

# Hematology Research - Analysis of CBC Results and Disease Diagnoses

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This script combines several datasets from the MIMIC-III clinical database in order to construct a dataset suitable for analysis of complete blood count (CBC) results and their relation to disease diagnoses. The process is as follows:

1. **Import pandas:** This line imports the pandas library, a widely-used tool in Python for data analysis and manipulation.
2. **Load the datasets:** The script reads six CSV files from the MIMIC-III database into pandas DataFrames. These DataFrames now hold the data from each CSV file and allow for manipulation and analysis in Python.
3. **List of CBC test names:** This is a list of tests that are part of a CBC. These are the tests the script will look for in the lab events data.
4. **Get the itemid for each test:** The script searches the `dlabitems_df` DataFrame for rows where the 'label' matches one of the CBC test names. It then gets the 'itemid' for each of these rows. The 'itemid' is a unique identifier for each type of lab test.
5. **Filter labevents for complete blood count tests:** The script filters the `labevents_df` DataFrame for rows where the 'itemid' matches one of the CBC test itemids. This creates a new DataFrame that only includes CBC test results.
6. **Merge datasets with custom suffixes:** The script merges the filtered CBC lab events data with the admissions, patients, and diagnoses data on the relevant identifiers. This creates a single DataFrame that includes all relevant information for each CBC test result. To avoid confusion, it adds suffixes to the column names of overlapping columns.
7. **Save the merged dataset:** Finally, the script saves the merged DataFrame to a new CSV file. This file will be used for the actual analysis of CBC results and disease diagnoses.

Note that the CSV files and the script need to be in the same directory for this to work. If they're not, you would need to include the full file path when reading each CSV file.

```
import pandas as pd
```

```
# Load the datasets
```

```
admissions_df = pd.read_csv('ADMISSIONS.csv')
labevents_df = pd.read_csv('LABEVENTS.csv')
patients_df = pd.read_csv('PATIENTS.csv')
dlabitems_df = pd.read_csv('D_LABITEMS.csv')
diagnoses_df = pd.read_csv('DIAGNOSES_ICD.csv')
d_icd_diagnoses_df = pd.read_csv('D_ICD_DIAGNOSES.csv')
```

```

# List of CBC test names
cbc_tests = ['Red Blood Cells', 'Hemoglobin', 'Hematocrit', 'MCV',
'MCH', 'MCHC', 'RDW', 'Platelets', 'White Blood Cells', 'Neutrophils',
'Lymphocytes', 'Monocytes', 'Eosinophils', 'Basophils']

# Get the itemid for each test
cbc_itemids = dlabitems_df[dlabitems_df['label'].isin(cbc_tests)]
['itemid'].values

# Filter labevents for complete blood count tests
cbc_labevents_df =
labevents_df[labevents_df['itemid'].isin(cbc_itemids)]

# Merge datasets with custom suffixes
merged_df = pd.merge(admissions_df, cbc_labevents_df,
on=['subject_id', 'hadm_id'], how='inner', suffixes=('_admissions',
'_labevents'))
merged_df = pd.merge(merged_df, patients_df, on='subject_id',
how='inner', suffixes=('', '_patients'))
merged_df = pd.merge(merged_df, diagnoses_df, on=['subject_id',
'hadm_id'], how='inner', suffixes=('', '_diagnoses'))
merged_df = pd.merge(merged_df, d_icd_diagnoses_df, on='icd9_code',
how='inner', suffixes=('', '_d_icd'))

# Save the merged dataset
merged_df.to_csv('merged_cbc_diagnoses_dataset.csv', index=False)

