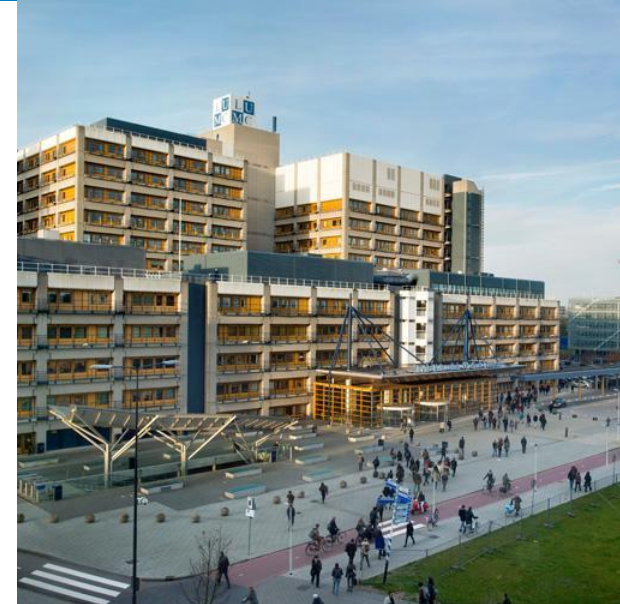
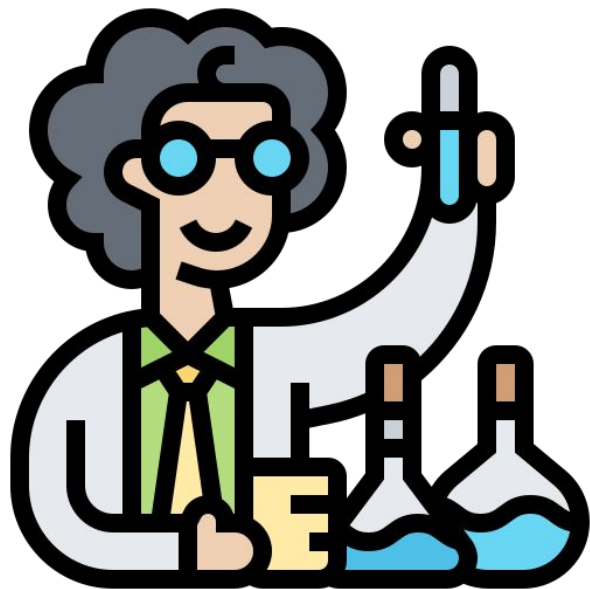


Goal-models to support communication, planning and guiding of FAIRification

BioSB 2021

César Henrique Bernabé, Annika Jacobsen, Núria Queralt Rosinach, Vitor E. Silva Souza, Luiz Olavo Bonino da Silva Santos, Barend Mons, Marco Roos



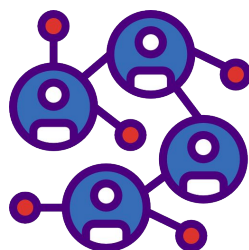


“We want to use our data to predict the disease course of a patient. We want our data to be interoperable with external sources. Hence, by using the potential of hidden knowledge in research data, we want to identify new treatments for the patient’s disease.”

Researcher Request



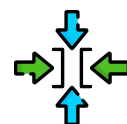
“We want to use our data to predict the disease course of a patient.
We want our data to be **interoperable with external sources**. [...]”



