# openEHR Industry

Rachel Dunscombe

15th January 2025

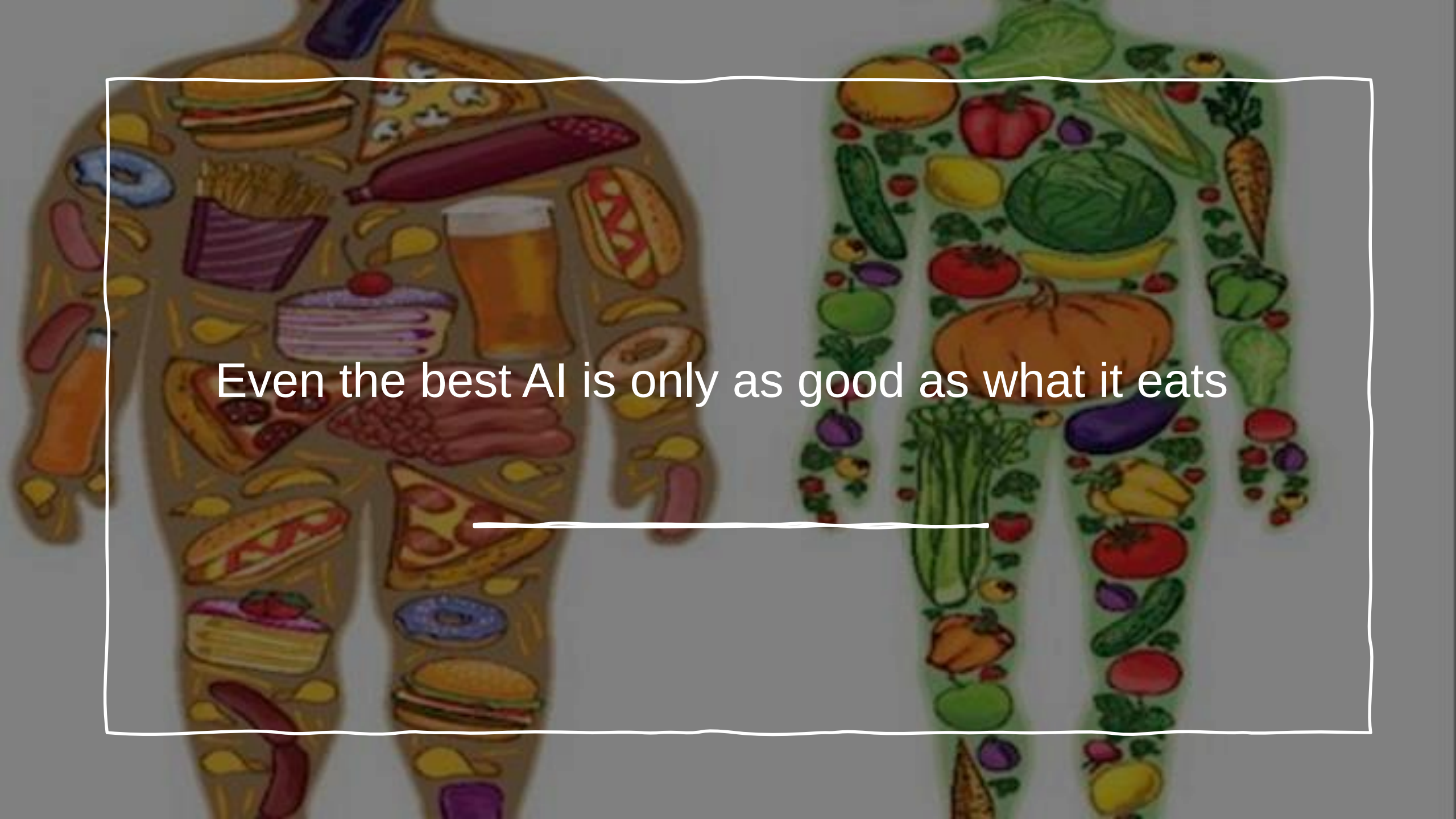
Empowering People. Connecting Lives.