```

merged\_df

|        | row_id_admissions | subject_id | hadm_id | admittime           |   |
|--------|-------------------|------------|---------|---------------------|---|
| 0      | 12258             | 10006      | 142345  | 2164-10-23 21:09:00 | \ |
| 1      | 12258             | 10006      | 142345  | 2164-10-23 21:09:00 |   |
| 2      | 12258             | 10006      | 142345  | 2164-10-23 21:09:00 |   |
| 3      | 12258             | 10006      | 142345  | 2164-10-23 21:09:00 |   |
| 4      | 12258             | 10006      | 142345  | 2164-10-23 21:09:00 |   |
| ...    | ...               | ...        | ...     | ...                 |   |
| 254396 | 41092             | 44228      | 103379  | 2170-12-15 03:14:00 |   |
| 254397 | 41092             | 44228      | 103379  | 2170-12-15 03:14:00 |   |
| 254398 | 41092             | 44228      | 103379  | 2170-12-15 03:14:00 |   |
| 254399 | 41092             | 44228      | 103379  | 2170-12-15 03:14:00 |   |
| 254400 | 41092             | 44228      | 103379  | 2170-12-15 03:14:00 |   |

|                    | disctime            | deathtime | admission_type |                |
|--------------------|---------------------|-----------|----------------|----------------|
| admission_location |                     |           |                |                |
| 0                  | 2164-11-01 17:15:00 | NaN       | EMERGENCY      | EMERGENCY ROOM |
| ADMIT \            |                     |           |                |                |
| 1                  | 2164-11-01 17:15:00 | NaN       | EMERGENCY      | EMERGENCY ROOM |
| ADMIT              |                     |           |                |                |
| 2                  | 2164-11-01 17:15:00 | NaN       | EMERGENCY      | EMERGENCY ROOM |

|        |            |          |     |           |           |      |
|--------|------------|----------|-----|-----------|-----------|------|
| ADMIT  |            |          |     |           |           |      |
| 3      | 2164-11-01 | 17:15:00 | NaN | EMERGENCY | EMERGENCY | ROOM |
| ADMIT  |            |          |     |           |           |      |
| 4      | 2164-11-01 | 17:15:00 | NaN | EMERGENCY | EMERGENCY | ROOM |
| ADMIT  |            |          |     |           |           |      |
| ...    |            | ...      | ... |           | ...       |      |
| ...    |            |          |     |           |           |      |
| 254396 | 2170-12-24 | 18:00:00 | NaN | EMERGENCY | EMERGENCY | ROOM |
| ADMIT  |            |          |     |           |           |      |
| 254397 | 2170-12-24 | 18:00:00 | NaN | EMERGENCY | EMERGENCY | ROOM |
| ADMIT  |            |          |     |           |           |      |
| 254398 | 2170-12-24 | 18:00:00 | NaN | EMERGENCY | EMERGENCY | ROOM |
| ADMIT  |            |          |     |           |           |      |
| 254399 | 2170-12-24 | 18:00:00 | NaN | EMERGENCY | EMERGENCY | ROOM |
| ADMIT  |            |          |     |           |           |      |
| 254400 | 2170-12-24 | 18:00:00 | NaN | EMERGENCY | EMERGENCY | ROOM |
| ADMIT  |            |          |     |           |           |      |

|        |                    |           |     |            |          |     |
|--------|--------------------|-----------|-----|------------|----------|-----|
|        | discharge_location | insurance | ... |            |          | dod |
| 0      | HOME HEALTH CARE   | Medicare  | ... | 2165-08-12 | 00:00:00 | \   |
| 1      | HOME HEALTH CARE   | Medicare  | ... | 2165-08-12 | 00:00:00 |     |
| 2      | HOME HEALTH CARE   | Medicare  | ... | 2165-08-12 | 00:00:00 |     |
| 3      | HOME HEALTH CARE   | Medicare  | ... | 2165-08-12 | 00:00:00 |     |
| 4      | HOME HEALTH CARE   | Medicare  | ... | 2165-08-12 | 00:00:00 |     |
| ...    |                    |           |     |            |          |     |
| 254396 | HOME HEALTH CARE   | Private   | ... | 2171-04-14 | 00:00:00 |     |
| 254397 | HOME HEALTH CARE   | Private   | ... | 2171-04-14 | 00:00:00 |     |
| 254398 | HOME HEALTH CARE   | Private   | ... | 2171-04-14 | 00:00:00 |     |
| 254399 | HOME HEALTH CARE   | Private   | ... | 2171-04-14 | 00:00:00 |     |
| 254400 | HOME HEALTH CARE   | Private   | ... | 2171-04-14 | 00:00:00 |     |

