

Overview:

More than one third of patients with chronic kidney disease (CKD) develop symptoms of heart failure. On the other hand congestive heart failure (CHF) is a common contributor of the progression of CKD .Thus, a vicious circle exists between these two diseases. Therefore, renal failure or renal insufficiency may be more than a marker for heart failure severity and instead may play a causative role in the progression of heart failure.

Annotation is marking up piece of text with class to describe it. In this task we will use brat in which it displays the annotations by highlighting the text with different colours according to the chosen class.

The Data:

The corpus consists of 300 clinical records obtained from i2b2 obesity challenge. The medical records are filtered to include only the discharge summaries for the patients with CHF and kidney failure (renal insufficiency).

Aim of current annotation :

This annotation task consists of two stages: i) to mark-up the mentions of medical terms that denote phenotypic information of CHF to highlight the entire characteristics of CHF such as: causes, risk factors , clinical signs/symptom and also to identify non-traditional risk factors (uremia-related) of heart failure to investigate the extent to which renal failure can worsen the condition of CHF, ii) the relationships annotations link two annotated entities to reflects the interactions between them.

Annotation task:

1- Terms annotation (Entities annotation):

The basic task of annotation is entity in which stretches of text (medical terms) that denote phenotypic information is marked up with the most relevant class.

CHF Phenotypic information is defined in three general classes as follows:

1.1) **Cause** is any medical problem that contributes to the occurrence of CHF. It could be any disease (i.e. coronary artery disease, renal insufficiency) or disordered activity of body systems, organ or tissues (i.e. atrial fibrillation) that cause heart failure.

Cause Cause Cause
sick sinus syndrome, atrial fibrillation and atrial flutter

Cause Cause Cause Cause
dilated cardiomyopathy , chronic renal insufficiency , atrial fibrillation . hypertension

1.2) **Risk factor** (RiskF) is a medical or social condition that increases the risk of CHF disease or it may contribute to put the patient in higher risk of developing the causes of CHF such as: bad life style (i.e. physical inactivity , smoking , being overweight) or it could be drug to control other diseases i.e. amikacin. Also, any family history of cardiovascular disease.

RiskF **RiskF** **Cause** **RiskF** **RiskF**
 obesity , type 2 diabetes , hypertension , high cholesterol , ventricular tachycardia

1.3) **Signs and Symptoms** are any observable manifestation of CHF disease which either experienced by a patient and reported to the doctor or found as a result by the doctor's examination. For example, fatigue , decreased exercise tolerance, shortness of breath, sweating, irregular rhythm , murmur , rub and gallop sounds, low cardiac output.

SS **SS** **SS**
 Increase in weigh. volume overload. increased lower extremity edema.

1.4) **Nontraditional risk factors: (NontradRF)** are the medical terms that denote the complications associated with abnormalities in the kidney functions that put the patient in a higher risk to progress “signs/symptoms” and causes of CHF, it could be disease (i.e. anemia) , electrolyte imbalance (i.e. hyperkalemia , hypokalemia and increased creatinine).

NontradRF **NontradRF**
 , iron deficiency , anemia

NontradRF
 hepatitis , renal artery stenosis

NontradRF **NontradRF** **NontradRF**
 h renal disease: Disordered mineral metabolism , Endothelial dysfunction , Increased cardiovascular risk ,

Other classes that highlight important and relevant information to the task:

a) **Chief complaint**(ChiefComp) is congestive heart failure in this annotation task.

ChiefComp
 congestive heart failure

b) **Organ** is any body part. For example,

Organ **Organ** **Organ**
 Abdomen , Extremities , Lungs

c) **Polarity clue** (polcue) to highlight the negation modifier that negate medical condition such as no , without , denies etc. Polarity clue refers to any words that denote negation or absence of medical conditions meaning that the patient does not have this condition. Only

annotate negation when it is related to medical condition.

Organ **PolCue** **SS**
Abdomen is soft , nontender , nondistended.

Only annotate negation modifier when it is negated medical condition related to CHF .

PolCue **Negate** **NontradRF**
She denies dysuria , hematuria , or hematochezia.

General guidelines for term annotations:

1-Only annotate the correct span (as much information as required).

2- The phenotypic term could be expressed in any syntactic structure it can be:

- a noun phrase
 - *pedal edema*
 - *diastolic dysfunction*
 - *orthopnea*
- prepositional phrase.
 - *Pain in chest*
 - *Shortness of breath*
- adjective phrases
 - The patient was *hypertensive*.
 - The patient was *anemic*
 - The patient becomes *hypercalemic*.

