sanofi

A-Lab - “Patient Like Me”

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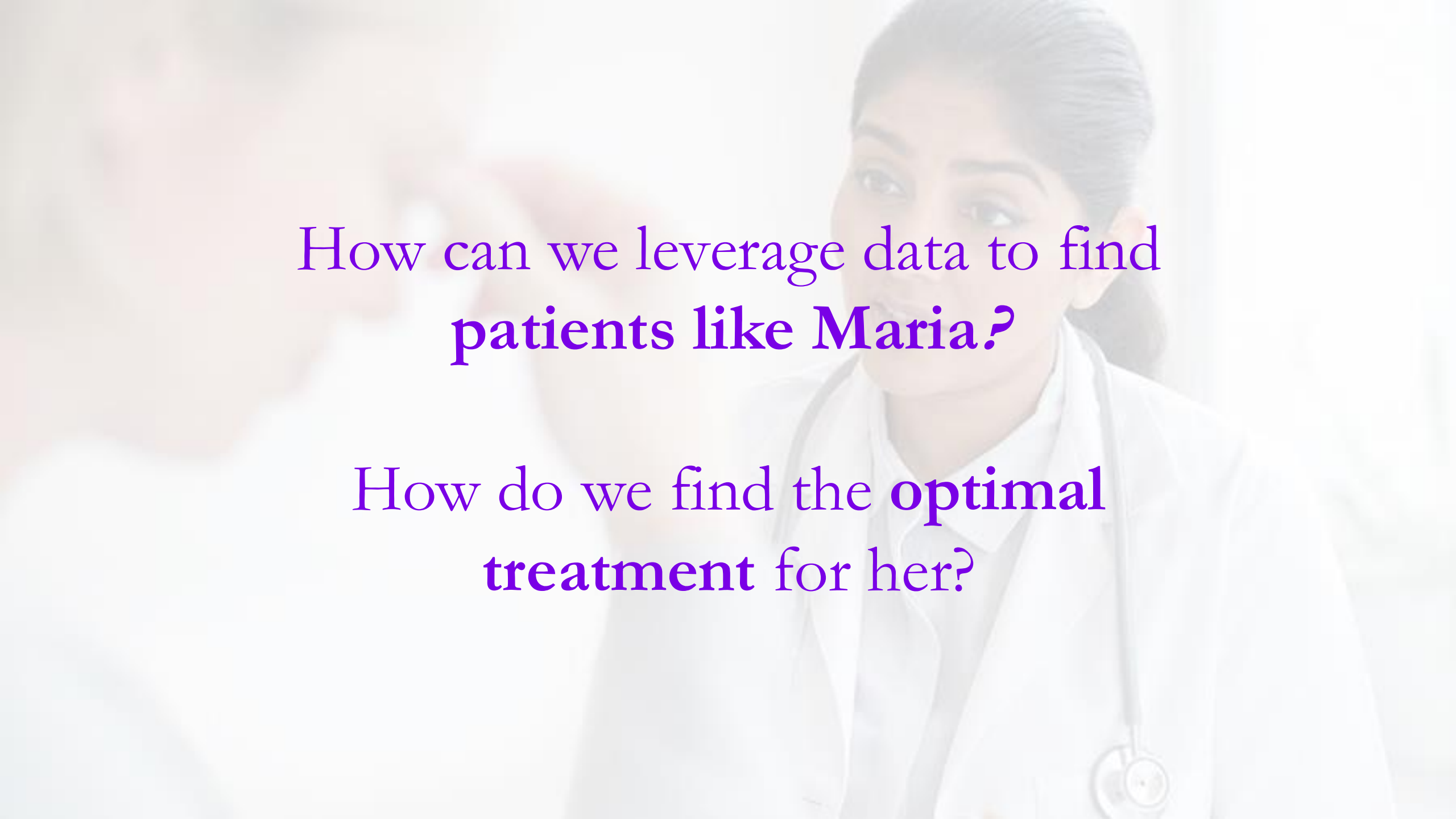
Hydroxychloroquine (Plaquenil)
Leflunomide (Arava)
Methotrexate (Trexall)
Adaptacept (Orencia)
Adalimumab (Humira)
Etanercept (Enbrel)
Golimumab (Simponi)
Infliximab (Remicade)
Rituximab (Rituxan)
Toxilizumab (Actemra)
Baricitinib (Olumiant)
Tofacitinib (Xeljanz)
Updatacitinib (Rinvoq)
…