|        |                     |                     |     |         |             |
|--------|---------------------|---------------------|-----|---------|-------------|
|        |                     | dod_hosp            |     | dod_ssn | expire_flag |
| row_id | diagnoses           |                     |     |         |             |
| 0      | 2165-08-12 00:00:00 | 2165-08-12 00:00:00 |     |         | 1           |
| 112344 | \                   |                     |     |         |             |
| 1      | 2165-08-12 00:00:00 | 2165-08-12 00:00:00 |     |         | 1           |
| 112344 |                     |                     |     |         |             |
| 2      | 2165-08-12 00:00:00 | 2165-08-12 00:00:00 |     |         | 1           |
| 112344 |                     |                     |     |         |             |
| 3      | 2165-08-12 00:00:00 | 2165-08-12 00:00:00 |     |         | 1           |
| 112344 |                     |                     |     |         |             |
| 4      | 2165-08-12 00:00:00 | 2165-08-12 00:00:00 |     |         | 1           |
| 112344 |                     |                     |     |         |             |
| ...    |                     | ...                 |     | ...     | ...         |
| ...    |                     |                     |     |         |             |
| 254396 | 2171-04-14 00:00:00 |                     | NaN |         | 1           |
| 397674 |                     |                     |     |         |             |
| 254397 | 2171-04-14 00:00:00 |                     | NaN |         | 1           |
| 397674 |                     |                     |     |         |             |
| 254398 | 2171-04-14 00:00:00 |                     | NaN |         | 1           |

```

397674
254399 2171-04-14 00:00:00 NaN 1
397674
254400 2171-04-14 00:00:00 NaN 1
397674

```

```

      seq_num icd9_code row_id_d_icd short_title \
0          1    99591    11403      Sepsis
1          1    99591    11403      Sepsis
2          1    99591    11403      Sepsis
3          1    99591    11403      Sepsis
4          1    99591    11403      Sepsis
...      ...      ...      ...
254396      8    45182    4289  Phlbts sprfc vn up extrm
254397      8    45182    4289  Phlbts sprfc vn up extrm
254398      8    45182    4289  Phlbts sprfc vn up extrm
254399      8    45182    4289  Phlbts sprfc vn up extrm
254400      8    45182    4289  Phlbts sprfc vn up extrm

                                long_title
0                                Sepsis
1                                Sepsis
2                                Sepsis
3                                Sepsis
4                                Sepsis
...
254396  Phlebitis and thrombophlebitis of superficial ...
254397  Phlebitis and thrombophlebitis of superficial ...
254398  Phlebitis and thrombophlebitis of superficial ...
254399  Phlebitis and thrombophlebitis of superficial ...
254400  Phlebitis and thrombophlebitis of superficial ...

```

[254401 rows x 39 columns]

**How many patients are in the dataset?**

```
len(merged_df['hadm_id'].unique())
```

129

*Count of Diseases related to CBC Results*

```
#print unique short_titles
```

```
merged_df['short_title'].unique()
```

```

array(['Sepsis', 'React-oth vasc dev/graft', 'Hyp kid NOS w cr kid V',
       'Atrial fibrillation', 'CHF NOS', 'Aortic valve disorder',
       'Mitral valve disorder', 'Staphylcocc septicem NEC',
       'Tachycardia NOS', 'Abn react-renal dialysis',
       'Inf mcrg rstn pncllins', 'Dvrtcli colon w/o hmrhg',
       'Anemia-other chronic dis', 'DMII wo cmp nt st uncnt',
       'Long-term use of insulin', 'Adv eff anticoagulants',