3- If the medical condition is preceded by modifier of multi words phrase. Annotate the whole phrase (except for negation refer to polarity clue annotation) for example:

- *Increased potassium.*
- *increased shortness of breath*
- *left atrial enlargement*

4- There should be only one annotation per mentioned disorder.

6- Annotate all abbreviations and acronyms that refer to phenotypic information. For example:

- JVP refers to jugular venous pressure
- CABG stand for coronary artery bypass graft
- AF stands for Atrial fibrillation
- A-fib stands for Atrial fibrillation

Do not annotate the following:

- 1- Normal condition for example if the information describe normal function i.e. EKG showed normal sinus rhythm , regular chest etc..
- 2- any thing you infer from the text only annotate the explicitly mentioned entity. For example consider the following lab result:

Laboratory data: INR of 1.6 , BUN of 110 , creatinine 3 , potassium 5.5 ,white blood cell count of 11.7 and a hematocrit of 27.9.

Do not annotate any thing in the previous example even though you felt that, the patient have high level of creatinine which suggest that the patient have impaired kidney function or the

patient have hyperkalemia which is uremia related risk factor for heart failure.

Another example is : Echo showed ejection fraction of 10-15%

Do not annotate anything in the previous sentence, even though an ejection fraction of 10-15% indicates sign of CHF.

2-Relations Annotation:

The aim of this task is to annotate the existing relationships on the top of the annotated entities. It usually links two annotated concepts (arguments) within the boundaries of a single sentence. Relationships help to identify:

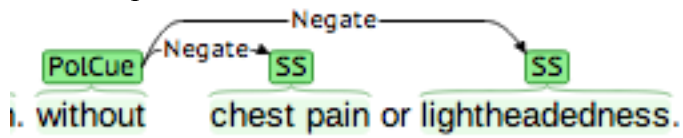
- Which medical condition causes the other?
- Which negation modifies which sign or symptoms?

There are three types of relationships and each type constrains to link two specific and predefined pair of arguments

2.1)Negate

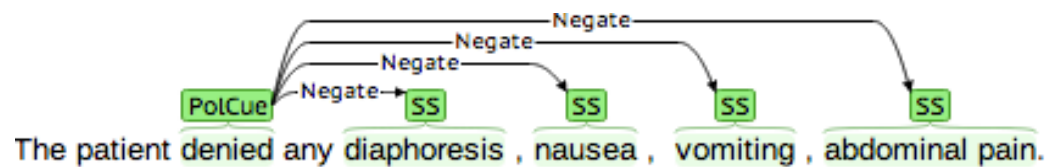
It is one-way relation to relate negation attribute to the condition that it is denied.

For example:



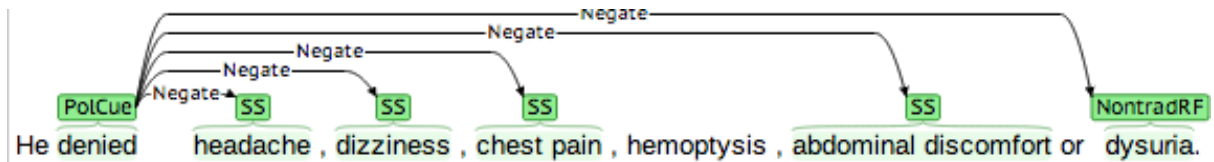
The above mentioned example illustrates the negate relationship as follows the modifier *without* is used to explicitly negate the following phenotypic information *chest pain* and *lightheadedness*.

- If the negation modifier refer to several medical condition create different negate relation for each negated medical condition.



The above mentioned example illustrates the negate relationship as follows the modifier *denied* is used to explicitly negate the following phenotype information *diaphoresis*, *nausea*, *vomiting* and *abdominal pain*.

Another example is:



-Only annotate Negate relationship on the top of the annotated concepts and, DO NOT annotate *negate* relationship for concepts out the scoop of this annotation task for example:

For example,

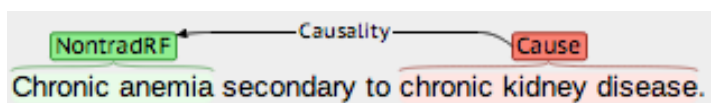
- The patient does not have diarrhea or constipation.
- No visual change.
- Patient was found without mental changes.