Our own data needs to **interoperate** with other research center’s data

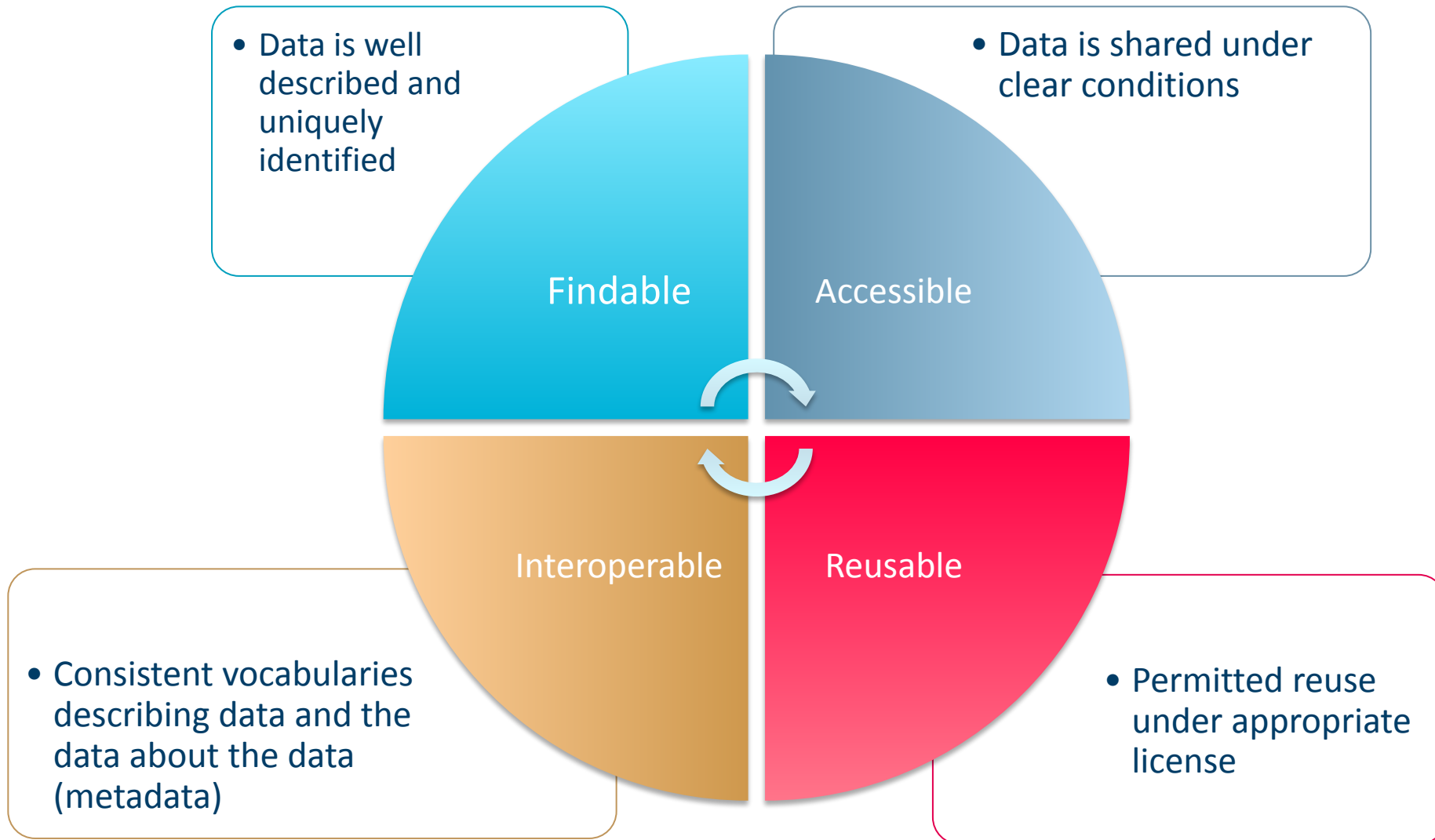


We need to **find** other center’s data and they should be able to **find** ours

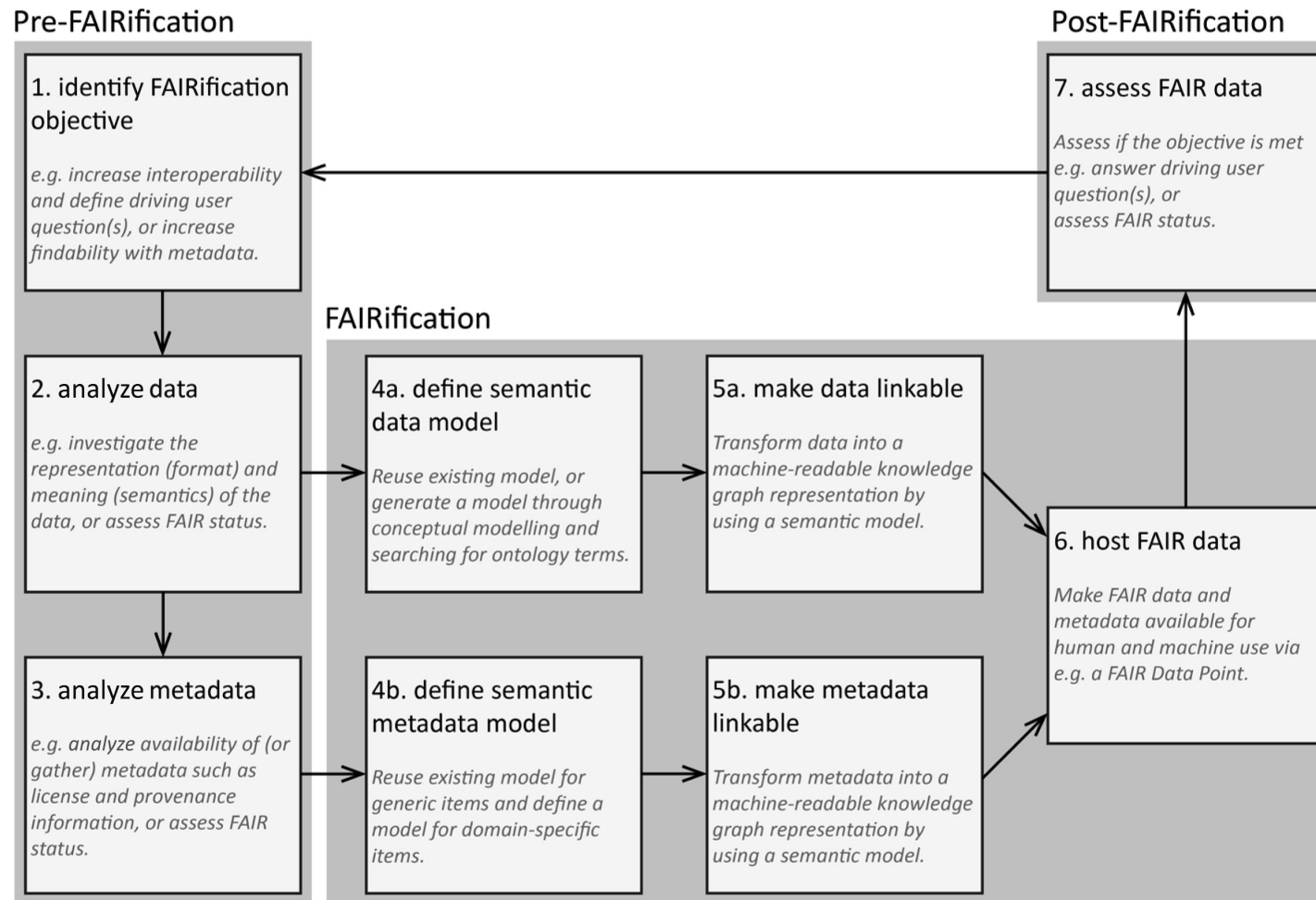


We need to describe clear **access** and **reuse** constraints for our data

Solution: the FAIR Guiding Principles



The FAIRification Workflow



A Generic Workflow for the Data FAIRification Process

Annika Jacobsen¹, Rajaram Kaliyaperumal¹, Luiz Olavo Bonino da Silva Santos²,
Barend Mons^{1,2}, Erik Schultes², Marco Roos¹ & Mark Thompson¹

¹Leiden University Medical Center, Leiden, 2333 ZA, The Netherlands
²GO FAIR International Support & Coordination Office (GFISCO), Leiden, The Netherlands



FAIRification Example

“We want to use our data to predict the disease course of a patient. We want our data to be interoperable with external sources. Hence, by using the potential of hidden knowledge in research data, we want to identify new treatments for the patient’s disease.”

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FAIRification Example

“We want to use our data to **predict the disease course of a patient**. We want our data to be **interoperable** with **external sources**. Hence, by using the potential of **hidden knowledge** in research data, we want to **identify new treatments** for the patient’s disease.”

FAIRification Challenges

- **What** activities are needed to achieve each request?
- **Who** are responsible for each activity?
- **How** different expertise should collaborate?
- **How** desired qualities can be achieved?
- **What** domain concepts needs to be modelled?



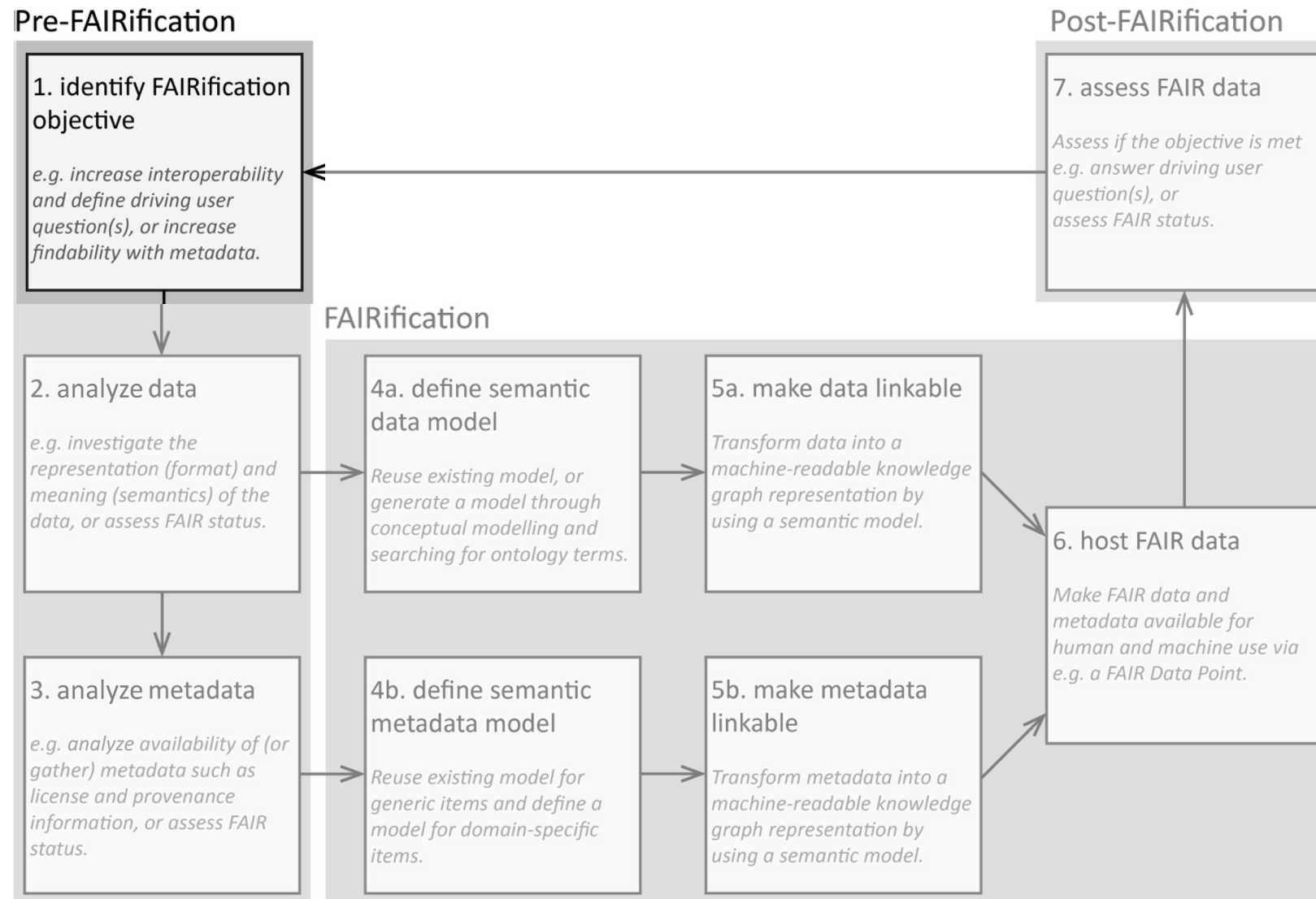
Proposal: use Goal-Modelling to support FAIRification

Goal-models to support **communication**,
planning and **guiding** of FAIRification