TNF-a Inhibition Drugs

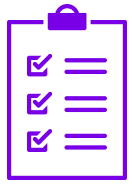


How can we leverage data to find **patients like Maria*?***

How do we find the **optimal treatment** for her?

Clinical and biomedical data provide the clues to finding Maria's optimal treatment (precision medicine)

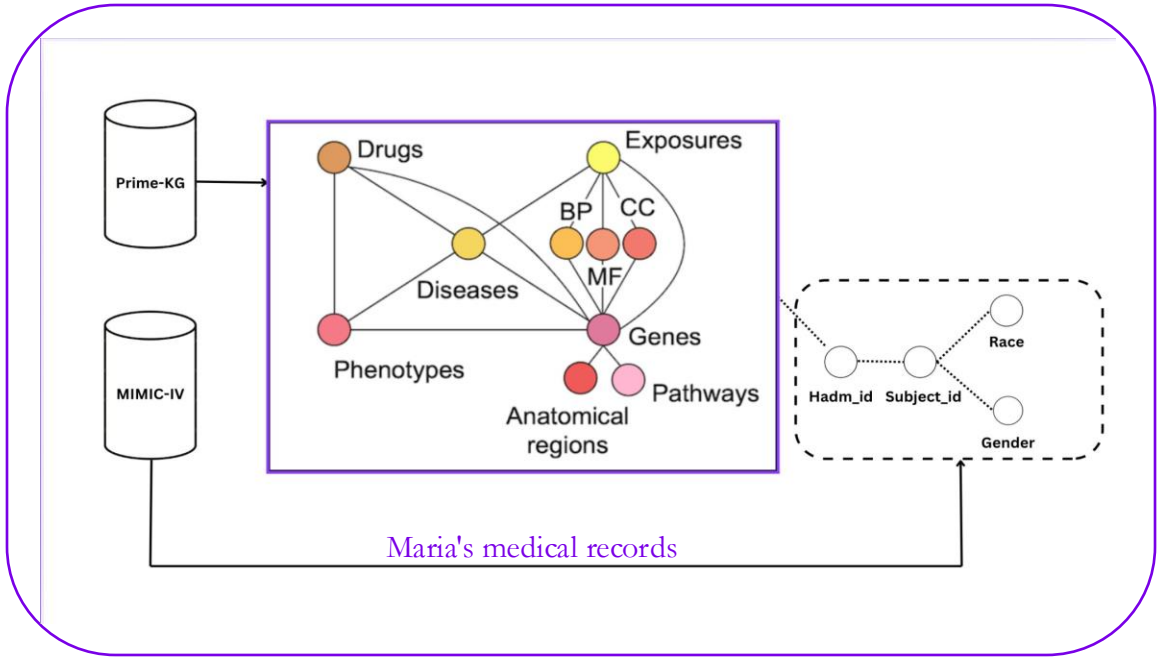
Maria's challenges (current state)



Data to address Maria's challenges

Maria's condition is **grouped** with all other rheumatoid arthritis patients	Electronic Health Record information (MIMIC-IV) Disease descriptions (PrimeKG)
Maria's physicians do not understand the **biological factors** driving her condition (RA)	Gender, Age, Race, Lab Tests, Past Diagnoses (MIMIC-IV)
Maria's doctors are unsure which TNF-Alpha inhibitor would best align with her **condition and biomarkers**	Drug descriptions (PrimeKG) Biological tests (MIMIC-IV)

Unlocking the power of Maria's clinical and biomedical data requires a creative approach