```

'Crnry athrsc1 natve vssl', 'Gout NOS', 'Tobacco use disorder',  
 'Acute necrosis of liver', 'Hpt B acte wo cm wo dlta',  
 'Chrnc hpt C wo hpat coma', 'Opioid dependence-contin',  
 'Thrombocytopenia NOS', 'Hyperosmolality', 'Septicemia NOS',  
 'Subendo infarct, initial', 'Cardiogenic shock',  
 'Pneumonia, organism NOS', 'Oth lymp unsp xtrnd1 org',  
 'Hyperlipidemia NEC/NOS', 'Fx surg nck humerus-clos',  
 'Emphysema NEC', 'Fx facial bone NEC-close',  
 'Fx malar/maxillary-close', 'Hematoma complic proc',  
 'Iatrogen pulm emb/infarc', 'Ac posthemorrhag anemia',  
 'Fall from slipping NEC', 'Abn react-surg proc NEC',  
 'Hx-circulatory dis NEC', 'Hypertension NOS',  
 'Acute respiratry failure', 'Acute pancreatitis',  
 'Alcoh dep NEC/NOS-unspec', 'Blood in stool',  
 'Ac kidney fail, tubr necr', 'Hepatic encephalopathy',  
 'Shock w/o trauma NEC', 'Severe sepsis', 'Ac alcoholic  
 hepatitis',  
 'Asthma NOS', 'Intracerebral hemorrhage', 'Malignant  
 hypertension',  
 'Urin tract infection NOS', 'Hyposmolality',  
 'Hx of breast malignancy', 'Idio periph neurpthy NOS',  
 'Anemia NOS', 'Tricuspid valve disease', 'Other heart block',  
 'Chronic kidney dis NOS', 'Mental disor NEC oth dis',  
 'Rectal prolapse', 'Abnrml coagultion prfile',  
 'Streptococcal septicemia', 'Comp-ren dialys dev/grft',  
 'Cholangitis', 'Choledochlith NOS w obst',  
 'End stage renal disease', 'Septic shock',  
 'Other pulmonary insuff', 'Pleural effusion NOS',  
 'Malfunc oth device/graft', 'Cerv spondyl w myelopath',  
 'Personal history of fall', 'Unc behav neo bone',  
 'Delirium d/t other cond', 'Status autm crd dfbrltr',  
 'Hx-prostatic malignancy', 'Fx lower humerus NEC-cl',  
 'Secondary malig neo bone', 'Food/vomit pneumonitis',  
 'Diastolc hrt failure NOS', 'Acute kidney failure NOS',  
 'Tox multnod goit no cris', 'Trachea & bronch dis NEC',  
 'Hyperpotassemia', 'Fall NOS', 'Pure hypercholesterolem',  
 'Depressive disorder NEC', 'Late eff CV dis-aphasia',  
 'Peptic ulcer NOS', 'Ocl crtd art wo infrct',  
 'Old myocardial infarct', 'Acidosis', 'Esophageal reflux',  
 'Alzheimer's disease', 'Dementia w/o behav dist',  
 'Polymyalgia rheumatica', 'Hypothyroidism NOS',  
 'React-oth int ortho dev', 'Pyogen arthritis-pelvis',  
 'Alkalosis',  
 'Comp-internal joint pros', 'Failure to thrive-adult',  
 'Venous insufficiency NOS', 'Abn react-artif implant',  
 'Accident in place NEC', 'Osteoporosis NOS',  
 'Streptococcus group b', 'Hyp ht dis NOS w ht fail',  
 'Bacteremia',  
 'Iron defic anemia NOS', 'Surg compl-heart',  
 'Parox ventric tachycard', 'Prim pulm hypertension',

