



Insights into clinical data input and translation: Impact on Research

Amol Bhalla MD M.Sci MHSA MBA
Chief Informaticist





Today's Agenda

- 1) Quick Introduction & My Background
- 2) Historical Background of Informatics
- 3) Evolution of Clinical Languages
- 4) Challenges We Face as Researchers

Fun Projects in My Career so far ...

- 1 x Public Facing EHR
- 1 x Health Information Exchange (HIE) Integration
- 2 x Precision Medicine Programs
 - Neurology – Cognitive Disorders
 - Oncology
- 1 x Bioinformatics Lab
 - Gene Inference Network
- 3 x Terminology Services
 - 1 x Relational
 - 2 x Semantic
- 2 x Clinical Message Interop Platform
 - On Prem Single Tenant
 - Serverless Multi Tenant
 - Cloud Multi Tenant
- 1 x EMPI Tool
- 3 x Analytics/DS Platform
- 2 x Semantically Driven Platform
 - Aggregating Patient Data
 - Developing Clinical Cohorts

Generalizable



Maintainable

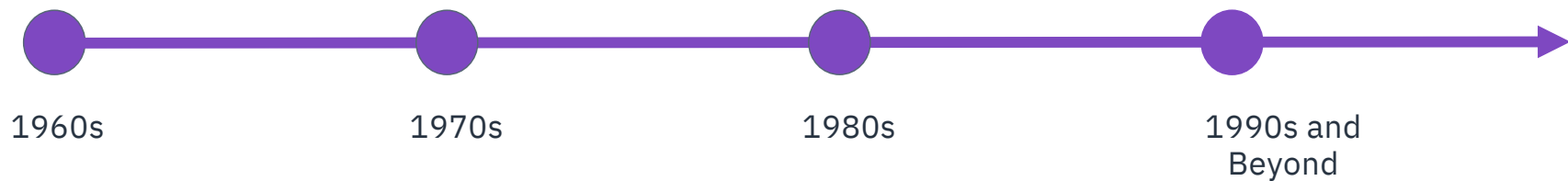


Scalable

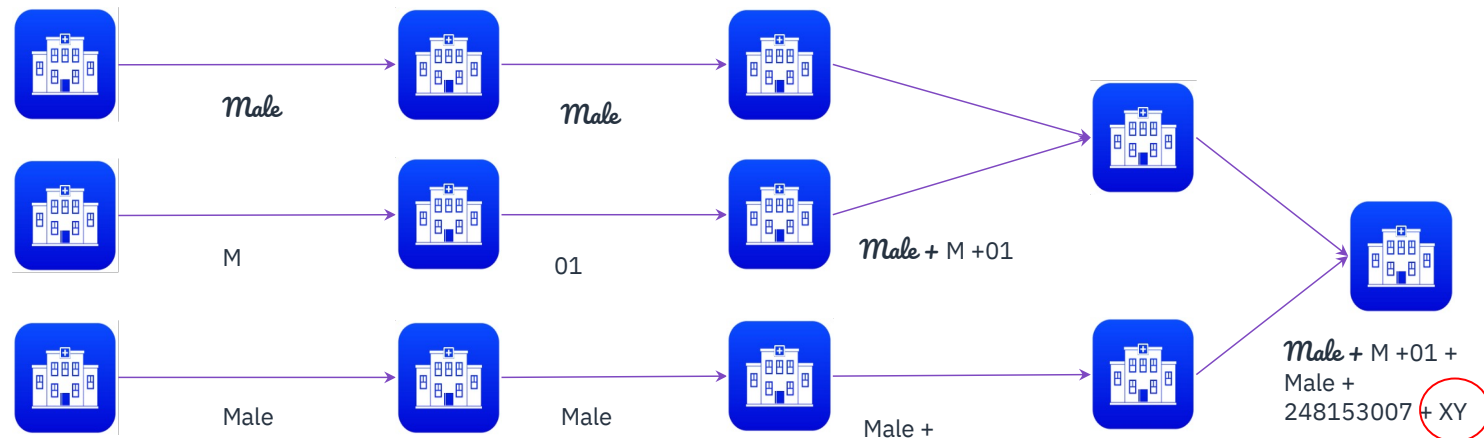
History of Clinical Informatics

The Syntax

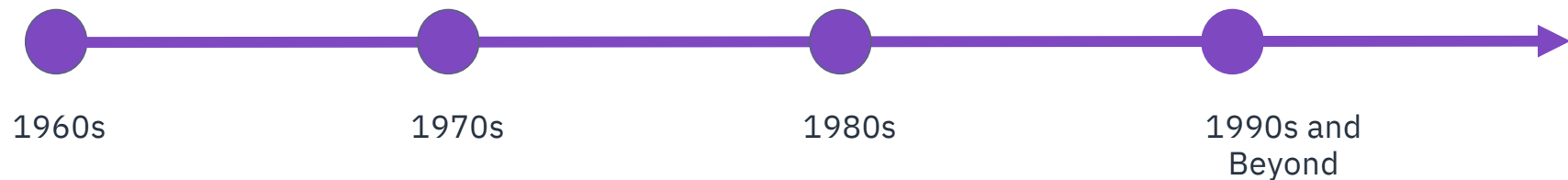
What's been going on behind the scenes within the Hospitals ...