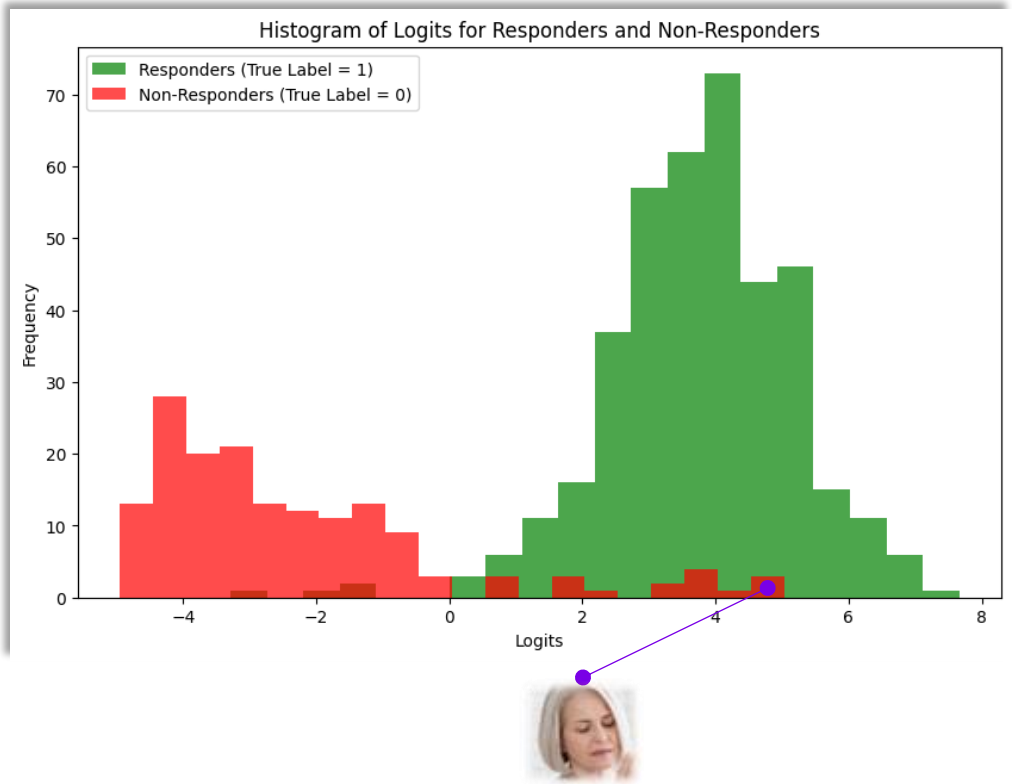


Node relationship	Node name X	Node name Y
Disease_Patient	Rheumatoid Arthritis	Hospital admission 22924109

Connect Maria's medical records to a Super-graph

- A smart doctor decides to **connect Maria's hospital admission ID to PrimeKG** via her rheumatoid arthritis diagnosis
- Maria's demographic information is seamlessly integrated into the super-graph with **nodes representing her attributes** like race, gender, and more
- Maria's doctors are now able to **identify similar patients** with the super-graph

Leveraging fused data, we were able to predict the right treatment for Maria



Maria is here: She's similar to the **responders**!

1 Maria was **so similar** to patients benefitting from drug D that cutting-edge models failed to realize she had **never even tried** the drug!

2 Doctors had overlooked drug D because she **didn't fit the typical profile** of patients on it

3 After seeing how **similar Maria really was** to the "known responders,"[1] her doctor decided to write her a prescription

4 Maria achieved a huge improvement in her symptoms and **quality of life**

[1] And carefully evaluating risks, including side effects

Social Impact

- **Personalized Treatment**
  - Assign Maria the same drug as those with similar characteristics and **greatest improvement**
- **Quality of Life**
  - Identify most relevant mechanisms of action for drugs to improve the overall **quality of life**

Business Impact

› **Patient Super-Responders**

- Identify user profiles who are likely to **significantly benefit** from particular drugs

› **Drug Development**

- Adjust **Randomized Clinical Trials** to include super-responders
- Compute **Average Treatment Effects** between groups

Together, we can improve patient lives

Thank You

Appendix