In the above mentioned examples *negate* relationship is not annotated because the underlined medical conditions are not associated with CHF.

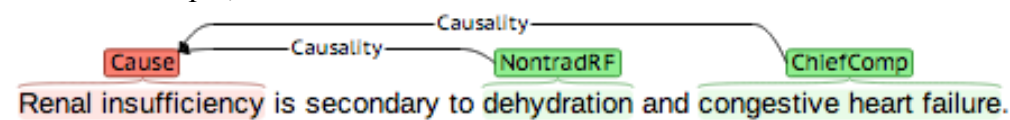
2.2)Causality:

This relationship links two concepts in which one argument causes the other.

For example, in the following sentence the *chronic kidney disease* causes the *chronic anemia*.

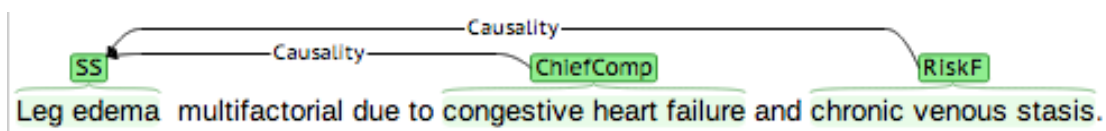


Another example,



In the above mentioned example there are two *causality* relations:

- First *causality* relationship associating *dehydration* to cause *renal insufficiency*.
- Second *causality* relationship associating *congestive heart failure* to cause *renal insufficiency*.



In the above mentioned example there are two causality relations:

- First *causality* relationship associating *congestive heart failure* to cause *leg edema*.
- Second *causality* relationship associating *chronic venous stasis* to cause *leg edema*.

- Do not annotate the relationship causality whenever the relationship does not contribute to the progression of CHF. For example,

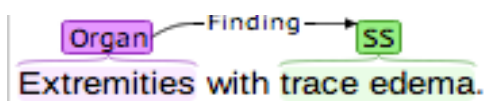
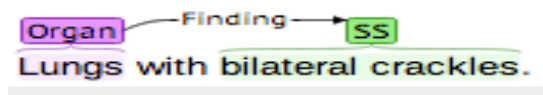
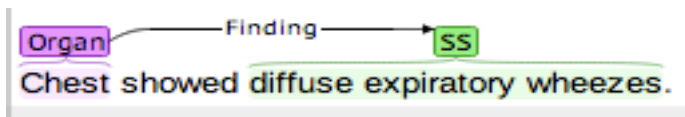
She had a urinary tract infection per report secondary to E.Coli resistant to Levaquin and gentamicin.

In the above mentioned example neither the relationship nor the medical concepts are annotated because they are irrelevant to this annotation task.

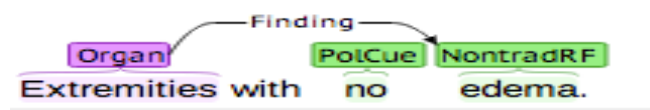
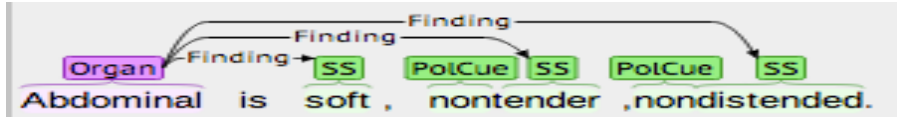
2.3) Finding

This relationship links the organ to the manifestation or abnormal variation that is observed during the diagnoses process.

For example,



- Annotate the finding relationship even if the signs and symptoms of CHF are negated in the records, and annotate the negation relationship.

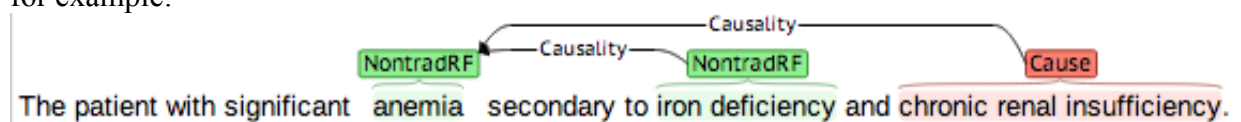


General guidelines for relationships annotations:

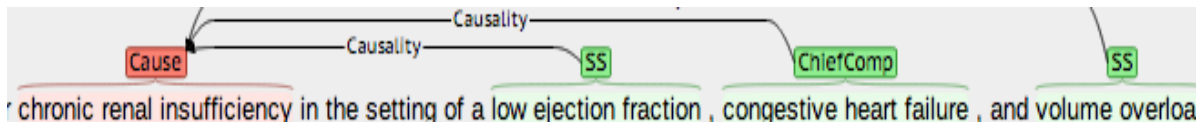
1- Relationship may be created based on medical knowledge:

2-If the relationship has many arguments create different causality relation for each negated medical condition.