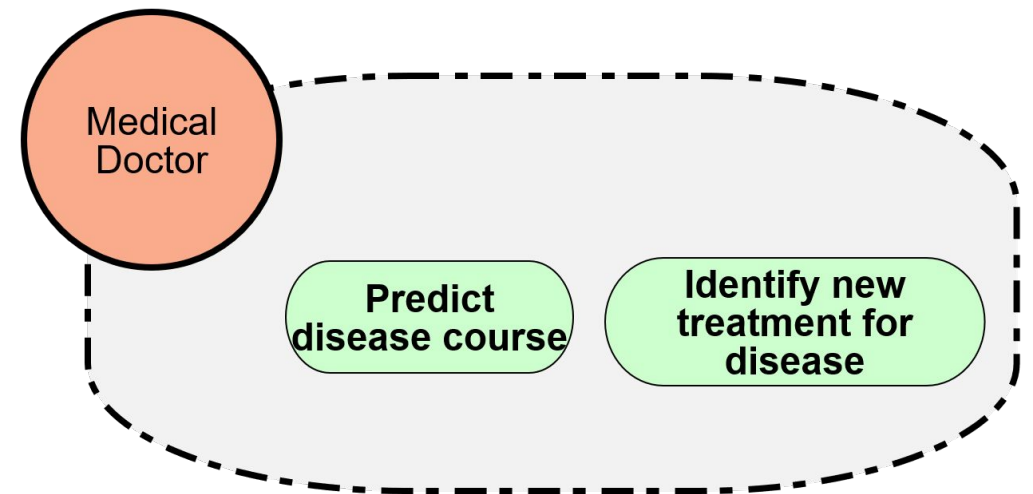
- Paradigm shift: **why** and **how** instead of **what**
- Help the research to get answers in a methodological way.

FAIRification - Conceptual Modelling



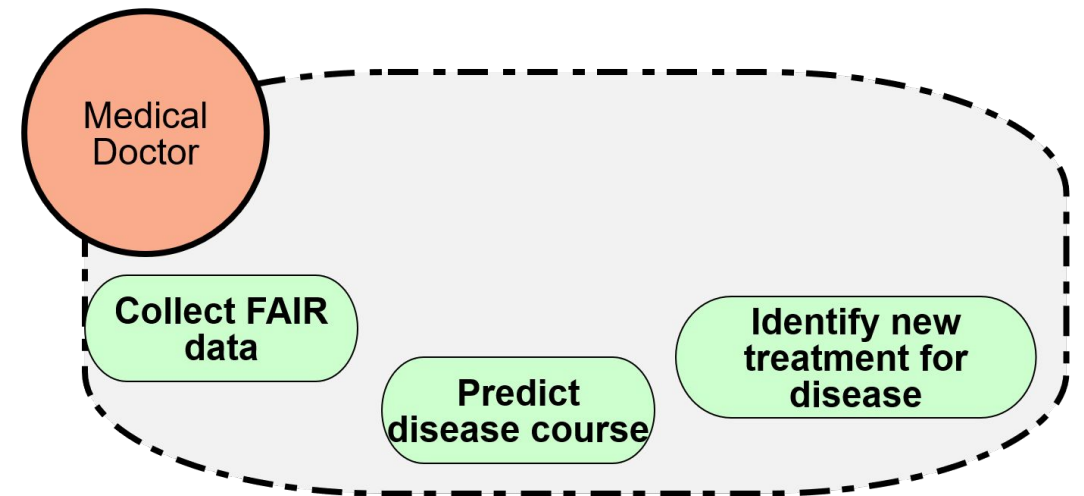
FAIRification Example

“We want to use our data to **predict the disease course of a patient**. We want our data to be interoperable with external sources. Hence, by using the potential of hidden knowledge in research data, we want to **identify new treatments** for the patient’s disease.”



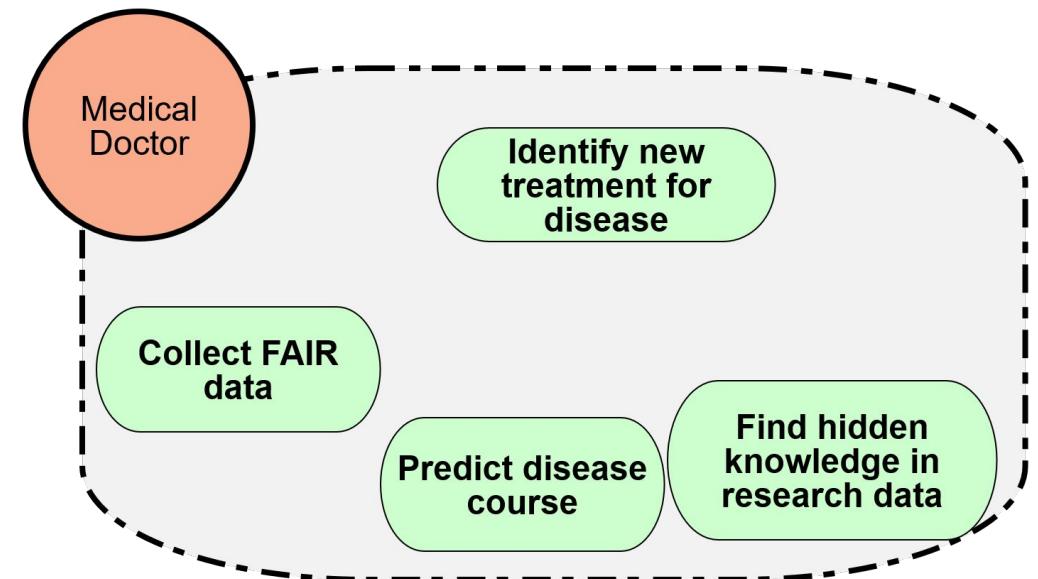
FAIRification Example

“We want to use our data to **predict the disease course of a patient**. We want our data to be **interoperable** with **external sources**. Hence, by using the potential of hidden knowledge in research data, we want to **identify new treatments** for the patient’s disease.”



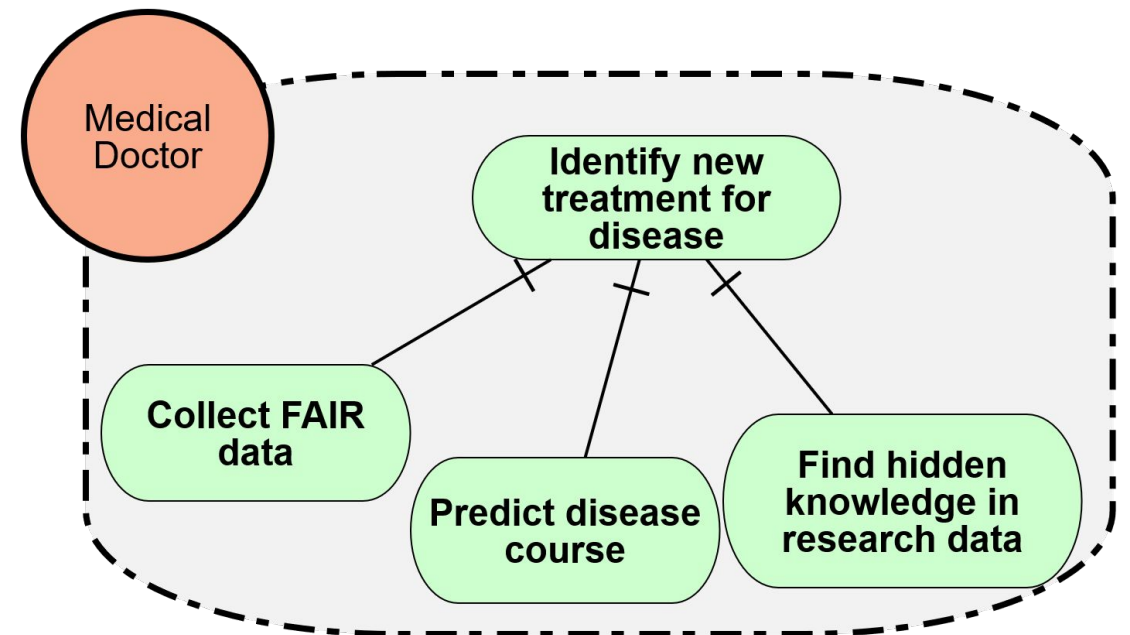
FAIRification Example

“We want to use our data to **predict the disease course of a patient**. We want our data to be **interoperable with external sources**. Hence, by using the potential of **hidden knowledge** in research data, we want to **identify new treatments** for the patient’s disease.”