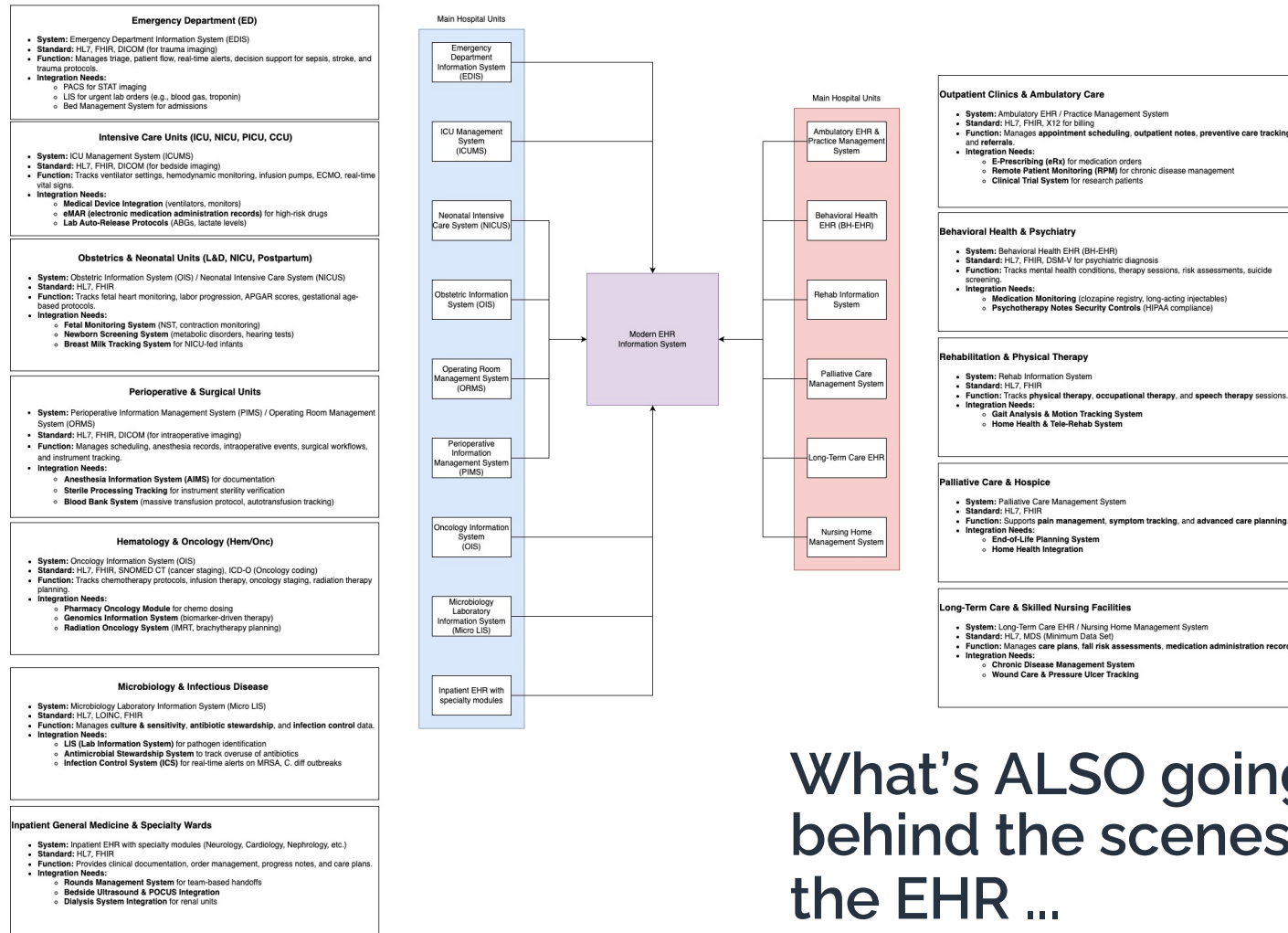


What's ALSO going on behind the scenes within the Hospitals ...



