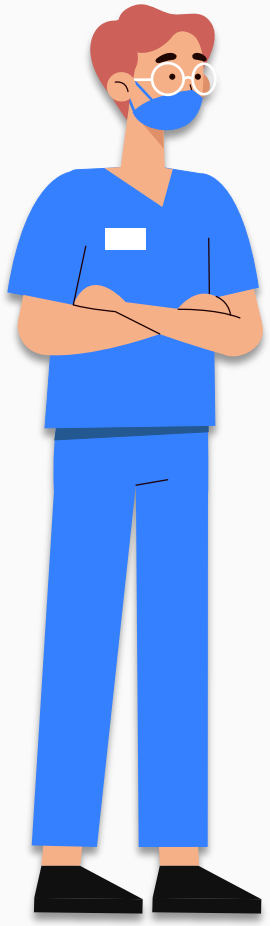
Accurate rare disease diagnostics for every child

Problem

Children with **rare diseases often** receive **no diagnosis** due to lack of data



Currently, **70%** of the children with rare diseases **don‘t receive** the **correct diagnosis**, and therefore **no treatment**

Why?

Data is **saved in local databases** and therefore **not accessible** to other hospitals

This is due to **privacy and security concerns** regarding patient data and a **lack of digitalization**

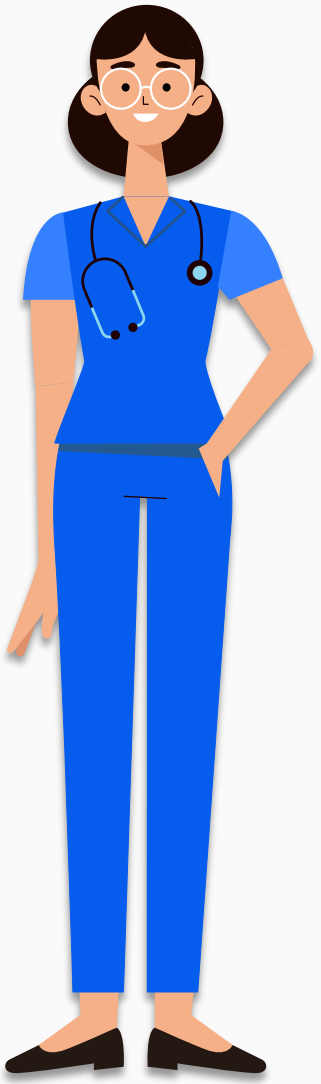
Our Solution in Short

AIME **helps** doctors to **diagnose rare diseases accurately** and gives them **access to** the **contact information** of **doctors who treated similar cases**