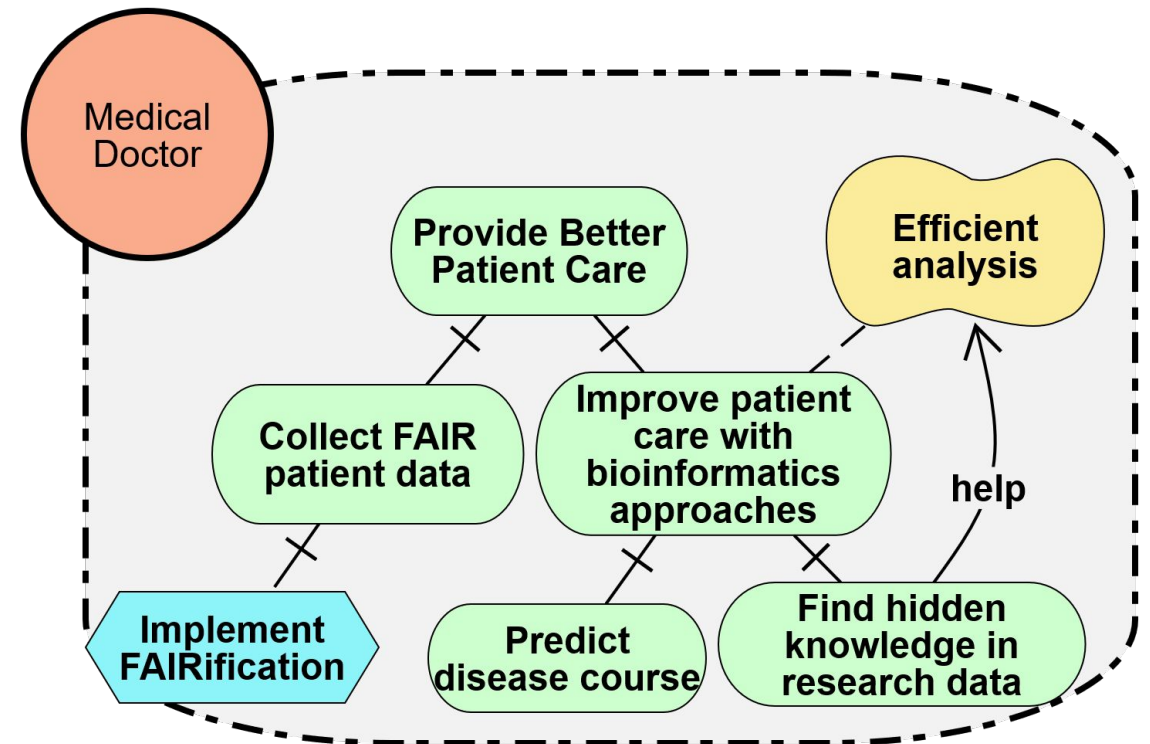
FAIRification Example

“We want to use our data to **predict the disease course of a patient**. We want our data to be **interoperable with external sources**. Hence, by using the potential of **hidden knowledge** in research data, we want to **identify new treatments** for the patient’s disease.”