'Periph vascular dis NOS', 'Obs chr bronc w(ac) exac',  
 'Int inf clstrdium dfcile', 'Ac diastolic hrt failure',  
 'Sec mal neo brain/spine', 'Cellulitis of leg',  
 'Second malig neo liver', 'Secondary malig neo lung',  
 'Renal & ureteral dis NOS', 'Anemia in neoplastic dis',  
 'Anaerobic septicemia', 'Lower extremity embolism',  
 'Acq coagul factor defic', 'Colstmy/enteros comp NEC',  
 'Stricture of artery', 'Subendo infarct, subseq',  
 'Mycoses NEC & NOS', 'Urinostomy status NEC',  
 'Hx-uterus malignancy NEC', 'Hx of irradiation',  
 'History of tobacco use', 'Status-post ptca', 'Convulsions  
 NEC',  
 'Cirrhosis of liver NOS', 'Hpt C w/o hepat coma NOS',  
 'Chr blood loss anemia', 'Bleed esoph var oth dis',  
 'Portal hypertension', 'Portal vein thrombosis',  
 'Hepatorenal syndrome', 'Pneumonia e coli',  
 'Cl skl base fx-deep coma', 'Traum hemothorax-closed',  
 'W/crft fall NEC-pers NEC', 'Mal neo stomach cardia',  
 'Sec mal neo GI NEC', 'Vasc comp med care NEC',  
 'Mal neo lymph intra-abd', 'Rheumatoid arthritis',  
 'Liver laceration, major', 'Concussion-deep coma',  
 'Traumatic shock', 'Cardiac arrest', 'Oth coll stnd obj-  
 mocycl',  
 'GI injury NEC-closed', 'Oth acq limb deformity',  
 'Epilepsy NOS w intr epil', 'Coma', 'Intellect disability NOS',  
 'Angio intes w hmrhg', 'Rheumatic heart failure',  
 'Mitral insuf/aort stenosis', 'Chr airway obstruct NEC',  
 'Cardiac dysrhythmias NEC', 'Long-term use anticoagul',  
 'Second malig neo pleura', 'Mal neo lower lobe lung',  
 'Protein-cal malnutr NOS', 'Diarrhea', 'Adv eff  
 antineoplastic',  
 'Amyloidosis NEC', 'Nutritional marasmus',  
 'Nephrotic syn in oth dis', 'Hypovolemia', 'Hematemesis',  
 'Inf mcr rst ot drg nt ml', 'Dis plas protein met NOS',  
 'Iatrogenc hypotnsion NEC', 'Dis plas protein met NEC',  
 'Enterococcus group d', 'Other esophagitis',  
 'Bacteroides fragilis', 'Aortocoronary bypass',  
 'Cor ath unsp vsl ntv/gft', 'Prsnl hst tuberculosis',  
 'Bronchitis NOS', 'Mth sus Stph aur els/NOS', 'Paralysis  
 agitans',  
 'Vascular dementia,uncomp', 'Cerebral atherosclerosis',  
 'Ath ext autologs bps gft', 'Dvrtclo colon w/o hmrhg',  
 'Vasc dementia w delirium', 'Gastrostomy status',  
 'Hx-lymphatic malign NEC', 'Poison-antipsychotic NEC',  
 'Recur depr psych-severe', 'Pois-cns muscle depress',  
 'Pois-benzodiazepine tran', 'Poison-psychotropic agt',  
 'Poison-drug/medicin NEC', 'Gastrointest hemorr NOS',  
 'Dehydration', 'Benign neo pituitary', 'Panhypopituitarism',  
 'Pressure ulcer, ankle', 'Opn skl fx NEC-deep coma',  
 'Mv collision NOS-driver', 'Accid on street/highway',