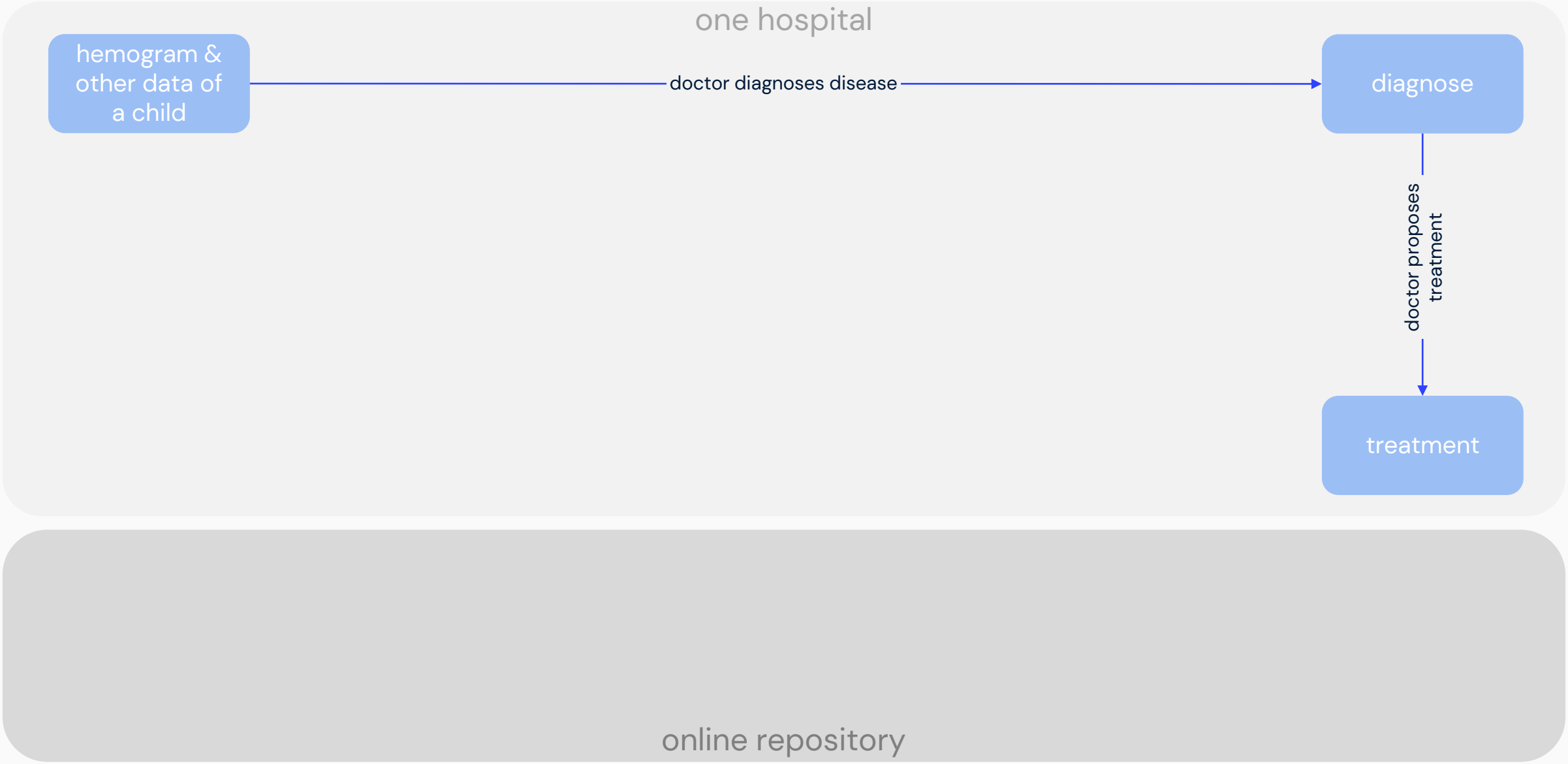
1. Accurate diagnosis tool

2. Advisory for possible treatments

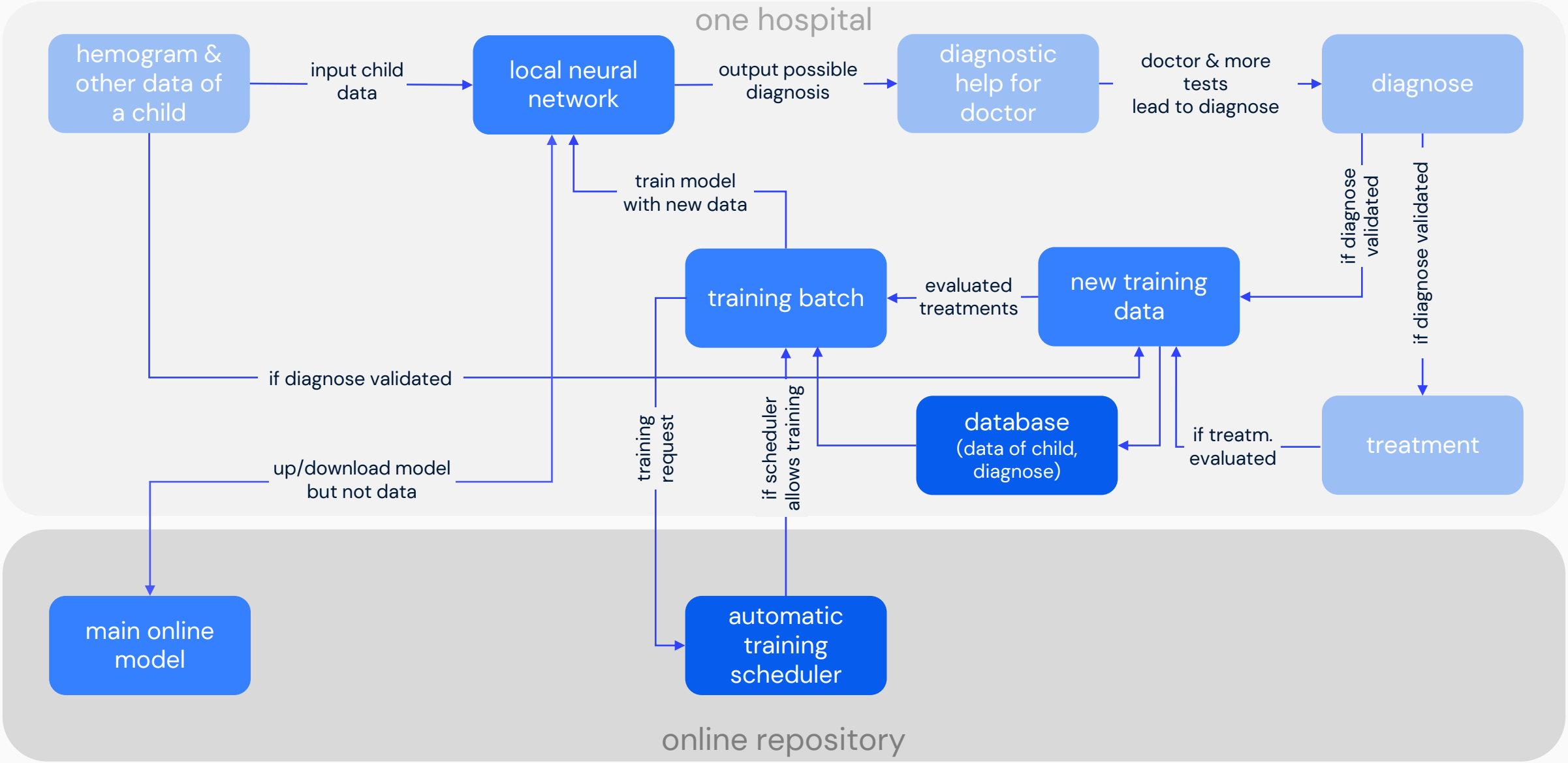
3. Interconnection of hospitals treating similar cases



Current Situation



Our Final Solution



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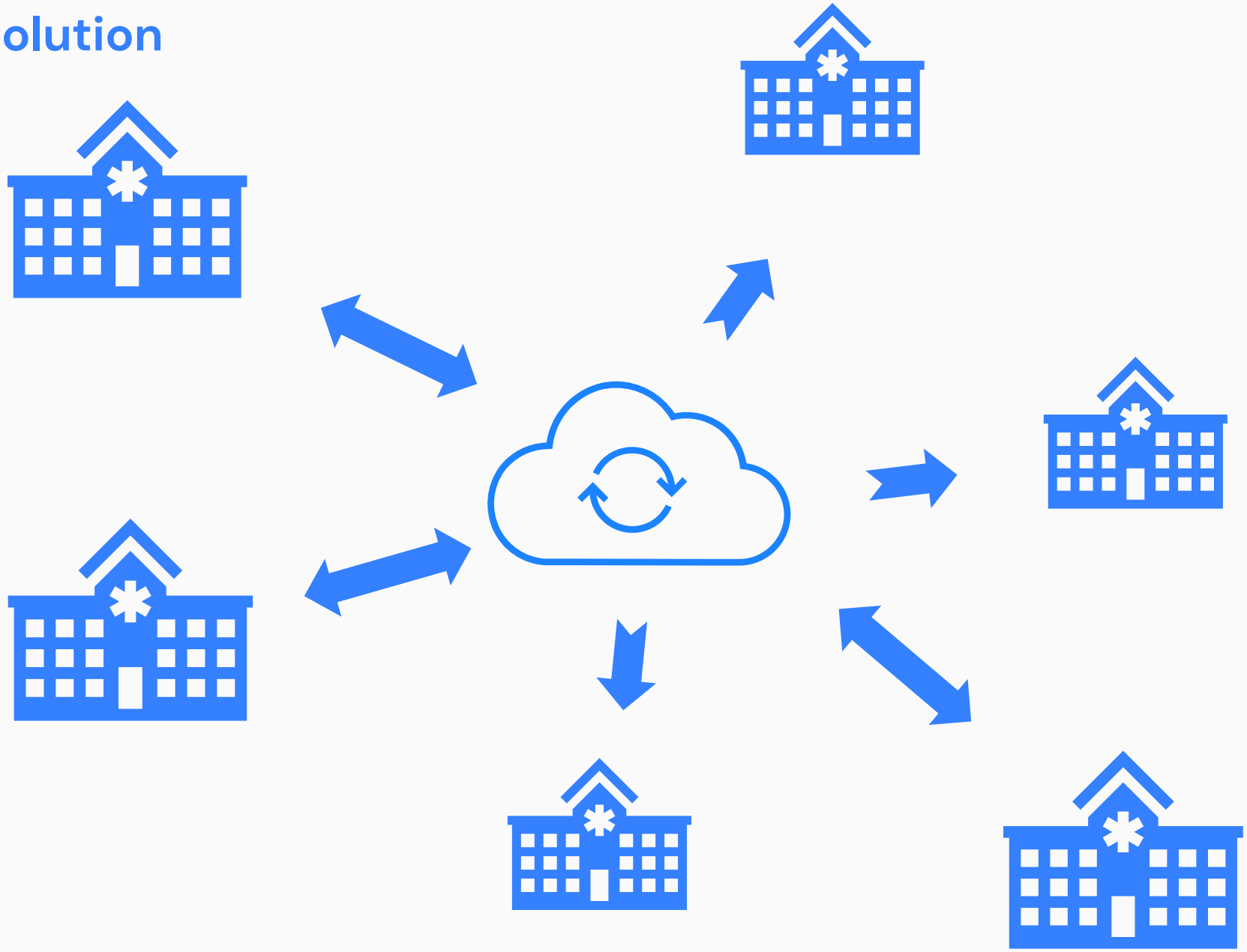
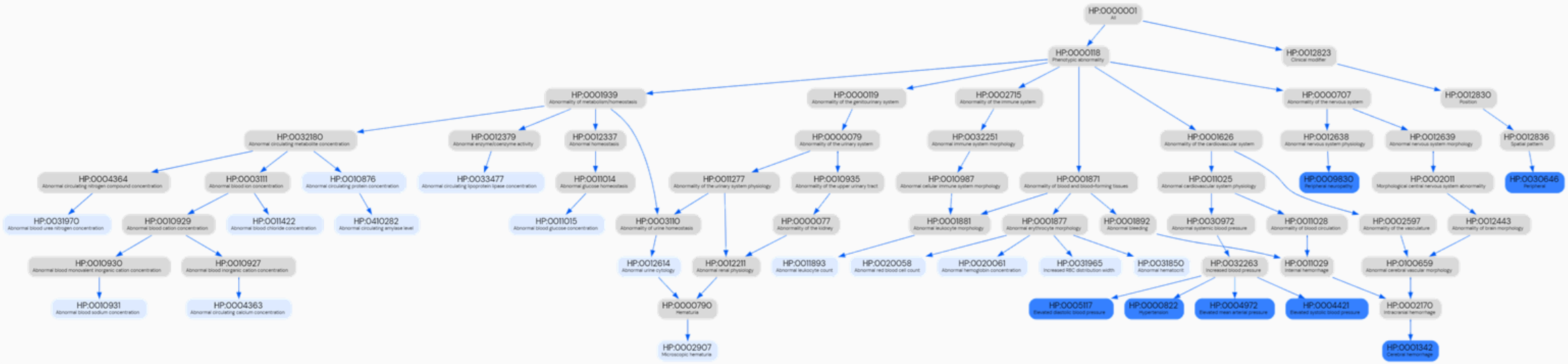