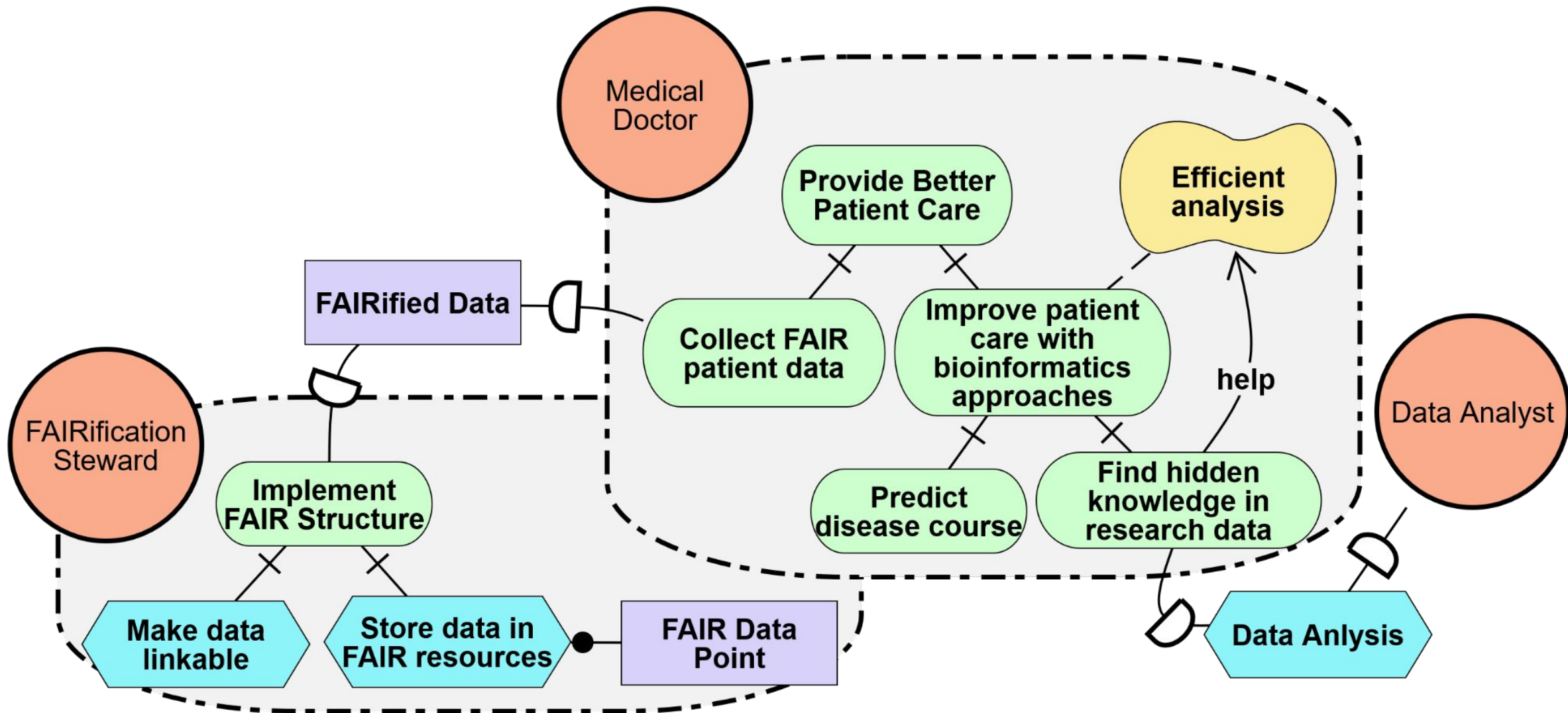


FAIRification Example

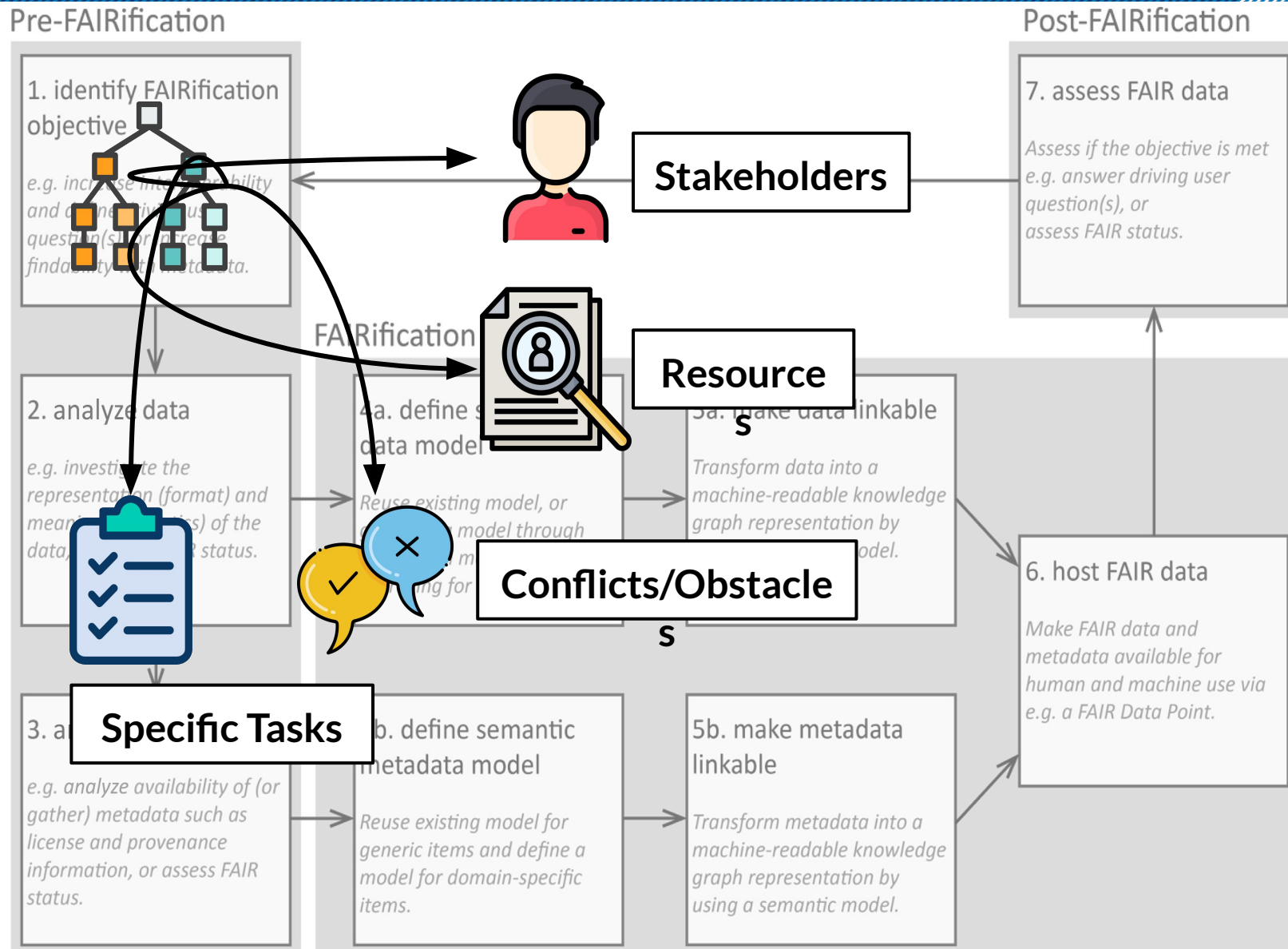
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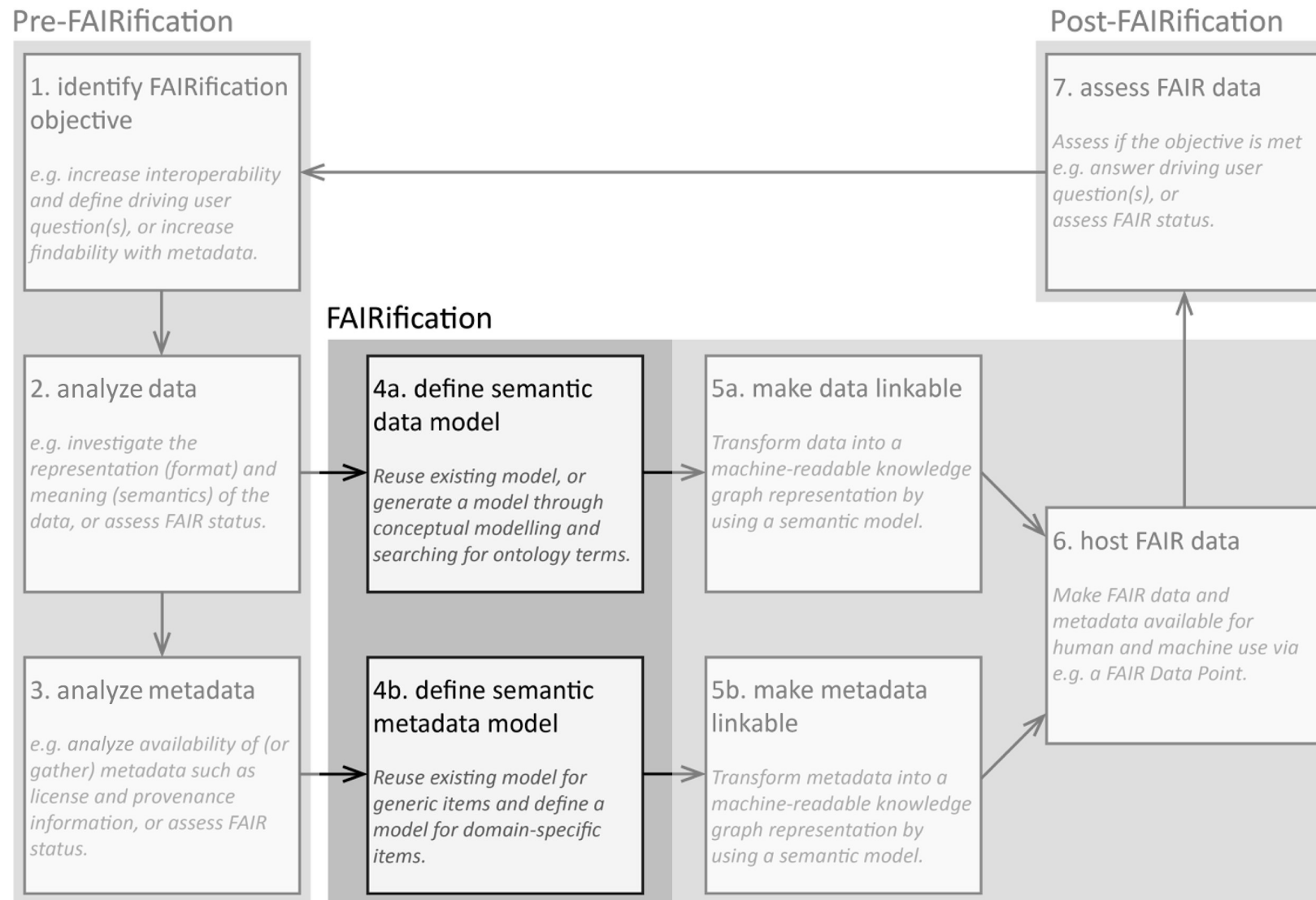
FAIRification Example



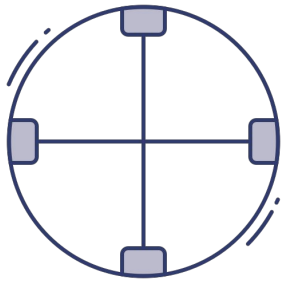
FAIRification with Goal Models



FAIRification - Conceptual Modelling



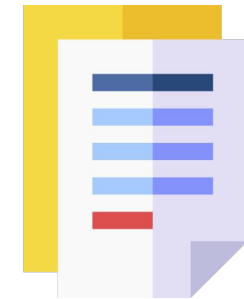
Conceptual modelling requires **collaboration** between **domain experts** and **modellers**