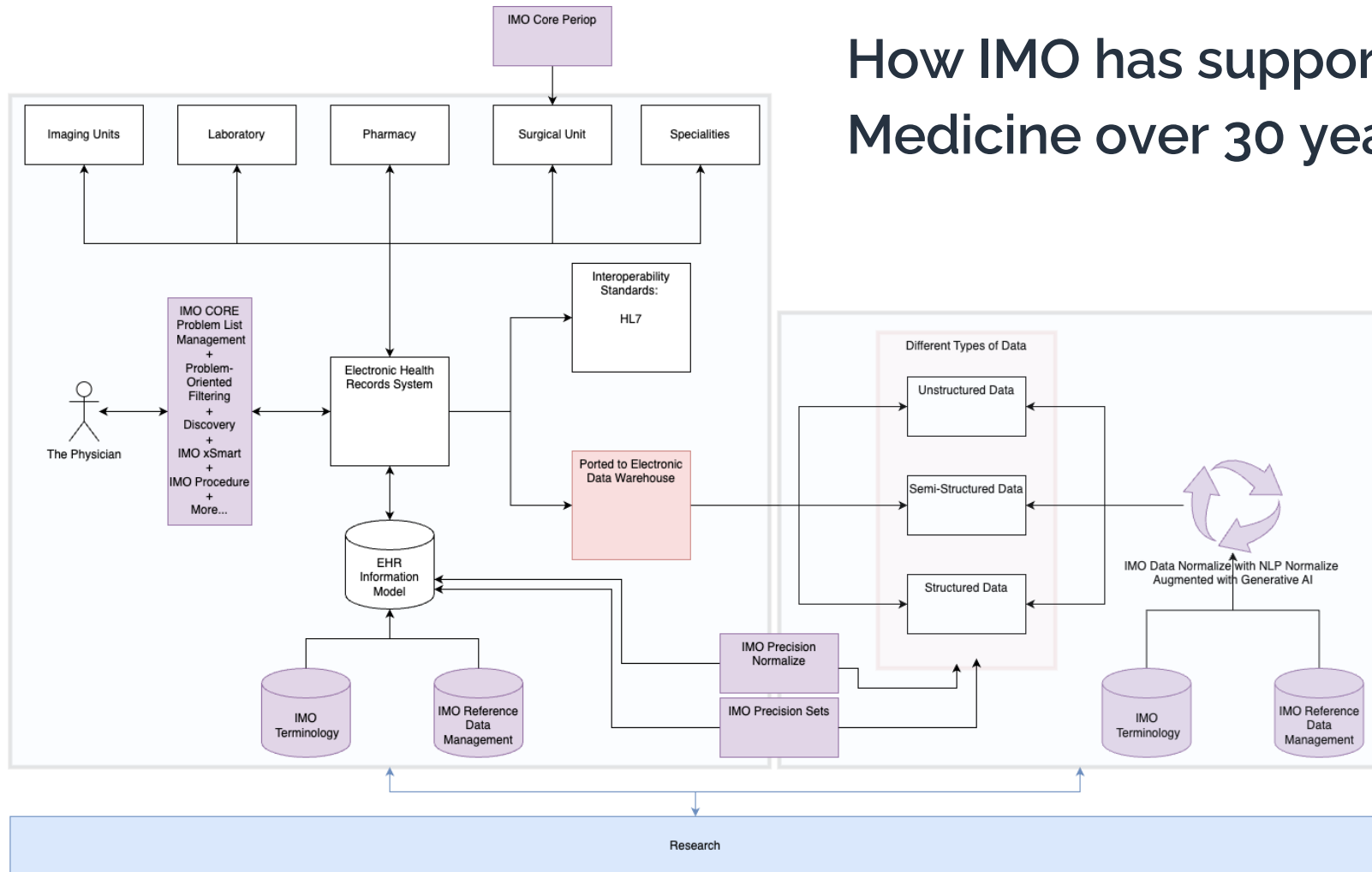
New Data and Domains



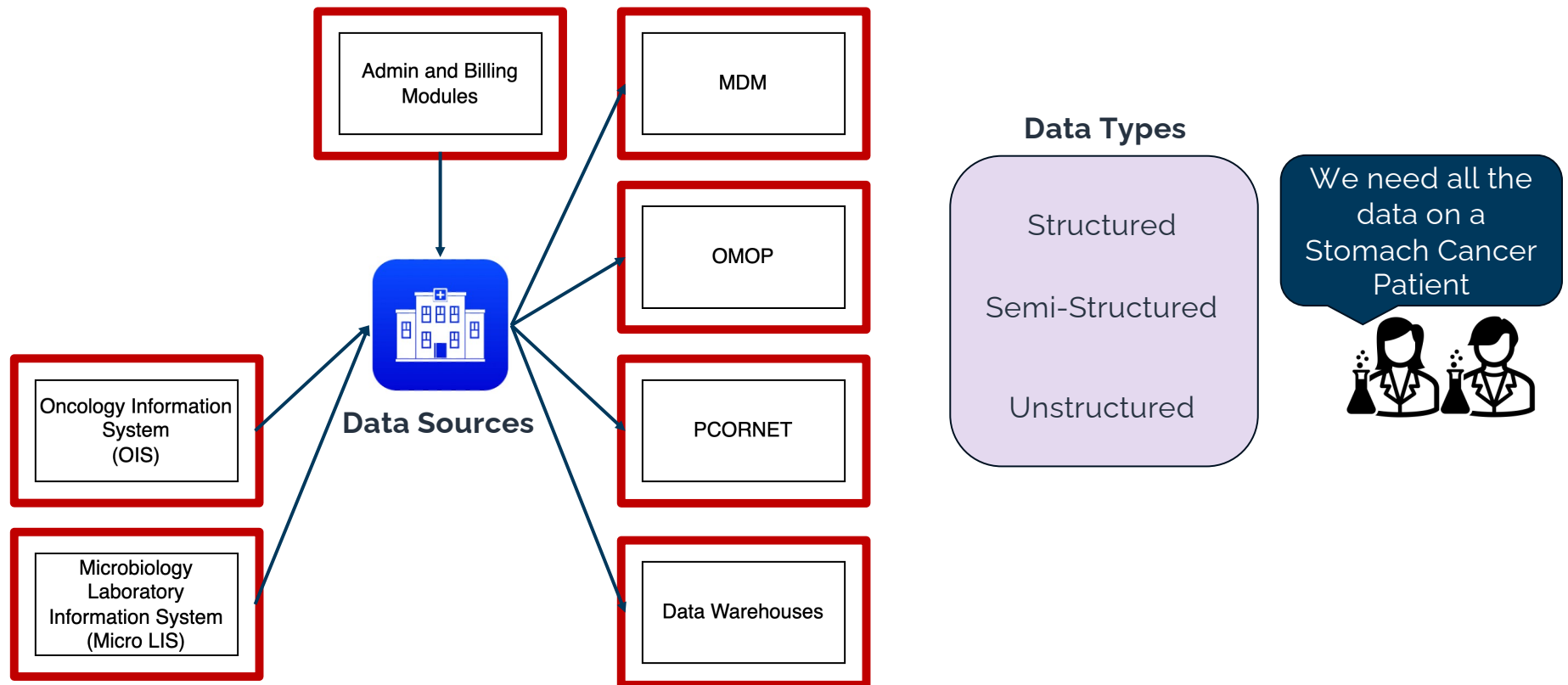


What's ALSO going on behind the scenes within the EHR ...

How IMO has supported Medicine over 30 years...



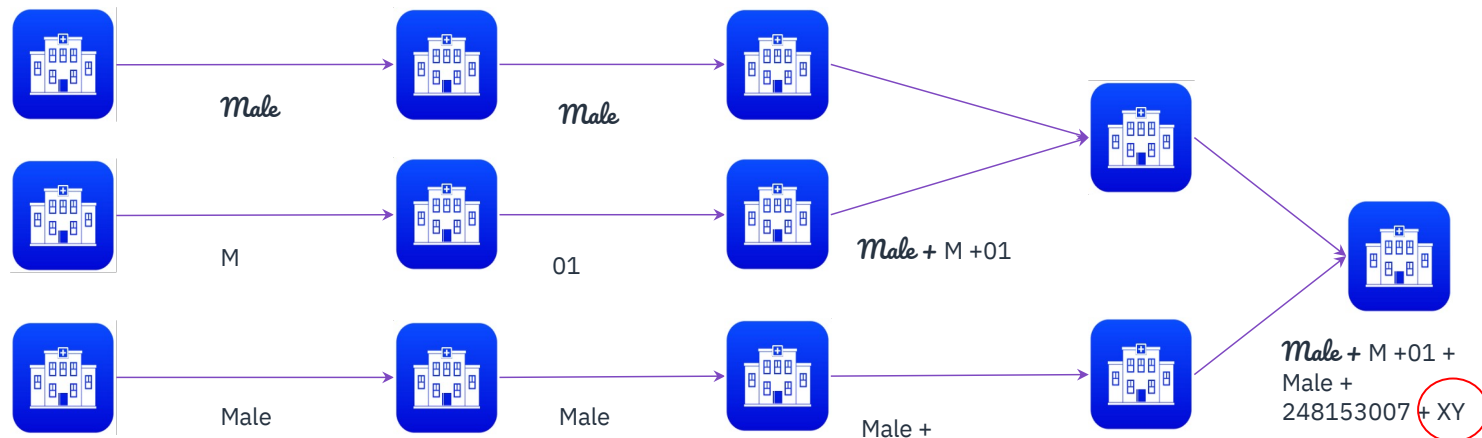
Syntax – IMO Focus Area for the last 5 + years



