	Y	N	Y
Snoring	Y	Y	Y	Y	Y	Y	N	Y
Asthma	Y	Y	Y	Y	Y	Y	N	Y
COPD	Y	Y	Y	Y	Y	Y	N	Y
AllergicRhinitis	Y	Y	Y	Y	Y	Y	N	Y
Wheezing	Y	Y	Y	Y	Y	Y	N	Y
ShortnessOfBreath	Y	Y	Y	Y	Y	Y	N	Y
Intermittent	N	N	N	N	N	N	N	N
Mild	N	N	N	N	N	N	N	N
Moderate	N	N	N	N	N	N	N	N
Severe	N	N	N	N	N	N	N	N
Alleviated	N	N	N	N	N	N	N	N
Worsened	N	N	N	N	N	N	N	N
OtherModifier	N	N	N	N	N	N	N	N
FEV1%	Y	Y	Y	Y	Y	Y	Y	Y
FEV1%Result	Y	Y	Y	Y	Y	Y	N	Y
Score	Y	Y	Y	Y	Y	Y	Y	Y
Score_Result	Y	Y	Y	Y	Y	Y	N	Y

Abbreviations: Y = yes, N = No

5   Relations

Relations are used to link two related entities. To create relations between entities, use the Create Relation button of the annotation tool. Relations are not created for entities that are more than two sentences apart. Some relations require a relation label that is found in the relation section of the annotation tool. Also, some relations require assignation of direction that is represented by an arrow in the relation section of the annotator tool.

Some examples of relations are provided here. The examples highlight the two entities that have to be linked with the relation.

A table with all the possible relations is included.

5.1.1   Is caused by

In NLP Lab: Is_Caused_By

Definition: this relation creates a link between an entity representing a disease or symptom and the drug that causes it.

Extraction rules: create the relation only when it is explicitly mentioned that the disease or symptom was caused by a drug.

Examples:

1. The patient refers that she has noted attention problems **AttentionProblems** as a result of Montelukast **Mon** use.
2. She reports having insomnia **SleepDisorder** as a side effect of Flovent **ICS**.

5.1.2   Is prescribed for

In NLP Lab: Is_Prescribed_For

Definition: this relation creates a link between an entity representing a drug and the disease or symptom that is prescribed for.

Extraction rules: create the relation only when it is explicitly mentioned that the drug was prescribed for a disease or symptom.

Examples:

1. The patient has been using singular **Mon** for asthma **Asthma** since 2019.
2. The patient is currently taking fluvoxamine **Antidepressant** (50 mg/day) for the treatment of their anxiety **FeelingAnxious** and OCD symptoms.

5.1.3 **Is severity of**

Definition: this relation creates a link between an entity representing a disease or symptom and an entity from the severity category.

Examples:

1. Concussion injury of body structure exacerbation of asthma, hyperlipidemia, intermittent **Intermittent** asthma **Asthma**.
2. Final dx: principal: f32.0 major depressive disorder **Depression** single episode, mild **Mild**.
3. His shortness of breath **SOB** episodes have been worse **Worsened**.

5.1.4 **Is test result of**

Definition: this relation creates a link between the entities FEV1% and FEV1%Result

Examples:

1. SPIROMETRY: Spirometry reveals the FVC to be adequate. FEV1 **FEV1%** is also adequate 93% **FEV1%Result**.
2. FEV1 **FEV1%** was 45% **FEV1%Result**. FEV1/FVC ratio was 52%. The predicted was 67%. FEF 25/75% was 22%, improved about 400-cc.

5.1.5 **Is score result**

Definition: this relation creates a link between the entities Score and Score value.