Define the scope and concepts based on the research question

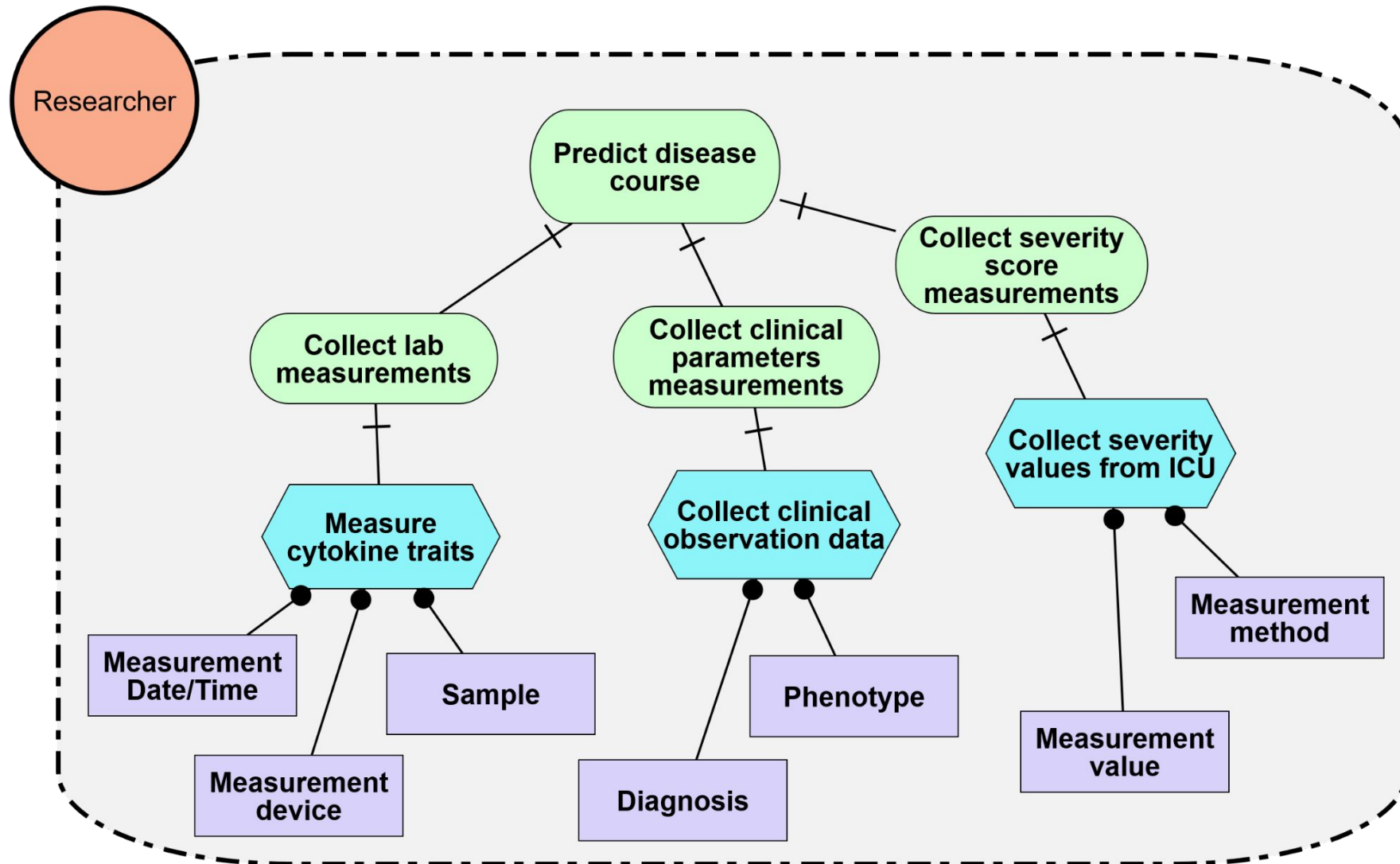


Align the conceptual model with FAIRification goals

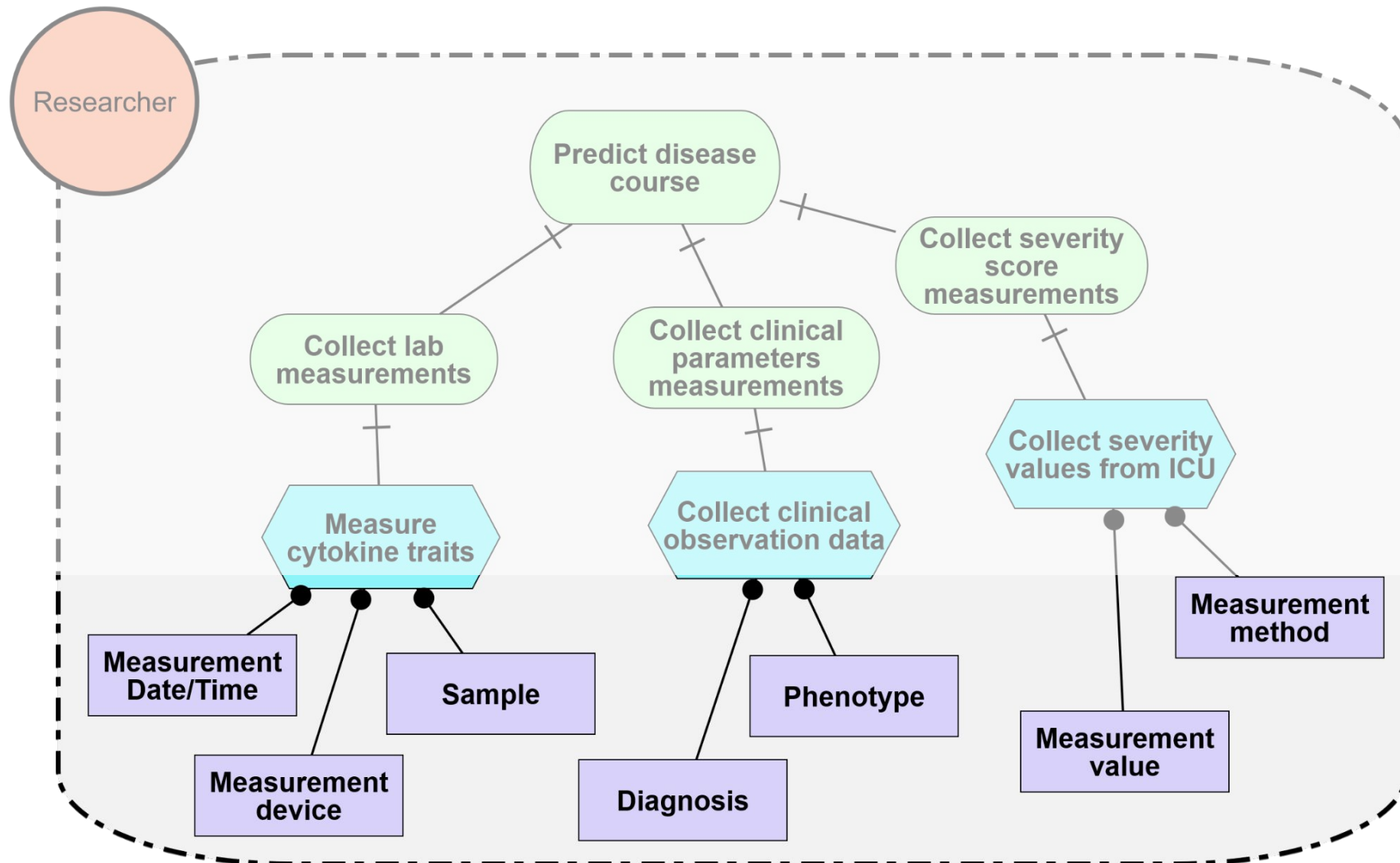


Provide good documentation for modelling decisions

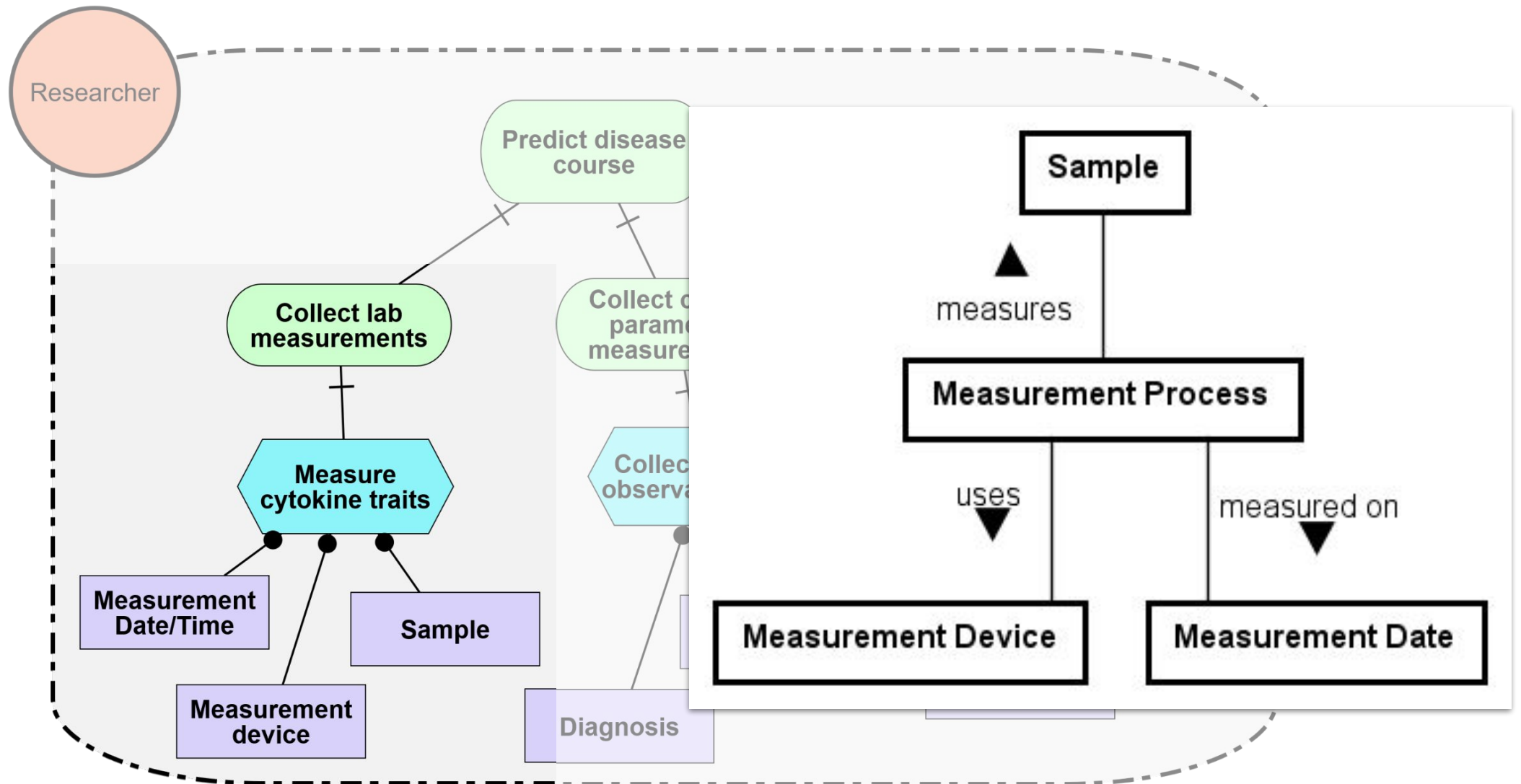
FAIRification - Conceptual Modelling Example - Different Perspective