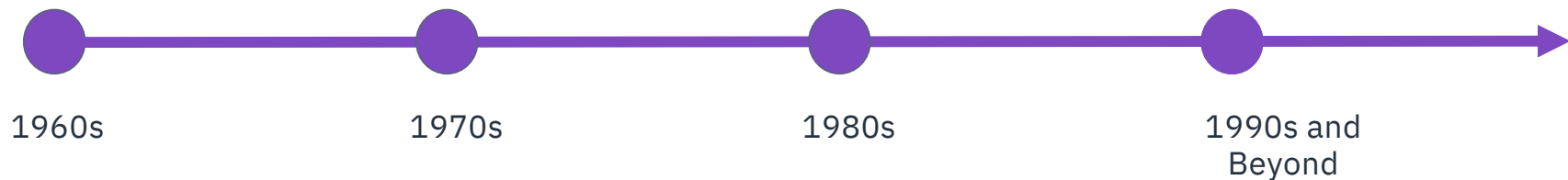
Evolution of Clinical Language

The Semantics

What's ALSO going on behind the scenes within the Hospitals ...

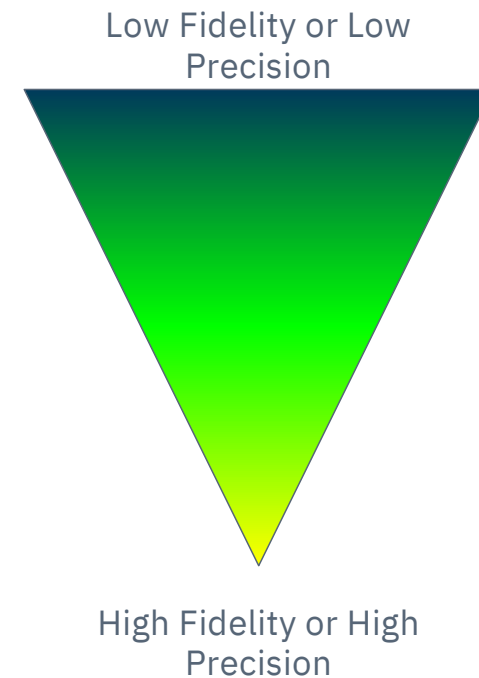


New Data and Domains

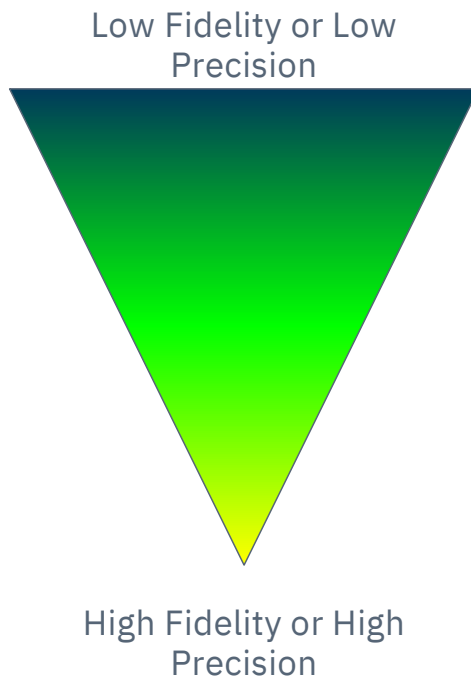


Evolution from Generalized to Individualized Treatment

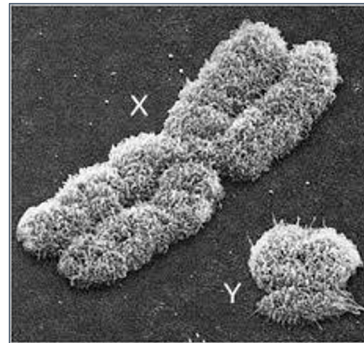
<i>Male</i>	
Male	Phenotype
M	
01	Codeable
248153007	Concepts
XY	Genotype