Examples:

- CSSRS **Score** – suicide: Score:,1 **Score_Result**.
- CSSRS **Score** – suicide: Score:,0 **Score_Result**
- PHQ-9 **Score** depression: Score:,27 **Score_Result**.
- PHQ-9 **Score** depression: Score:,0 **Score_Result**.
- GAD-7 **Score** anxiety: Score:,21 **Score_Result**

5.1.6 **Relations Table**

Relation	Entity category 1	Entity category 2	Label Needed	Direction Needed
Is caused by	Drugs	Symptoms or diseases	Yes	No
Is prescribed for	Drugs	Symptoms or diseases	Yes	No
Is severity of	Disease Severity and Control	Symptoms or diseases	No	No
Is test result of	FEV1%	FEV1%Result	No	No
Is score value	Score	Score_Result	No	No

Invalid Documents

Documents are considered invalid, if they have the characteristics mentioned below:

1. The information in the documents is hypothetical only and doesn't have actual patient information. These documents are usually patient education notes, discharge notes and summaries.
   Note: Discharge summaries can include prescriptions, in this case the document **must be labelled and is considered valid.**
2. Documents that have modifiers only and no other NER labels.
3. Documents that does not have any relevant NER **(excluding the modifiers)** entities and no information can be extracted.

6 Change Log

Date: April 4, 2023

- Self-harm Ideation assertion label removed.
- Self-harm Ideation NER label added.
- Score NER label added.
- Score value NER label added.
- Is score value relation added.
- Added the possibility of two assertion labels (Family, Someone Else + Absent) to smoking entity.
- Added rule: For entities appearing in the psychiatric score's sections present assertion should be used even if the score value is greater than zero.

Date: April 11, 2023

- ICS_Combination entity added.
- Added rule: do not extract corticosteroids nasal sprays as ICS.

Date: April 13, 2023

- Added examples of the possibility of two assertion labels (Family, Someone Else + Absent) to Substance_Abuse, Alcohol_Use, and Marijuana_Use entities.

Date: April 16, 2023

- "reactive airways" and "reactive airways disease" should be annotated as asthma

Date: April 21, 2023

- Extract "Hopeless" as Depression but do not extract "Feeling bad".
- Extract "dysthymic disorder" as Depression.
- Extract all drugs from the protocol´s Antidepressants List as Antidepressant.

Date: April 24, 2023

- Extract "status asthmaticus" as Asthma.
- Extract "difficulty breathing" as Shortness of Breath.
- When there are mentions of corticosteroids, but the administration route is not mentioned, and there are several possible routes, do not extract those mentions.
- If the administration route is only oral then extract as Oral Corticosteroid even if the route is not mentioned in the text, for example, prednisone.

Date: May 2nd, 2023

- Extract "Initial/Detailed/Total Depression Screen Score" as a Score.
- Extract "social anxiety" as Feeling_Anxious.
- Extract "recurrent" and "persistent" as Other_Modifier.

- New NER label Delusion included.
- Do not extract "sleepiness" as Trouble_Sleeping.

Date: May 9, 2023

- In "asthma attack" extract "asthma" as Asthma and "attack" as Worsened.

Date: May 10, 2023

- Added examples for smoking extraction.
- Added examples for extraction of "dysthymic", "dysthymia", as Depression.
- Added examples for extraction of "exacerbation" "flare up" as Worsened.
- Added rule, do not extract "intent to harm".
- Added example to extract "not being able to stop worrying" as Feeling_Anxious.
- Added example to extract "amphetamine use" as Substance_Abuse.
- Added rule, extract combinations drugs that contain a SABA.
- Added example of extraction of "depressed" mood as Depression.

Date: May 17, 2023

- Examples added for not extracting "suicide age".
- Examples added to Uncontrolled_Muscle_Movement.
- Rule added, Extract mentions of drug classes such as "Antidepressant", "SSRI", "SNRI".
- Rule added, extract panic disorder or episodic paroxysmal anxiety as Anxiety_Disorder.
- Rule, added to extract "seeing and hearing things", "hear voices", etc. as Hallucinations.

Date: May 31, 2023

- Examples added for TroubleSleeping.
- Example removed from Sleep_Disorder and was relocated to TroubleSleeping.
- Rule and example added for "Sober".
- Example added for Aggressive Behavior Hostility.

Date: Jun 14, 2023

- Examples added to extract ataxia and extrapyramidal side effects as Uncontrolled_Muscle_Movement.

Date: Jun 21, 2023

- Definition of the invalid documents was added to the AG.

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