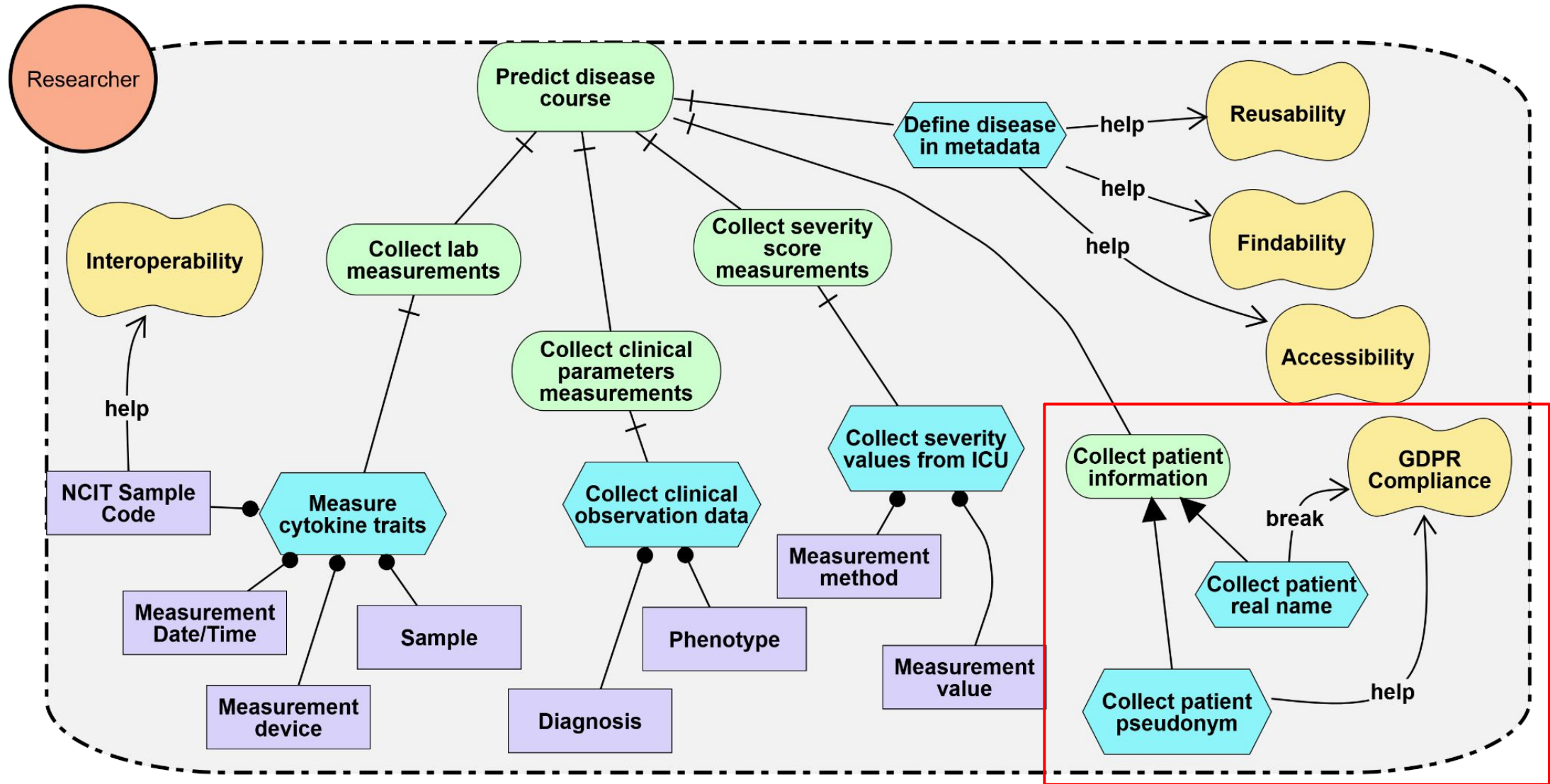
FAIRification - Conceptual Modelling Example - Different Perspective