Let's take a look at the data from a different Lens

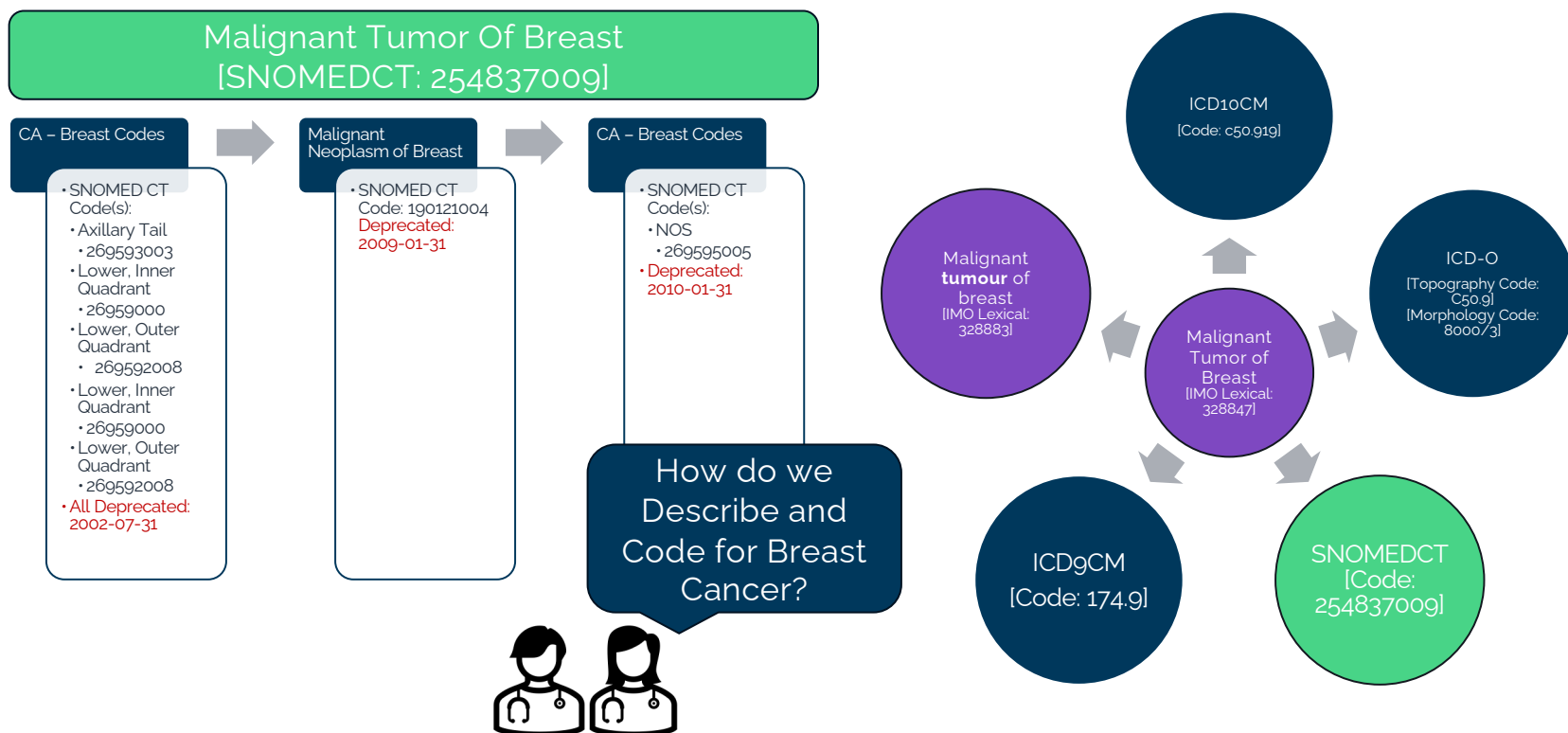


Any Species with Male a.k.a. Phenotypic Male



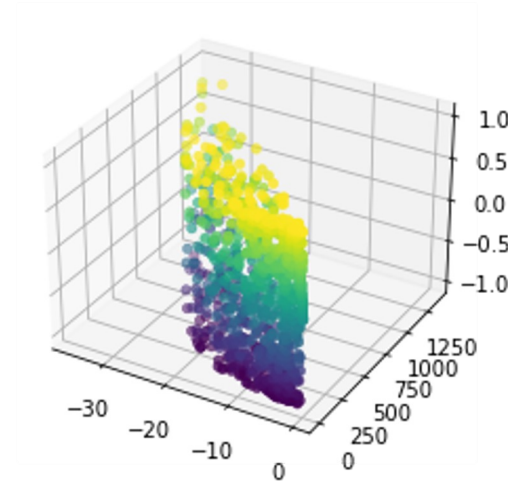
**XY Chromosomes
a.k.a. Genotypic
Human Male**

Semantics - IMO has been doing this for over 30 years!

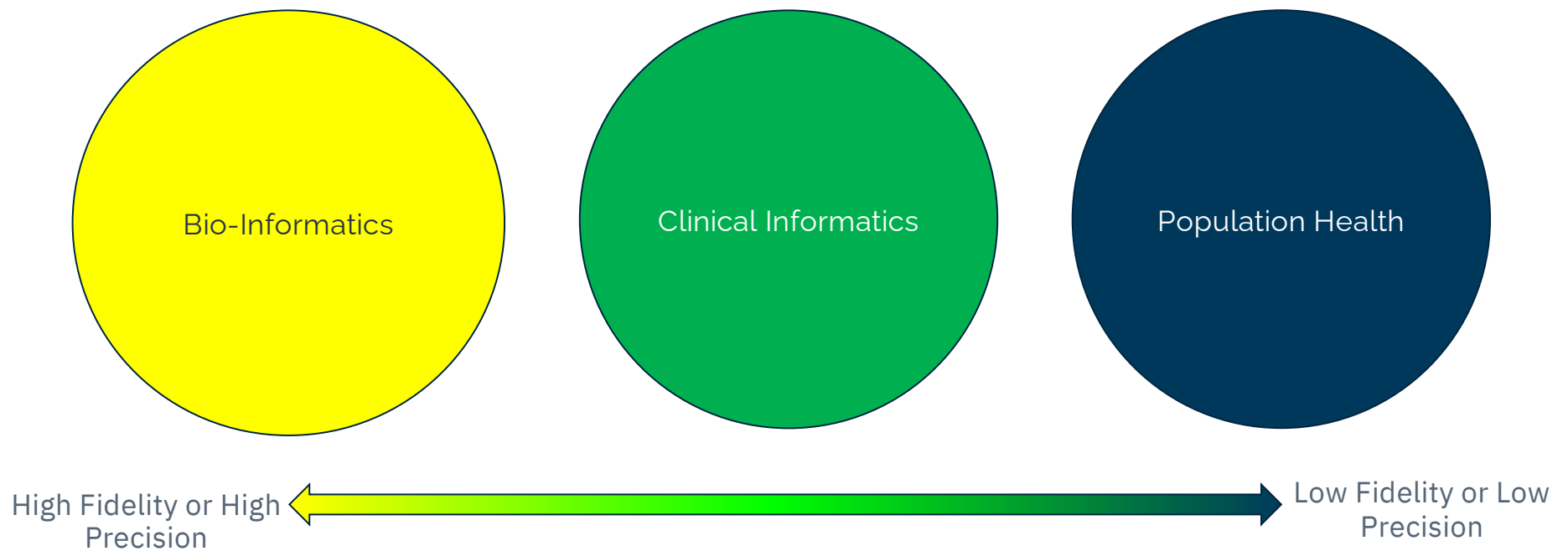


Clinical Data has Evolved to become....