Tech – Datastructure

Data of lab events and diagnoses are mixed

Tree like structure

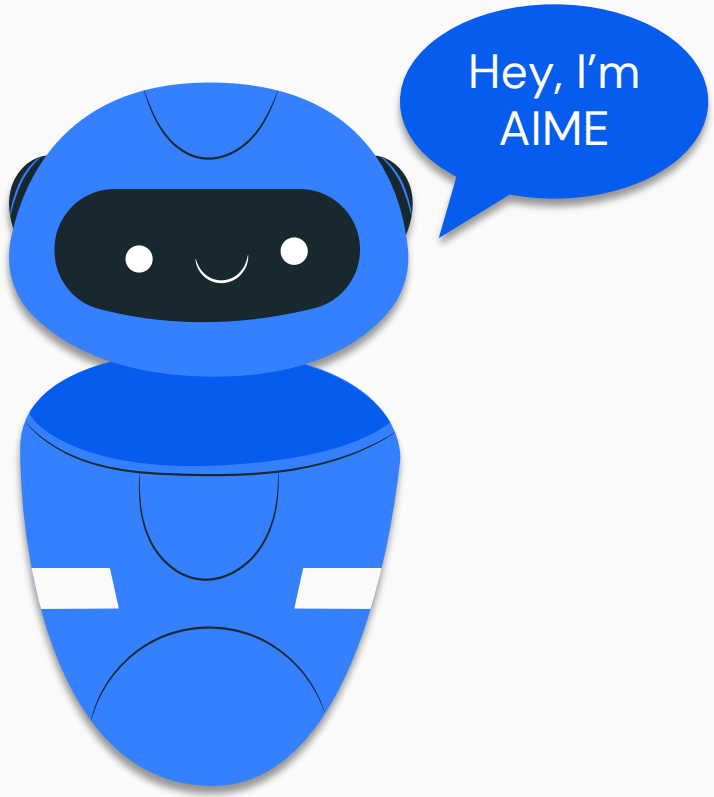


Tech – Most Confident Solution

Problem: large variance in very little data

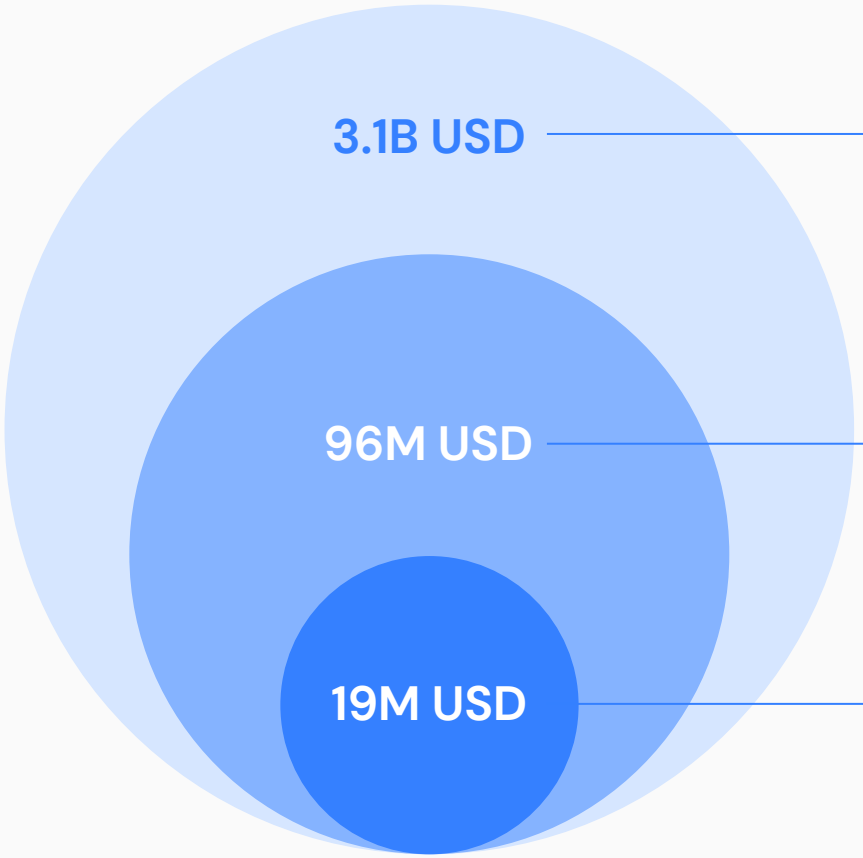
Solution -> modular architecture:

- Optional autoencoder, produces pretrained encoder
- Optional activation of parent nodes
- Optional classification on ICD-9



Market Analysis

There is a **strongly growing market** for our solution



TAM

0.5% (our operating charge) of money spent on healthcare of children with rare diseases worldwide[1]

SAM

0.5% of money spent on healthcare of children with rare diseases in Germany

SOM

20% market share (20% of SAM)

40%

9-year CAGR[2]

Sources:
1. https://cutt.ly/bGuE5WU
2. https://cutt.ly/7GuE2RS

Social Impact

We use **20%** of our yearly **revenue** to **empower hospitals in developing countries**