'Open wound of face NEC', 'Mal neo bronch/lung NEC',  
 'Second malig neo adrenal', 'Second malig neo kidney',  
 'Sec mal neo peritoneum', 'Secondary malig neo NEC',  
 'Ch myl leuk wo achv rmsn', 'Pulmonary collapse',  
 'Pressure ulcer, low back', 'Spleen disease NEC',  
 'Adrenal hypofunction NEC', 'Herpetic encephalitis',  
 'Sinoatrial node dysfunct', 'Sleep apnea NOS',  
 'Ventricular fibrillation', 'Anoxic brain damage',  
 'Persistent vegtv state', 'Bipolar I current NOS',  
 'Intermed coronary synd', 'Drug-induced delirium',  
 'Adv eff benzodiaz tranq', 'Glossitis', 'Mult mye w/o achv  
 rmson',  
 'Thrush', 'Trnspl status-bne marrow', 'Acute cholecystitis',  
 'Perforation gallbladder', 'Toxic encephalopathy',  
 'Chr duoden ulcer w hem', 'Chr stomach ulc w hem',  
 'Grand mal status', 'Defibrination syndrome', 'Cerebral edema',  
 'Metabolic encephalopathy', 'Encountr palliative care',  
 'Adv eff hydantoin deriv', 'Intertrochanteric fx-cl',  
 'Chr diastolic hrt fail', 'Hemorrhage complic proc',  
 'Abdom aortic aneurysm', 'Hy kid NOS w cr kid I-IV',  
 'Acute & chronc resp fail', 'Ac on chr diast hrt fail',  
 'DMII unspf uncntrld', 'Meth susc Staph aur sept',  
 'Pressure ulcer, buttock', 'Chr pulmon heart dis NEC',  
 'Obstructive sleep apnea', 'Obesity NOS',  
 'Afttrcre traumatic fx hip', 'Hx-ven thrombosis/embols',  
 'Constipation NOS', 'Compl liver transplant',  
 'Alcohol cirrhosis liver', 'Hpt B chrn wo cm wo dlta',  
 'Iatrogenic pneumothorax', 'Hemoperitoneum',  
 'Obstruction of bile duct', 'C1-c4 fx-cl/com cord les',  
 'Fx femur shaft-closed', 'Cl skul base fx-brf coma',  
 'Seroma complicting proc', 'Quadrplg c1-c4, complete',  
 'Oth coll stndng obj-psgr', 'Vascular myelopathies',  
 'Open wound of scalp', 'Nasal bone fx-closed',  
 'Candidias urogenital NEC', 'Nystagmus NOS', 'Intestinal  
 fistula',  
 'Hx of colonic malignancy', 'Candidiasis of lung',  
 'Pulm embol/infarct NEC', 'Malig neo main bronchus',  
 'Nonspecif skin erupt NEC', 'Gall&bil cal w/oth w obs',  
 'Glaucoma NOS', 'Chr systolic hrt failure',  
 'Sec hyperparathyrd-renal', 'Other alter consciounes',  
 'Renal dialysis status', 'Joint pain-l/leg',  
 'Meth resis Staph carrier', 'Subarach hem-coma NOS',  
 'Brain hem NEC-coma NOS', 'Hypopotassemia', 'Stridor',  
 'Anxiety state NOS', 'Personal history UTI',  
 'Traum arthropathy-pelvis', 'Adv eff opiates', 'Apnea',  
 'Mal neo lymph-intrathor', 'Foreign body bronchus',  
 'Anemia in chr kidney dis', 'Hx-bronchogenic malignan',  
 'Brkt tmr unsp xtrndl org', 'Tumor lysis syndrome',  
 'Meth res pneu d/t Staph', 'Pressure ulcer, stage IV',  
 'Aplastic anemias NEC', 'Pneu mycplsm pneumoniae',