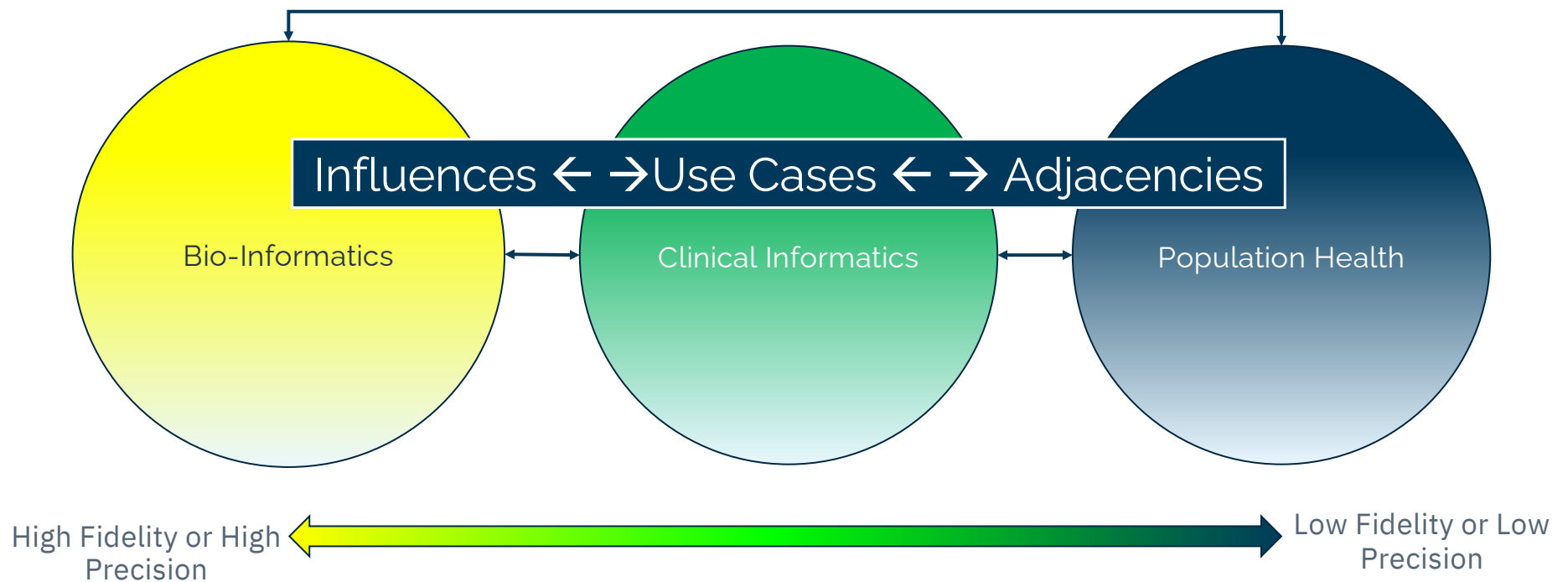
“Multi-Dimensionally Disparate Data.”
or
MDD



How does Informatics play a role?



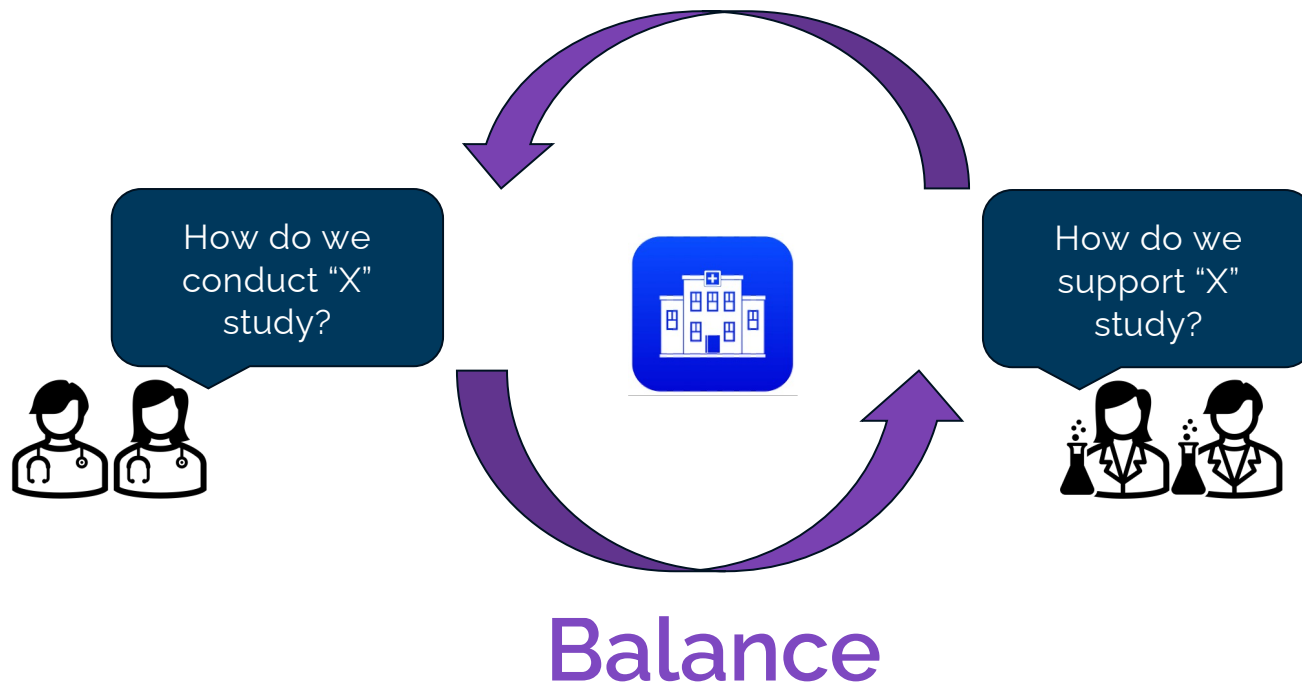
Data Fidelity Within Each Sphere



How do we get research done?