Our **yearly** expected **revenue** is **19M USD**

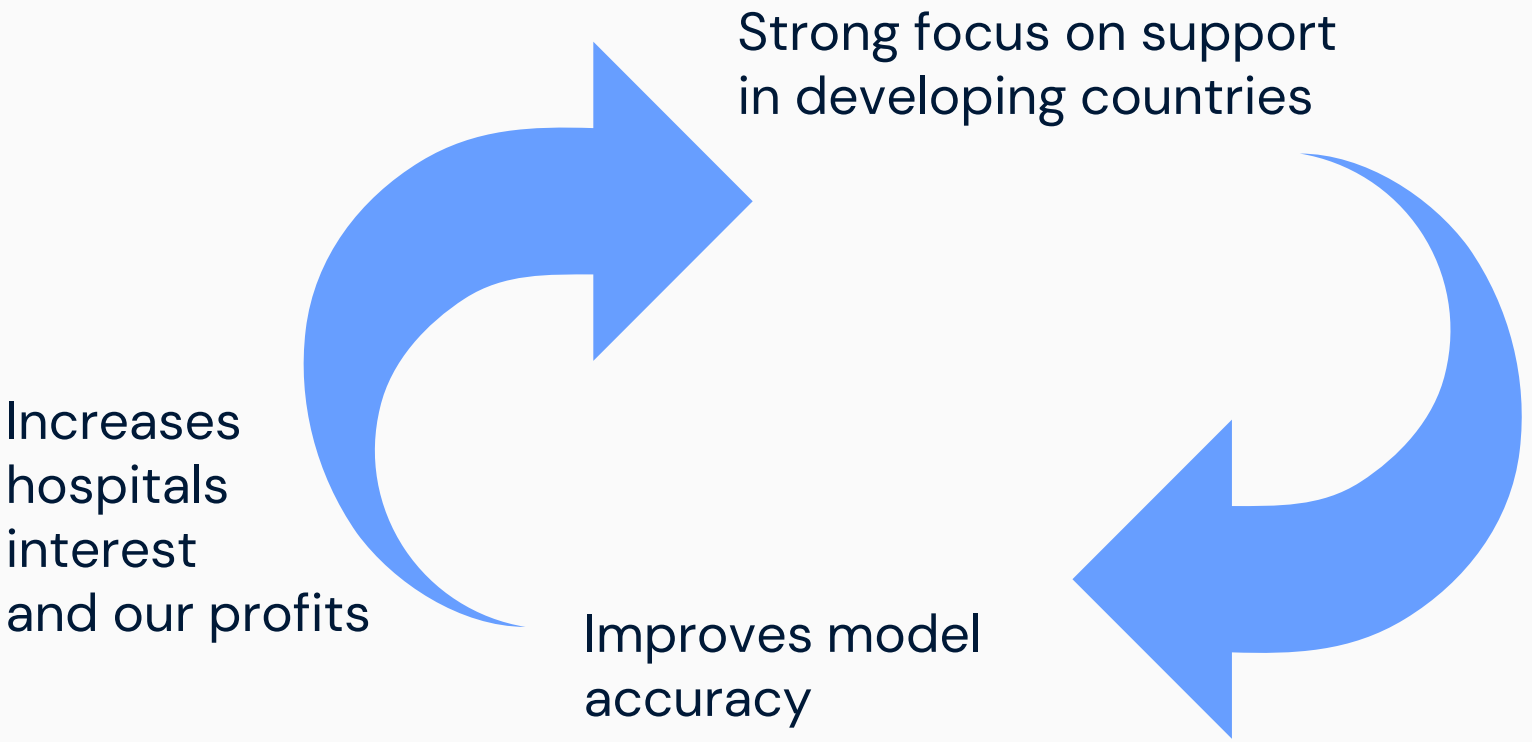
20% of yearly expected revenue comes up to **3.8M USD**

The **cost** of **equipping** a **hospital** in a **developing country** with our system is about **100,000 USD**

Therefore we can support **38 hospitals** in developing countries **annually**

Social Impact

Guaranteed social impact through **mutual benefits** and **helping children with rare diseases** to **get the right diagnosis**



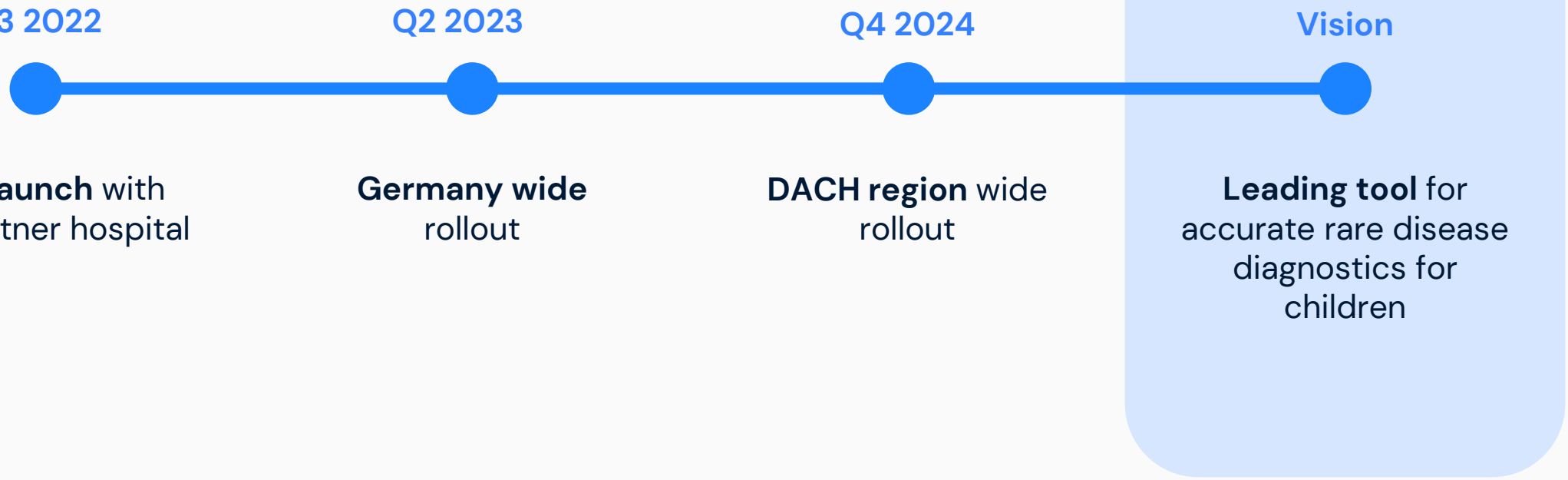
Competitor analysis

Our **secure interconnected diagnosis tool** puts us **ahead of competition**

	aime	SCREEN 4CARE	STANFORD SCHOOL OF MEDICINE	HEALTH UNIVERSITY OF UTAH
Companies				
Product	secure rare diseases diagnosis & contact to doctors who treated similar cases	rare disease diagnosis based on: genetic newborn screening, digital technologies	automatically and quickly suggest a list of genes for interpretation	rapid diagnosis of rare disorders in critically ill children
Type	Start-Up	Project	University research	University research
Accurate diagnosis tool	✓	✓	✓	✓
Working with genes and hemogram	✓	✗	✗	✗
Data security solution	✓	✓	−	−
Interconnection of hospitals	✓	−	✗	✗