'Ac DVT/emb prox low ext', 'Mixed acid-base bal dis',  
 'Ac embl suprfl up ext', 'Crit illness neuropathy',  
 'Acromegaly and gigantism', 'Neutropenia NOS', 'Corneal ulcer  
 NOS',  
 'Retention urine NOS', 'Bronchiectas w/o ac exac', "Bell's  
 palsy",  
 'Hypercalcemia', 'Hydrocele NOS', 'Orchitis/epididymit NOS',  
 'Dis phosphorus metabol', 'Osteoarthrosis-mult site',  
 'Mucosits d/t antineo rx', 'Drug induced neutropenia',  
 'Lack of housing', 'Constipation NEC', 'Meth sus pneum d/t  
 Staph',  
 'Hx antineoplastic chemo', 'Drug dermatitis NOS', 'Hiccough',  
 'Hx Methicln resist Staph', 'Adv eff antibiotics NEC',  
 'Ac on chr syst hrt fail', 'B12 defic anemia NEC',  
 'Ac systolic hrt failure', 'Lumbosacral spondylosis',  
 'Pure hyperglyceridemia', 'Idiopathic scoliosis',  
 'Tracheoesophageal fstula', 'Mal neo bronch/lung NOS',  
 'Atrial flutter', 'Ventltr assoc pneumonia',  
 'Other dsrdrs esophagus', 'Benign hypertension',  
 'Dysphagia,pharyngoesoph', 'Abnormal glucose NEC',  
 'AMI anterolateral, init', 'Morbid obesity', 'Paralytic ileus',  
 'Epilep NOS w/o intr epil', 'Subac dyskinesa d/t drug',  
 'Adv eff medicinal NOS', 'Schizoffective dis NOS',  
 'Septicemia NEC', 'Chr kidney dis stage IV',  
 'Gstr/ddnts NOS w hmrhg', 'Ulcer of heel & midfoot',  
 'DMII wo cmp uncntld', 'Ac DVT/embl low ext NOS',  
 'Mal neo lymph-inguin/leg', 'Schizophr dis resid-chr',  
 'Heart valve replac NEC', 'Ulcer of calf',  
 'Respirator depend status', 'Pseudomonas septicemia',  
 'Gram-neg septicemia NEC', 'Atten to gastrostomy',  
 'Pericardial disease NOS', 'Pressure ulcer, heel',  
 'Pressure ulcer,stage NOS', 'Pressure ulcer, stage II',  
 'Oth sequela, chr liv dis', 'Chronic sinusitis NOS',  
 'Atten to tracheostomy', 'Afttrce traum fx bone NEC',  
 'Afttrcare traum fx up arm', 'Late eff motor vehic acc',  
 'Pressure ulcer, stage I', 'MRSA septicemia',  
 'DMII neuro nt st uncntld', 'Neuropathy in diabetes',  
 'Late ef CV dis dysphagia', 'Dysphagia NOS',  
 'Pressure ulcer,stage III', 'Pseudomonas infect NOS',  
 'Tracheostomy status', 'Ileostomy status', 'Hematuria NOS',  
 'Urethral stricture NOS', 'Pneumo oth grm-neg bact',  
 'React-indwell urin cath', 'Gastrostomy comp NEC',  
 'Proteus infection NOS', 'Abn react-urinary cath',  
 'Hx TIA/stroke w/o resid', 'Gram-neg septicemia NOS',  
 'Late ef-spch/lang df NEC', 'Late effect CV dis NEC',  
 'DMII neuro uncntld', 'Late ef-spch/lng def NOS',  
 'Gastrostomy comp - mech', 'Paraplegia NOS',  
 'Tracheostomy comp NEC', 'Abn react-procedure NEC',  
 'Lt ef oth parals-bilat', 'Bed confinement status',  
 'Abn involun movement NEC', 'Enterostomy status NEC',