The Balancing act

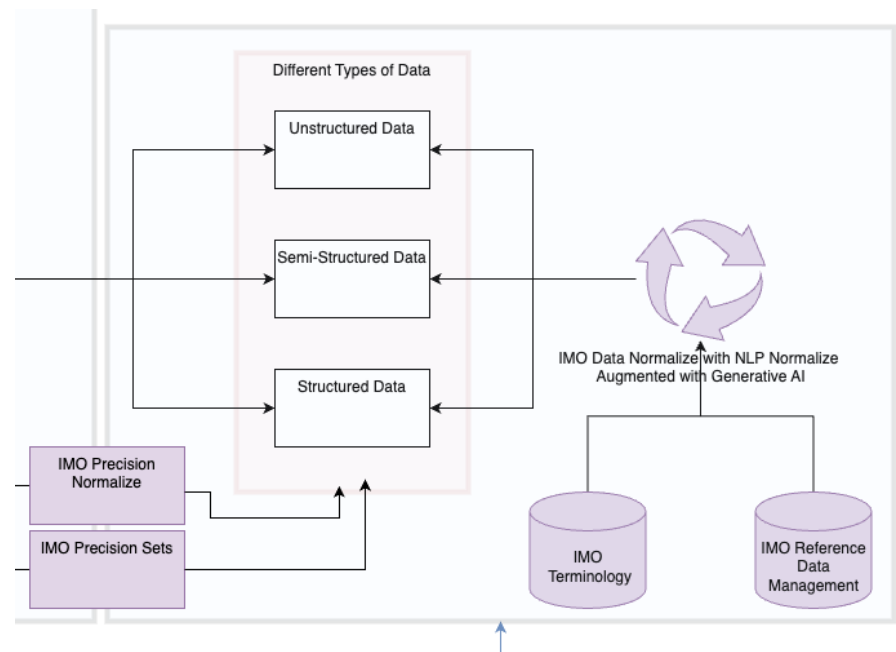
Semantics & Syntax



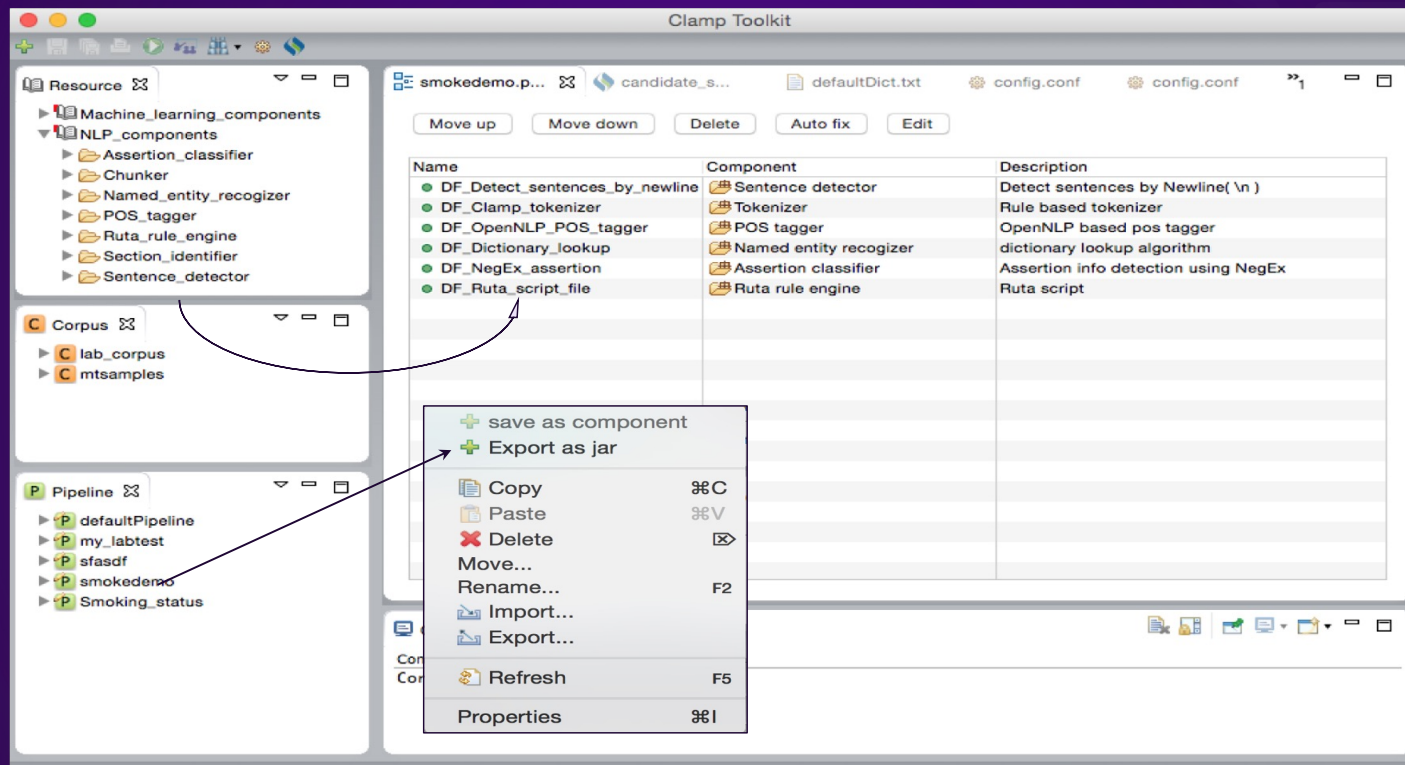
Example of IMO Health Technologies

Sample Use Case

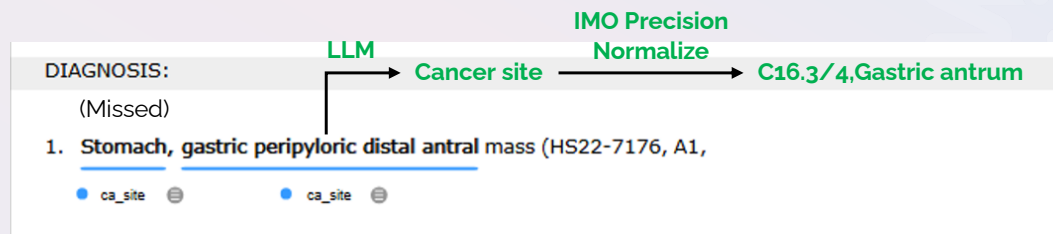
- Our client's request was to "improve their Cancer Registry Operations."
- We were asked to develop a Clinical NLP pipeline to process unstructured data, extract clinical concepts, reconcile them, and ultimately structure the data.