Roadmap

We **first** scale to the **DACH** region **then** to **Europe**



aime

Accurate rare disease diagnostics for every child

Robin

AI

Malte

Tech

Flo

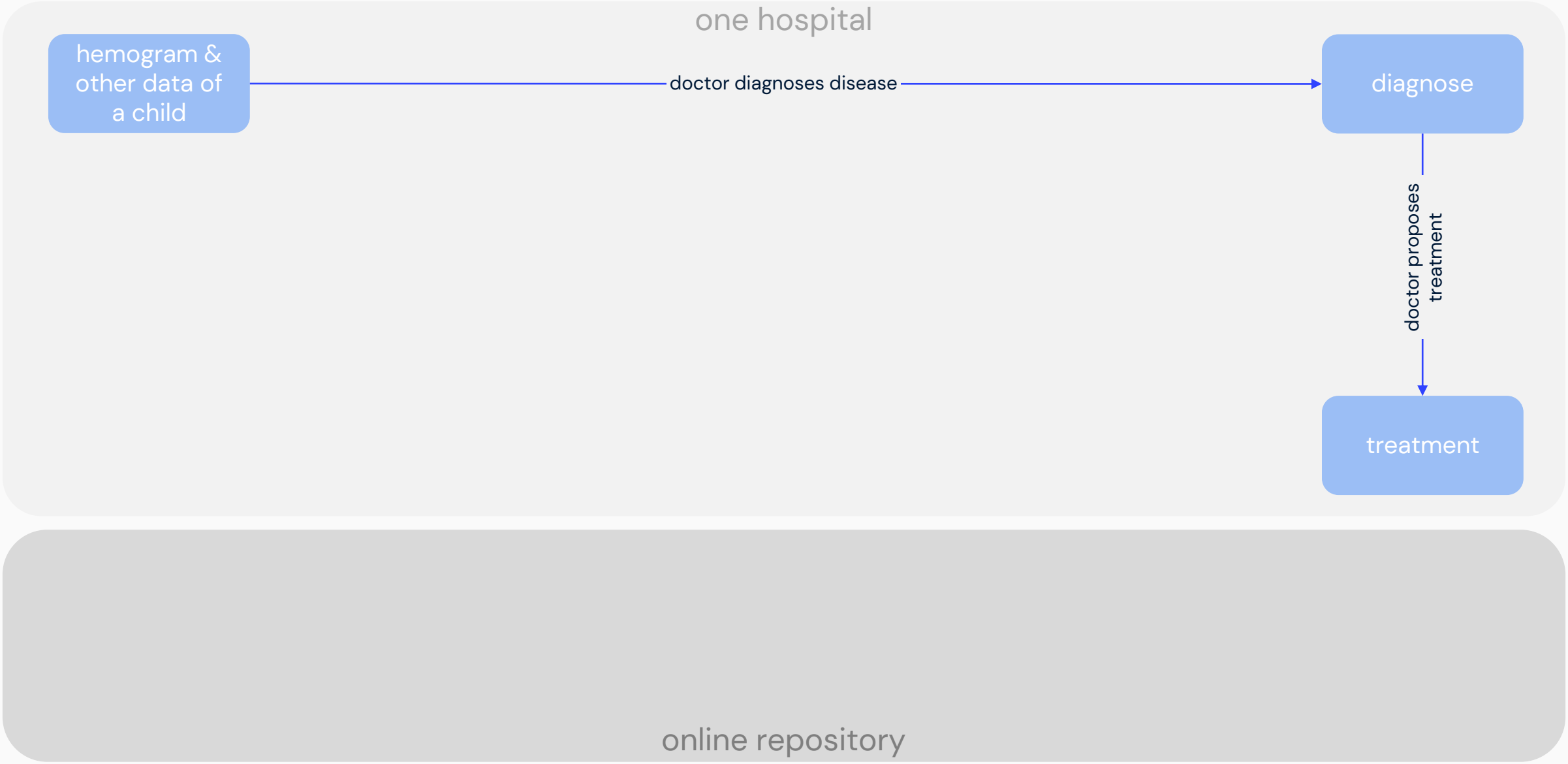
Product

Jakob

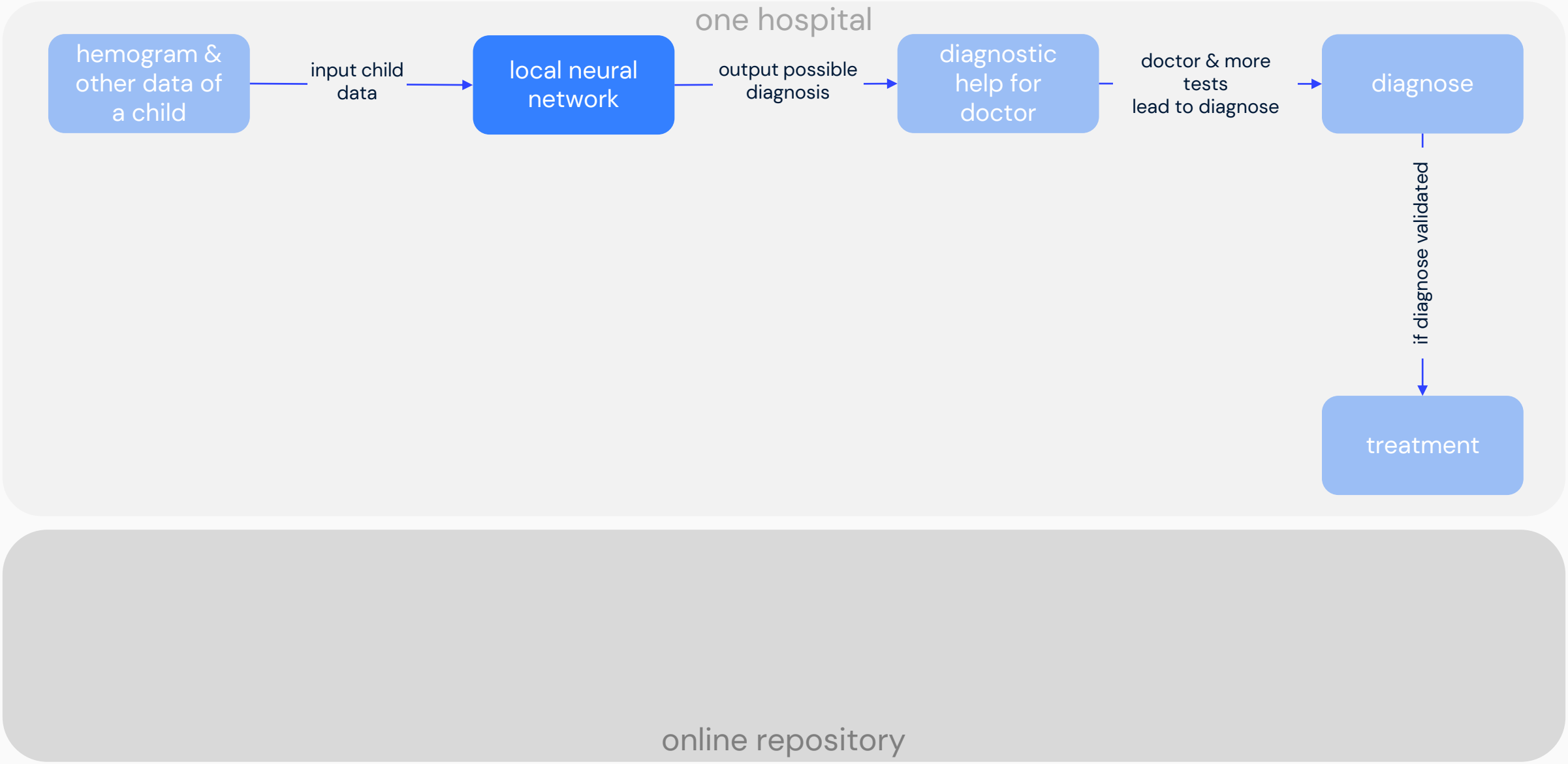
Business

Backup