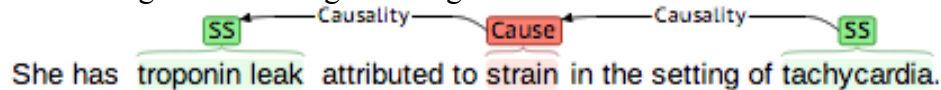
for example:



- First *causality* relationship associating *iron deficiency* to cause *anemia*.
- Second *causality* relationship associating *chronic renal insufficiency* to cause *anemia*.



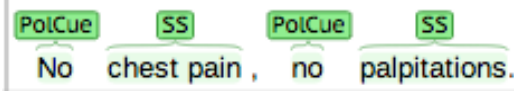
3- Some argument causing other argument



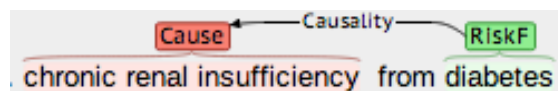
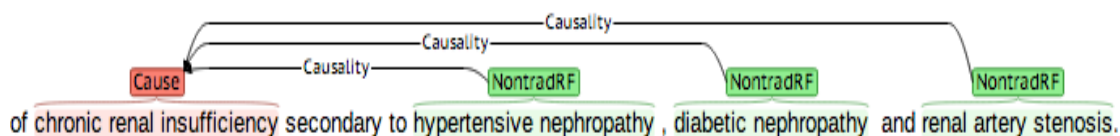
4- At least one relation exists for each annotated negation modifier

General Guidelines for the annotation task:

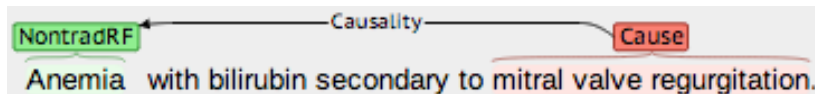
- 1- Complete this task independently. Do not discuss your annotations with anyone else.
- 2- Read the whole patient's record first to get understanding about the patient medical case
- 3- Read the document again and annotate the medical terms with correct class and in parallel annotate the negation modifier (polarity clue) where they are found.



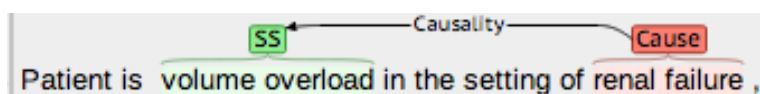
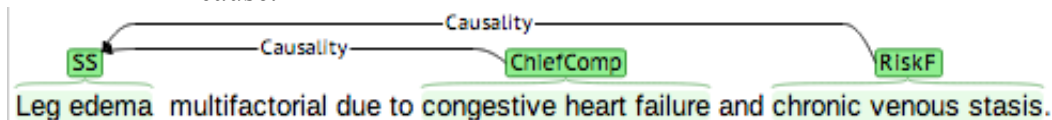
- 4- Go to each annotated terms and look if it is related to any other annotated term in the same sentence. For example consider the following :
 - For each Cause decide whether it was caused by any non-traditional (uremia) risk factor or risk factor.



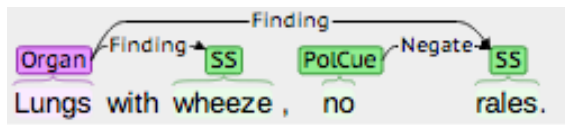
- For each non-traditional risk factor decide whether it was caused by any cause.



- For each sign or symptom decide whether was it caused by any risk factor or cause.



- For each organ check if it is associated with any sign or symptom.



- 5- Per each record you have annotated please record any comments you might think it is important to improve the guidelines for example you could record comments about:
- The clarity and applicability of the guidelines.
 - Adding any important information that is not covered by the guidelines.