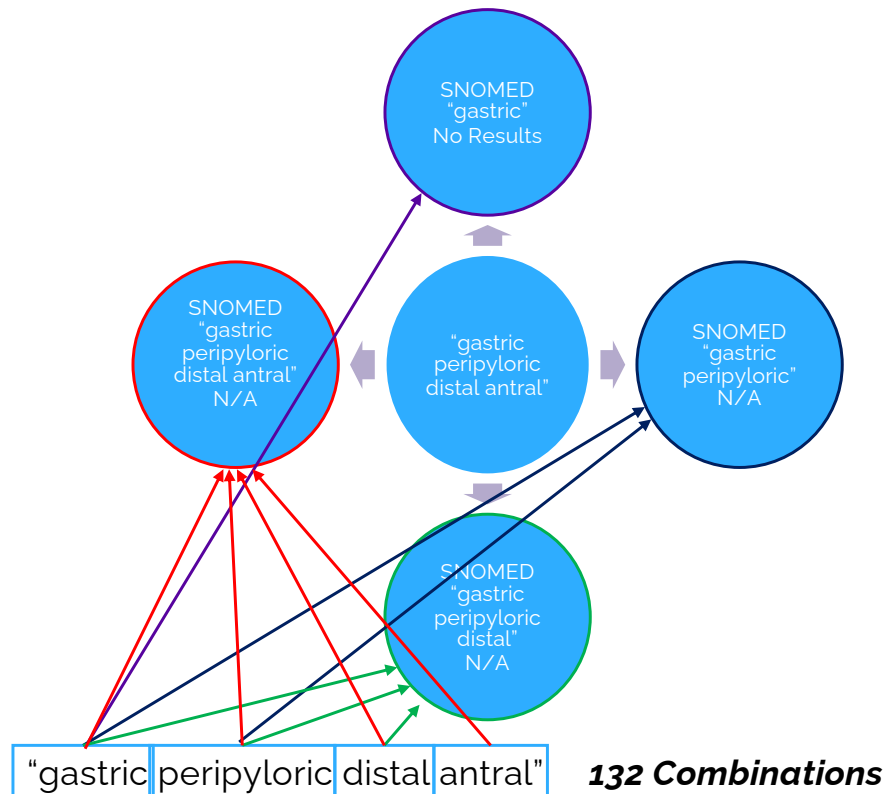
CLAMP GUI: Tool to Build Customized NLP Pipelines



Detection of Primary Site in Clinical Note



Only utilizing SNOMED...



- After Enough Permutations:

- "Gastric Antrum"

- Pyloric Antrum Structure (body structure)

- Other False Positives

- "Polya Gastric Antrectomy"

- Polya gastric antrectomy (procedure)

- Gastric antral biopsy sample

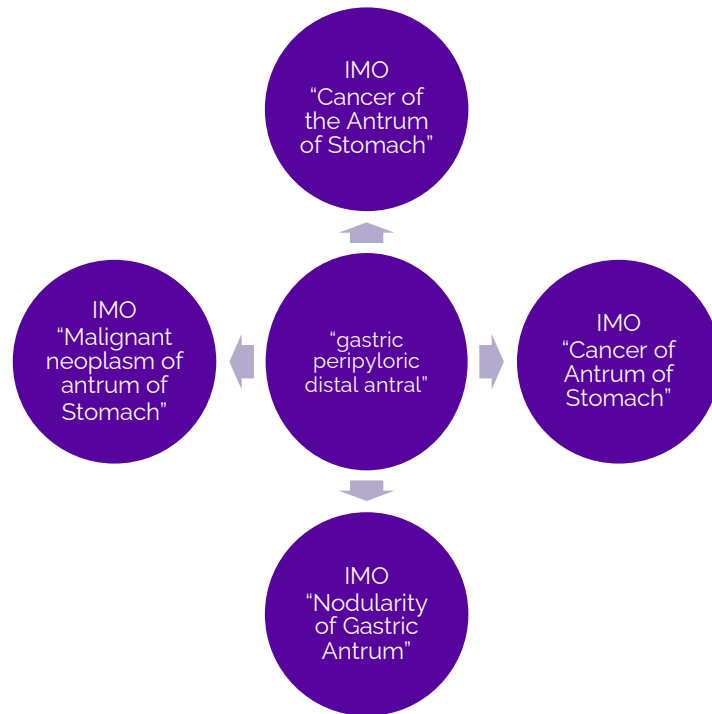
- Gastric antral biopsy specimen (specimen)

- Billroth I gastric antrectomy

- Billroth I gastric antrectomy (procedure)

What was the original Clinical Intent??

The Power of IMO Content



- With IMO Content with NLP + LLMs
 - “gastric peripyloric distal antral”
 - IMO
 - Malignant Neoplasm of Pyloric Antrum
 - SNOMED
 - 18774000 - Malignant tumor of pyloric antrum
 - ICD 10
 - C16.3 - Gastrointestinal cancers – stomach
 - ICD-0-3
 - C16.3 – Gastric Antrum
 - Other Code Systems

IMO, does **NOT CHANGE** the clinical intent; we ensure correct encapsulation and then semantically harmonization to a known coding system.

Conclusion

Conclusion - Semantics & Syntax