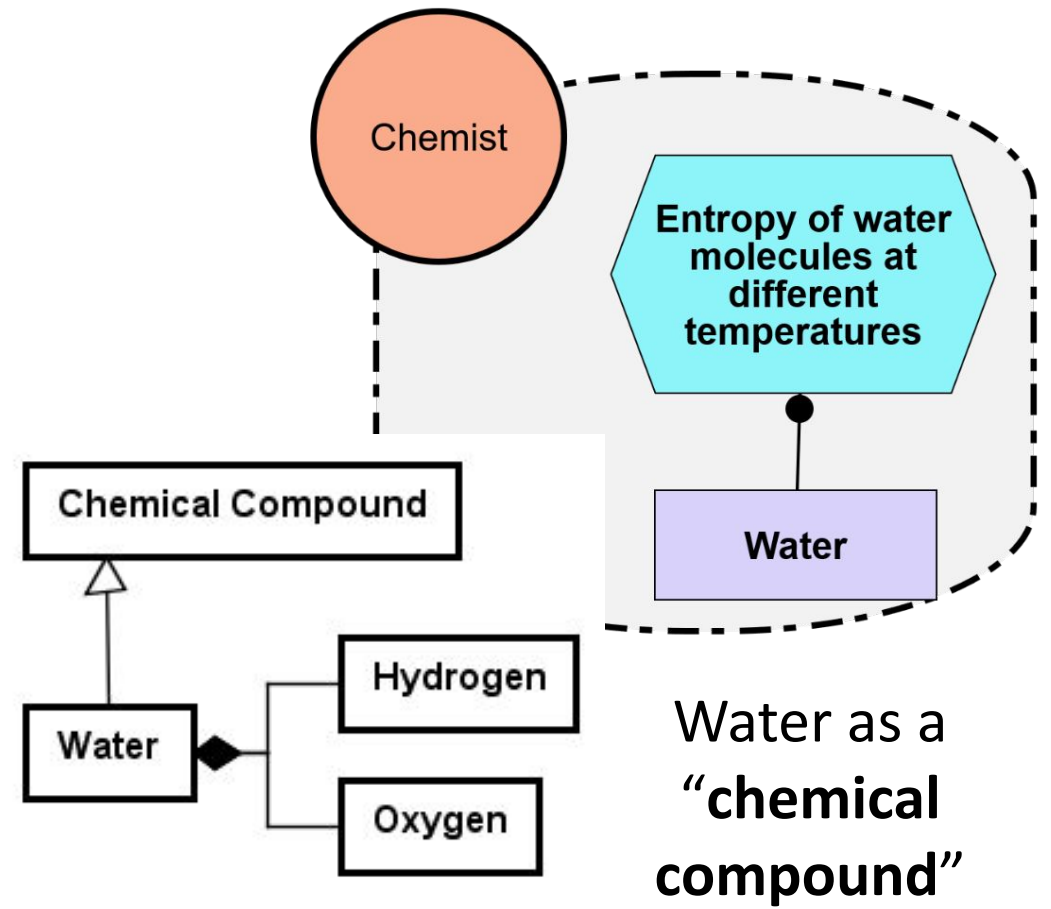
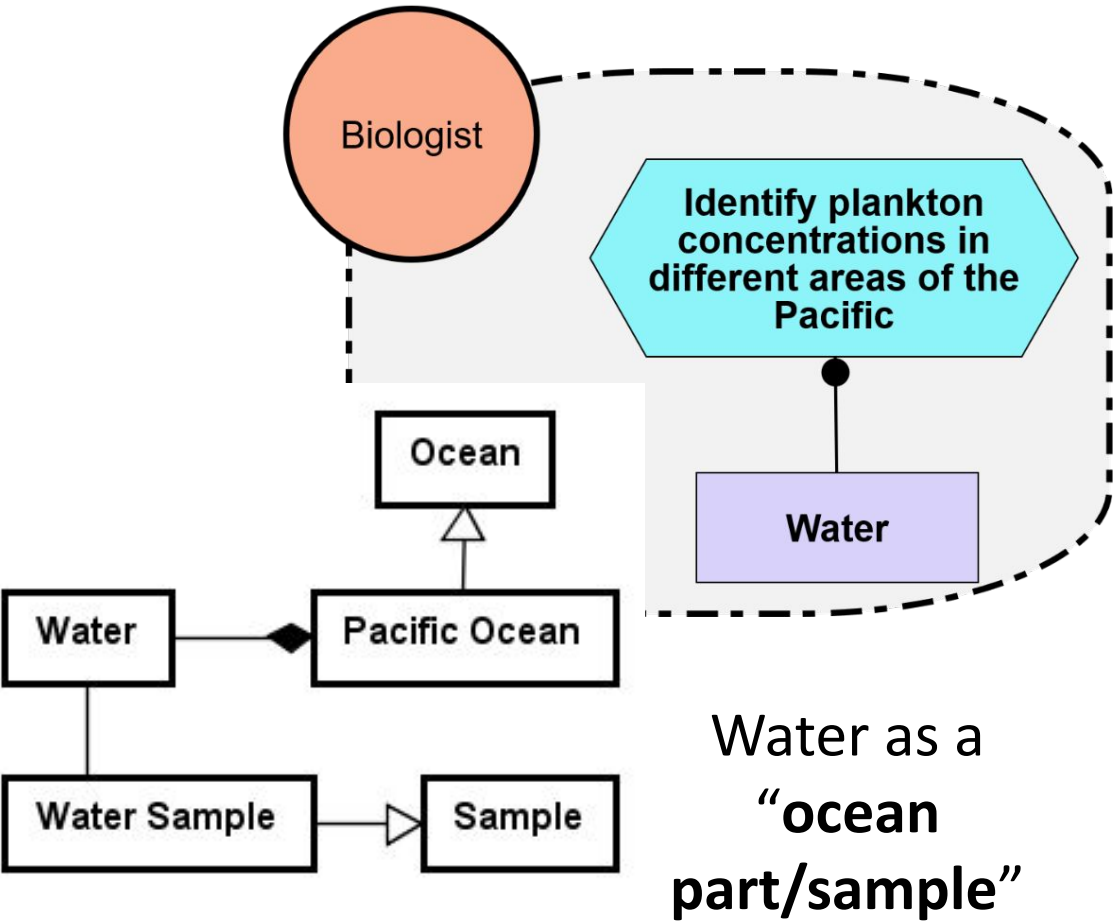
FAIRification - Conceptual Modelling Example - Different Perspective



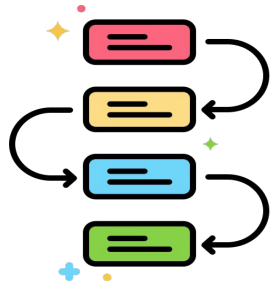
FAIRification - Conceptual Modelling Example - Different Perspective



FAIRification - Conceptual Modelling Example - Different Perspective



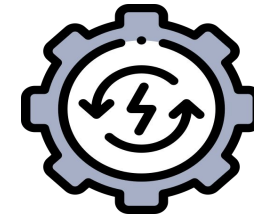
Final Results



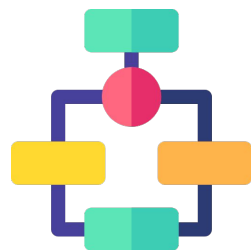
FAIRification Plan



FAIRification Documentation



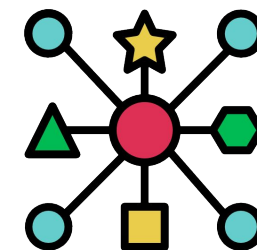
FAIRification Reusable "Recipe"



Conceptual Model aligned with the FAIRification Plan

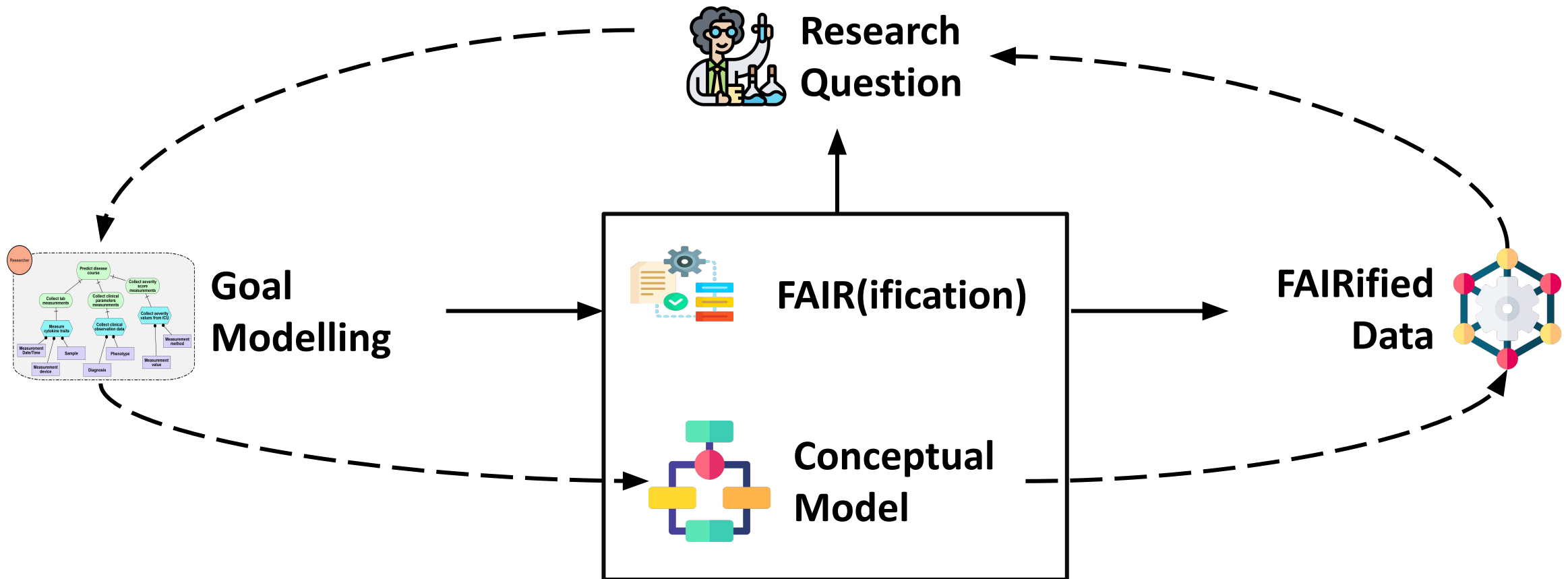


Conceptual Model Documentation



Interoperable and Reusable Conceptual Model

Proposal Overview



Conclusion



FAIRification can help researchers to find hidden knowledge



FAIRification can benefit from formal methods for efficient communication among experts



FAIRification is as complex activity



Goal modelling can aid FAIRification planning



Conceptual Models should be aligned with the research question goals

Next Steps



Initial Stage



Refinement, Testing, Adjustment and Validation



Goal-modelling - Ontology Engineering

References

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