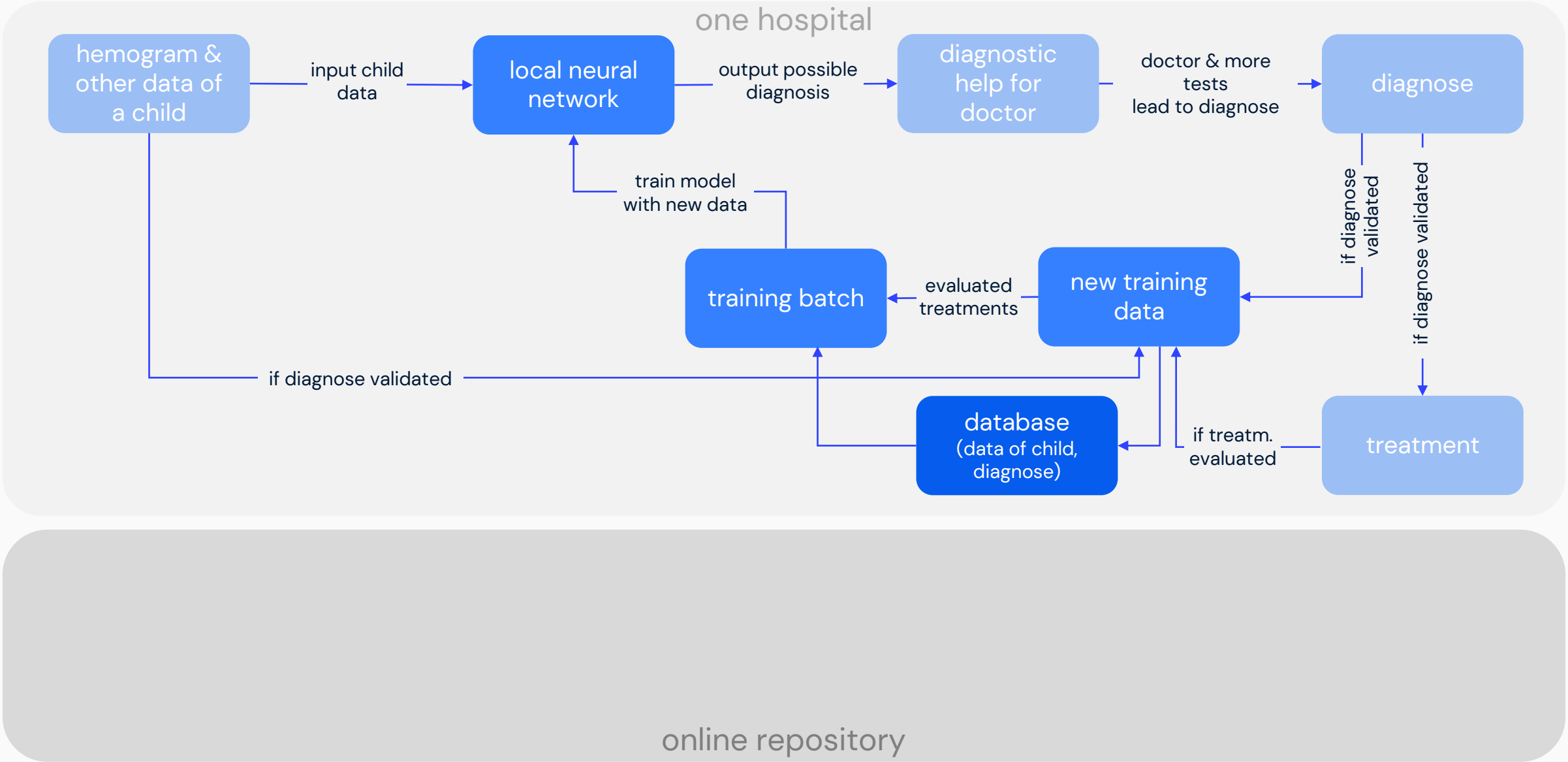
Current Situation



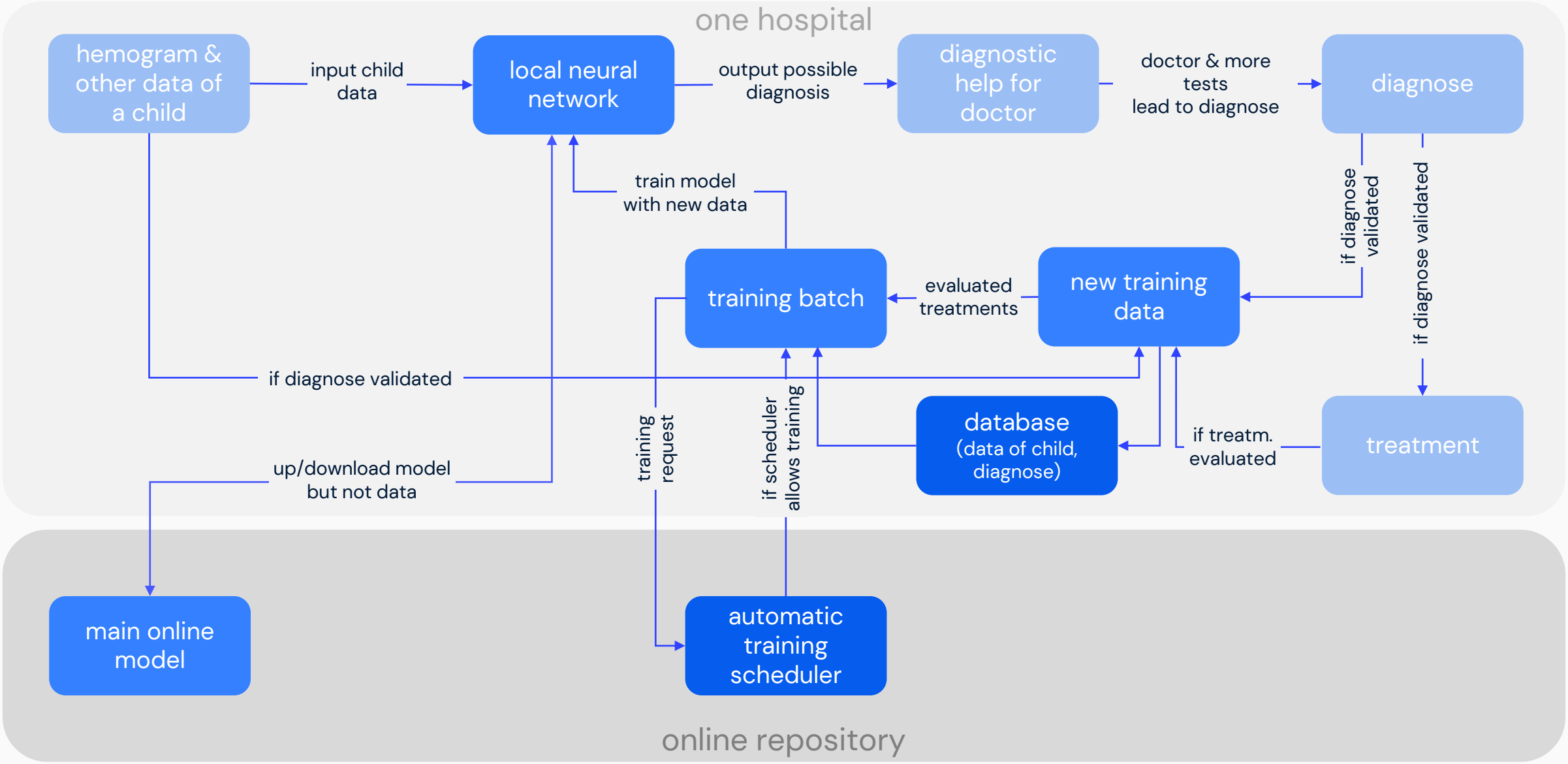
Part 1: Local AI Assistant



Part 2: Local AI Assistant with training



Part 3: Securely Connected AI Assistant



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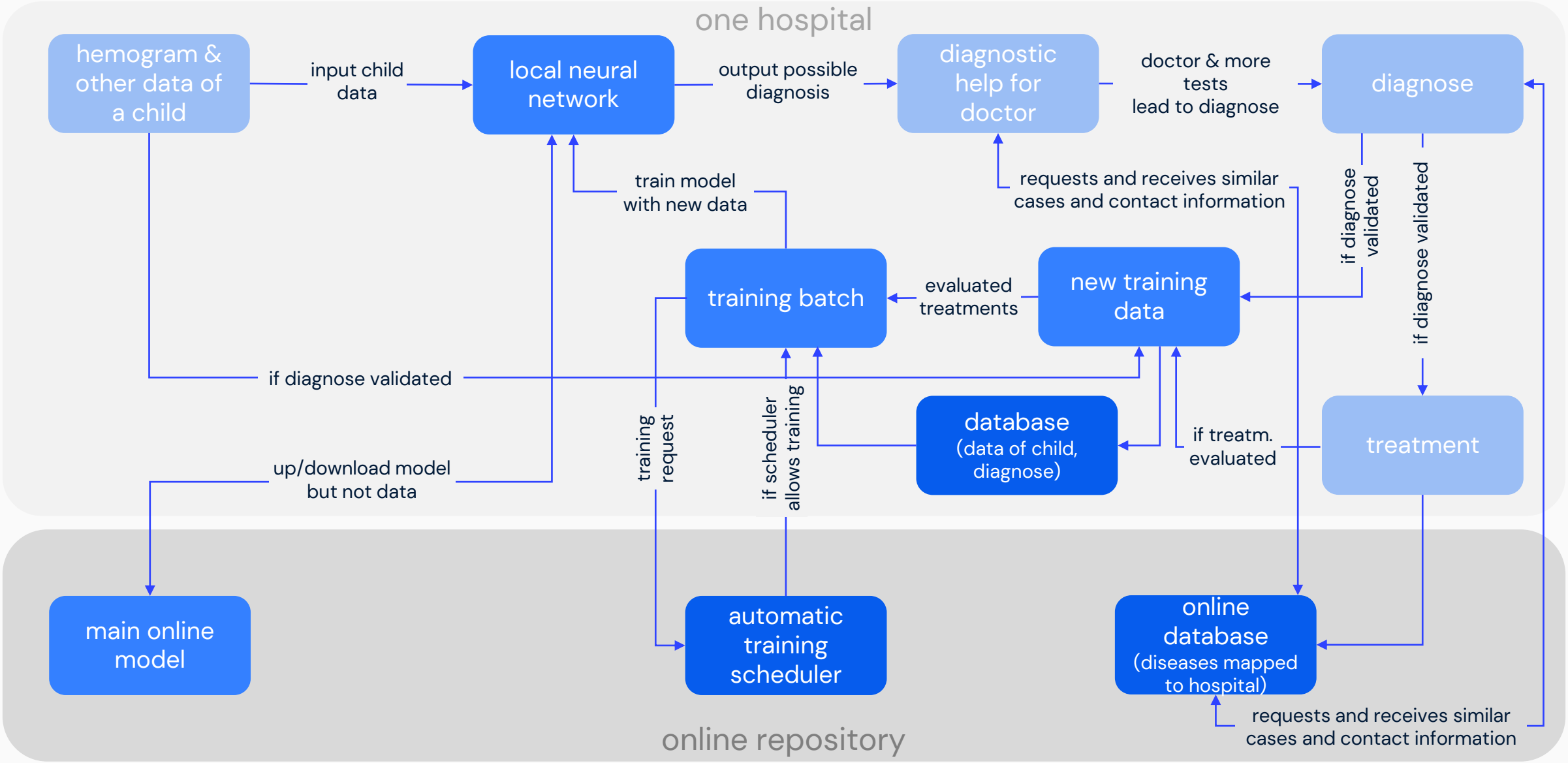