'Quadriplegia, unspecifd', 'Dis magnesium metabolism',  
 'Urinary obstruction NOS', 'Leukocytosis NOS',  
 'Vitamin D deficiency NOS', 'Chronic pain NEC',  
 'Do not resuscitate status', 'Acquire absnce intestine',  
 'Fx c1 vertebra-closed', 'Fx dorsal vertebra-close',  
 'Ch lym leuk wo achv rmsn', 'Fx c2 vertebra-closed',  
 'Open wnd knee/leg-compl', 'Fall on stair/step NEC',  
 'Accident in home', 'Cataract NOS', 'Down's syndrome',  
 'AMI inferior wall, init', 'Mal neo upper lobe lung',  
 'Hypotension NEC', 'Heparin-indu thrombocyto', 'Ascites NEC',  
 'Gastroduodenal dis NEC', 'Alcoh dep NEC/NOS-remiss',  
 'Await organ transplnt st', 'Esoph varice oth dis NOS',  
 'Cachexia',  
 'Hx of past noncompliance', 'Alcoh dep NEC/NOS-contin',  
 'Crbl thrmb w infrct', 'Unsp hemiplga unspf side',  
 'Mal neo pancreas head', 'Thrombophlebitis migrans',  
 'Malig neopl kidney', 'Mal neo lymph-intrapelv',  
 'Accidental op laceration', 'Acc cut/hem in surgery',  
 'Malign neopl thyroid', 'Chr kidney dis stage III',  
 'Dysphagia, oropharyngeal', 'Esophageal stricture',  
 'Status cardiac pacemaker', 'BPH w/o urinary obs/LUTS',  
 'Vocal paral bilat part', 'Depend-supplement oxygen',  
 'Digest-genit fistul, fem', 'Irradiation cystitis',  
 'Chrnc hpt C w hepat Coma', 'Irritable bowel syndrome',  
 'Rectal & anal dis NEC', 'Diaphragmatic hernia',  
 'Hx-cervical malignancy', 'Acq absnce cervix/uterus',  
 'Abn react-radiotherapy', 'Open wound of finger',  
 'Alcohol withdrawal', 'DMII oth nt st uncntrld',  
 'Ac alcohol intox-contin', 'Cornea transplant status',  
 'DMII circ nt st uncntrld', 'Athscl extrm ntv art NOS',  
 'Malfunc urethral cath', 'Accid in resident instit',  
 'Ch obst asth w (ac) exac', 'Hypoxemia', 'Multiple sclerosis',  
 'Ectropion NOS', 'Psychosis NOS', 'Long-term use steroids',  
 'MRSA elsewhere/NOS', 'Traum pneumothorax-close',  
 'Congen obst urtroplv jnc', 'Volume depletion NOS',  
 'Lt ef oth paral side NOS', 'Prim cardiomyopathy NEC',  
 'Mitr/aortic mult involv', 'Conjunctivitis NOS',  
 'Hx-skin malignancy NEC', 'Volvulus of intestine',  
 'Mitral/aortic val insuff', 'Hypotension NOS',  
 'Subdural hem-deep coma', 'Norml pressure hydroceph',  
 'Epil par cont w/o int ep', 'Ventricular shunt status',  
 'Muscskel sympt limb NEC', 'Euthyroid sick syndrome', 'Fever  
 NOS',  
 'Oth spcf hypoglycemia', 'Bladder/urethra inj-clos',  
 'Gross hematuria', 'Chr ischemic hrt dis NOS',  
 'Prsnl hst colonic polyps', 'Accident NOS', 'Crbl emblsm w  
 infrct',  
 'Compression of brain', 'Parox atrial tachycardia',  
 'Spinal stenosis NOS', 'Encephalopathy NOS',  
 'Ac/chr syst/dia hrt fail', 'Malignant neopl rectum',

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'Pancreat cyst/pseudocyst', 'Bladder neck obstruction',
'Klebsiella pneumoniae', 'Osteoarthros NOS-unspec',
'Abdmnal pain unspcf site', 'Edema', 'Subdural hem w/o coma',
'Malignant neo colon NOS', 'Rt bbb/lft ant fasc blk',
'Effusion NEC exc tb', 'Vocal paral unilat part',
'Emphyema w/o fistula', 'Macular degeneration NOS',
'Acq absnce breast/nipple', 'Crbl art ocl NOS w infrc',
'Pulm congest/hypostasis', 'Adv eff sedat/hypnot NOS',
'Syncope and collapse', 'Mal neo esophagus NEC',
'Kidney transplant status', 'Joint pain-unspec',
'Stomach ulcer NOS', 'Esophageal hemorrhage',
'Neurohypophysis dis NEC', 'Respiratory arrest',
'Chr tot occlus cor artry', 'Angina pectoris NEC/NOS',
'Prsnl hst urnr dsrd calc', 'Hx-esophageal malignancy',
'Cardiac tamponade', 'Arthropathy NOS-unspec',
'Asympt varicose veins', 'Immune thrombocyt purpra',
'Univrsl ulcertve colitis', 'Chron kidney dis stage V',
'Acq hemolytic anemia NOS', 'Adv eff cardiovasc NEC',
'E coli septicemia', 'Mal neo extrahepat ducts',
'Sec malig neo lg bowel', 'Phlbts sprfc vn up extrm'],
dtype=object)

```

*Its quite interesting we got 561 diseases related to CBC results*

```
len(merged_df['short_title'].unique())
```

561