

# Named Entity Recognition (NER)

## Clinical NER Process & Entity Types

"The patient was prescribed **metformin 500mg** twice daily for **type 2 diabetes**. She reported **nausea** and **dizziness** but no **chest pain**. Labs showed **HbA1c 7.2%**."



DRUG



DISEASE



SYMPOTM



LAB TEST



NEG

## NER Approach Comparison

### Rule-Based

- ✓ Fast, interpretable
- ✗ Limited coverage

### Machine Learning

- ✓ Good generalization
- ✗ Needs training data

### Deep Learning

- ✓ State-of-the-art
- ✗ Resource intensive



## Medical Entities

- Diseases & conditions
- Medications & dosages
- Signs & symptoms
- Procedures & surgeries
- Anatomical structures
- Lab tests & values



## Rule-Based NER

- Dictionary lookup (UMLS)
- Regular expressions
- Pattern matching rules
- Fast execution
- Limited to known terms



## ML/DL Models

- CRF (Conditional Random Fields)
- BiLSTM-CRF networks
- BERT-based models
- BioBERT, ClinicalBERT
- Transfer learning approach



## Performance Metrics

- Precision: correct predictions
- Recall: coverage of entities
- F1 score: harmonic mean
- Entity-level vs token-level
- Cross-validation testing