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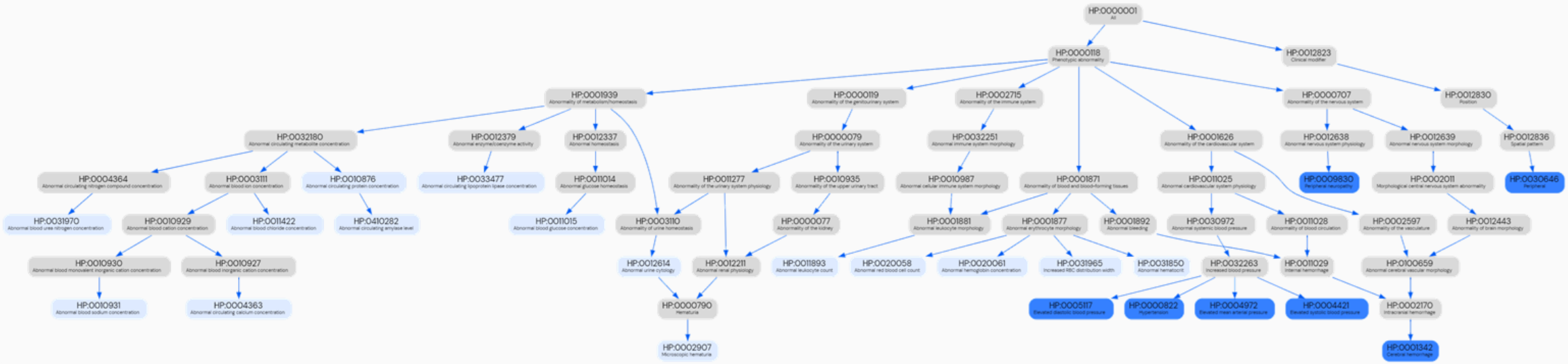
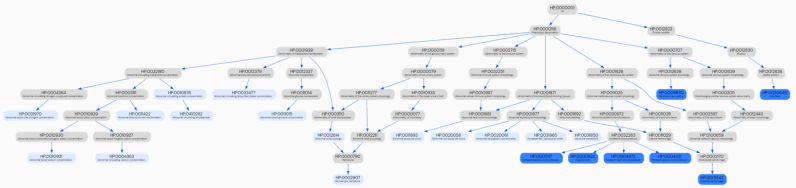


Tech – 1st Iteration

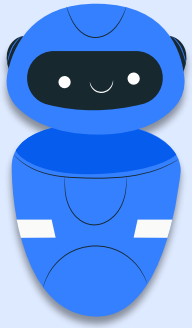
First preselection of possible diagnoses



Architecture: Fully Connected Neural Network, multi-hot encoding as I/O vector

HPO Features: Labevents

FCN



HPO Features: Diagnoses

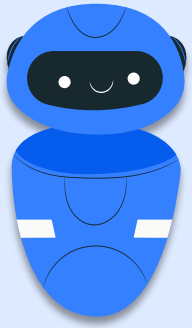
Tech – 2nd Iteration

Optional selection of parent nodes in in/output

Architecture: Fully Connected Neural Network, multi-hot encoding as I/O vector

HPO Features: Labevents

FCN

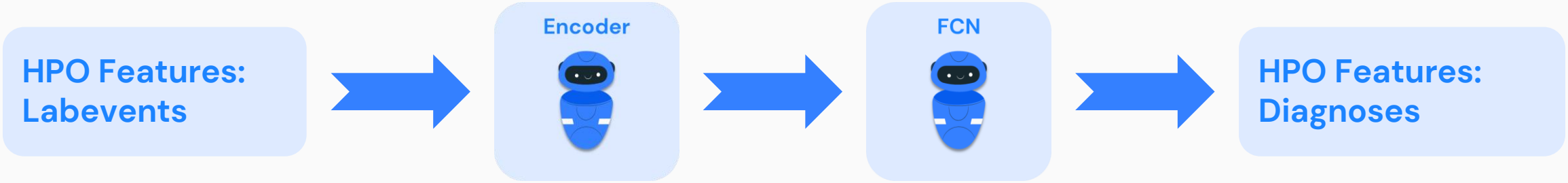


HPO Features: Diagnoses

Tech – 3rd Iteration

Optional pretrained encoder

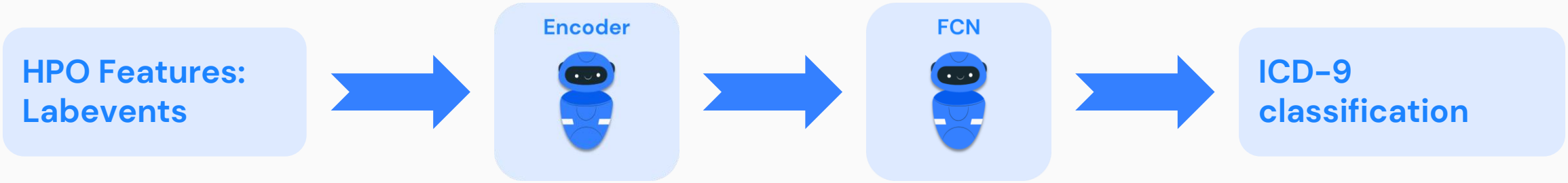
Architecture: autoencoder –> encoder + Fully Connected Neural Network



Tech – 4th Iteration

Optional final classification on ICD-9 data

Architecture: autoencoder -> encoder + Fully Connected Neural Network



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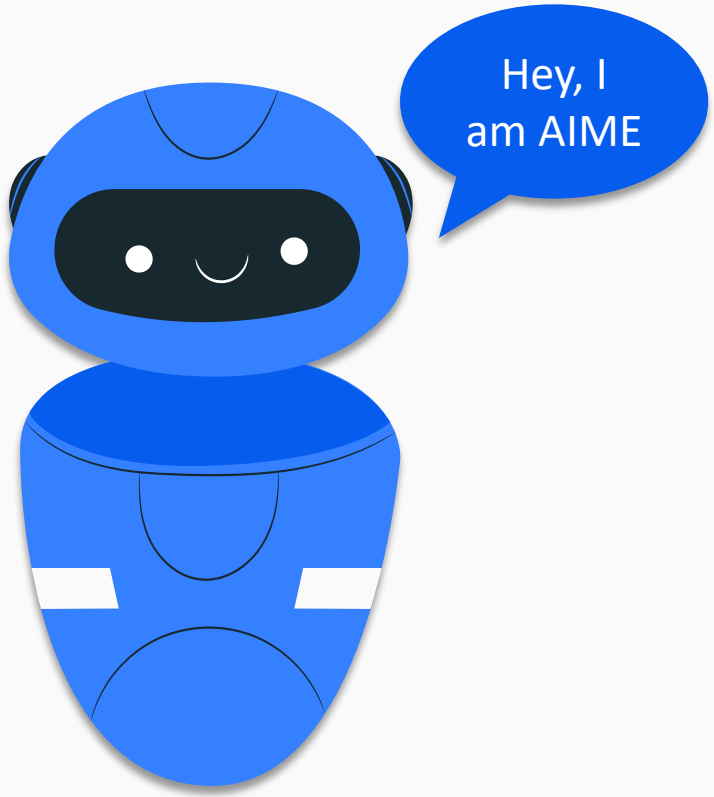


Tech – Future Possibilities

Utilize power on Convolutional Neural Networks

Architecture:

- Transformation of graph in structured adjacency matrix
- U-Net with residual connection to minimize information loss

Utilize power on Graph Neural Network

Architecture:

- Convolutional Graph Neural Network
- Edge to Node and Node to Edge updates
- Relationship of neighbouring nodes is trained

User Profile – Doctors

With our solution, we **cater to** multiple needs of **doctors**

Doctors who **struggle with the diagnosis** of a rare disease

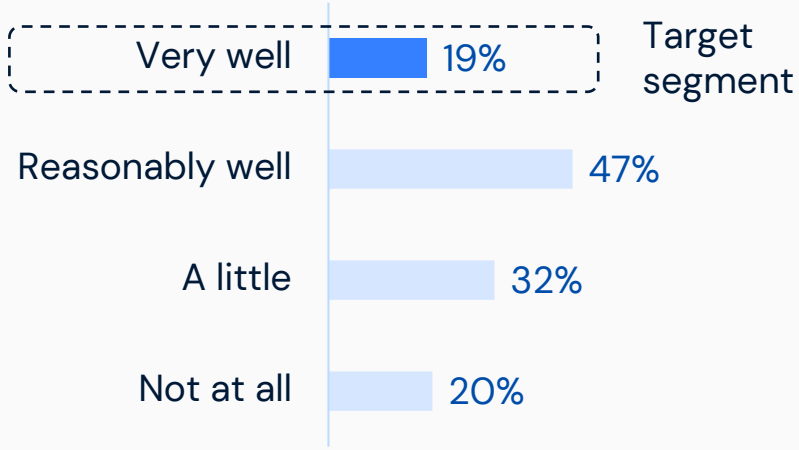
Doctors who need **advice** on **how to treat** a specific rare **disease**

Doctors who want to **pool their knowledge** with others and **improve** their own **judgments**

Customer Profile and Benefits – Hospitals

We **target hospitals** that are **best prepared for** the adoption of **digital solutions**

Preparedness for digitalization



Key customer benefits

- Support for hospitals to make **accurate diagnoses** for rare diseases
- **Access collective knowledge** of rare diseases in neural network while maintaining **data security**
- Possibility to **treat more patients**

Our **customers benefit** from **global knowledge access** while keeping the **data of** their **patients secure** because the hemogram and the other genetic data never leaves the local hospital

Why now?

Strong **legislative tailwind** in **Germany** makes it the right time to enter this promising market

Krankenhaus-zukunftsgesetz

Enforces strong uptake of investments by hospitals into digital infrastructure

High growth market

The 9-year CAGR of the AI market in healthcare is estimated to be 40%

Business Model Canvas

Partners

NGO (Care-For-Rare, GA4GH)

Hospitals (paying & non paying)

Doctors

Activities

Provide accurate diagnoses

Connect hospitals in a data secure way

Resources

Hospitals training data

Middleware software

Value Prop.

Accurate diagnosis

Treatment proposals

Connect hospitals

Data security

Relationships

IT service team

Consulting

Channels

Referral through the NGO

Biz. dev. through social impact

Customers

Paying Hospitals

Developing country hospitals

NGO (Care-For-Rare, GA4GH)

Costs

Development, IT setup & service

Revenues

Hospital size according fee model

Company and Revenue Structure