# openEHR Industry

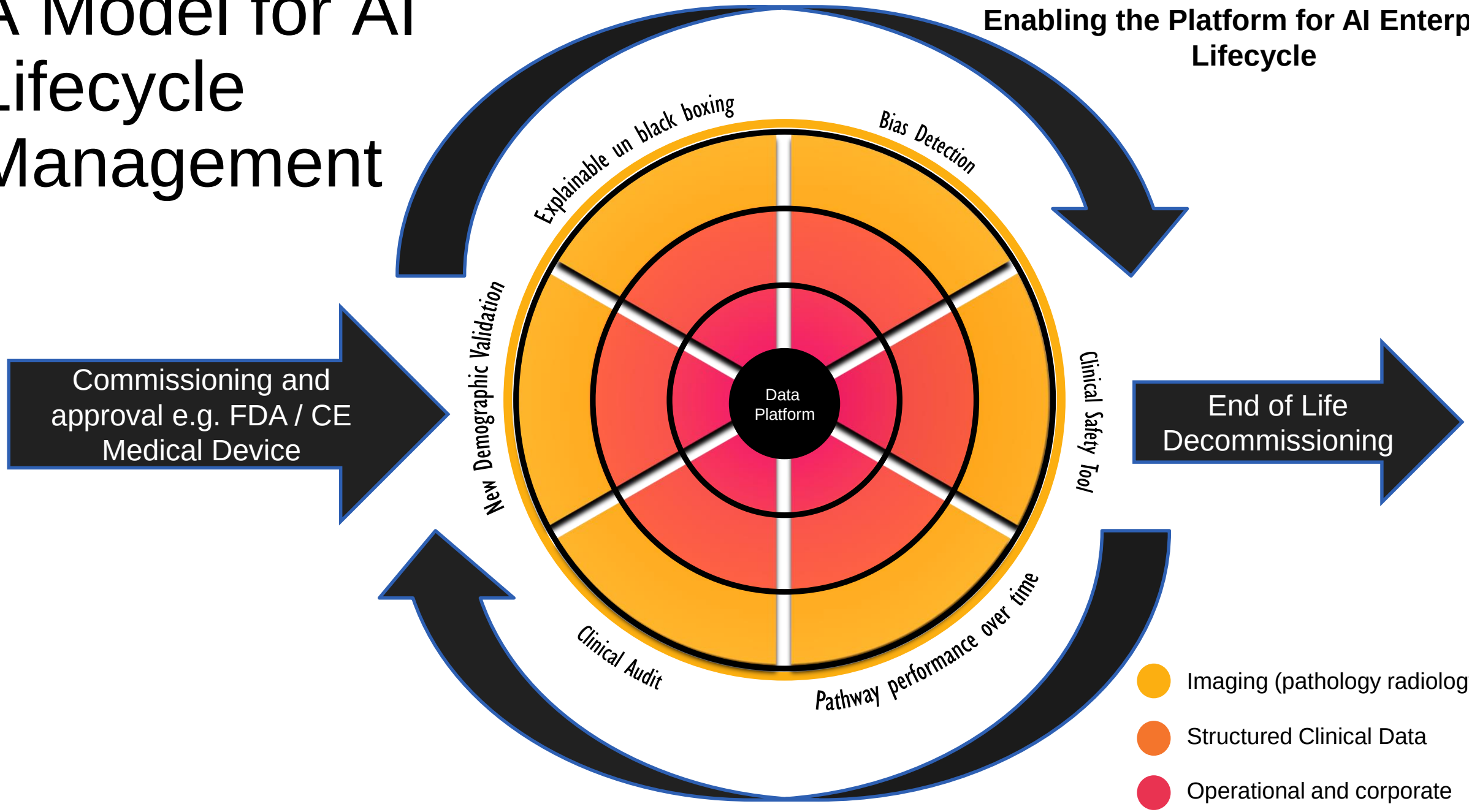
## Contributing to the community for better data in Healthcare


Rachel Dunscombe –
Rachel.Dunscombe@openehr.org

CEO openEHR


Even the best AI is only as good as what it eats

# A Model for AI Lifecycle Management



## Why OpenEHR is Ideal for AI

**Structured and Standardized Data**
OpenEHR uses archetypes and templates to model clinical information, ensuring data is highly structured, consistent, and semantically interoperable. This makes it easier to train AI models without the need for extensive preprocessing.

**Interoperability**
OpenEHR provides a standardized platform for sharing data across different systems, enabling AI to access diverse, high-quality datasets from various sources.

**Rich Clinical Context**
OpenEHR stores data with detailed metadata and clinical context, allowing AI to make more accurate and clinically relevant predictions.

**Longitudinal Data**
OpenEHR supports time-series data, making it ideal for training AI models that require longitudinal patient information, such as disease progression or treatment outcomes.

**Scalability and Flexibility**
The modular and extensible design of OpenEHR allows seamless integration of AI tools and algorithms, adapting to evolving healthcare needs.

**Ethical and Transparent AI Development**
With OpenEHR, data provenance and traceability are inherent, supporting ethical AI practices and ensuring transparency in decision-making.

**Focus on Reusability**
Archetypes in OpenEHR are reusable and adaptable, enabling rapid deployment of AI models across different healthcare settings with minimal customization.

**Global Adoption and Collaboration**
OpenEHR is supported by an active international community, facilitating the sharing of best practices, tools, and AI solutions globally.

By leveraging OpenEHR, healthcare organizations can unlock the full potential of AI while maintaining the integrity, security, and usability of clinical data.

**Global Initiatives Using OpenEHR for AI**

**NHS England**

**Leveraging OpenEHR to standardize health records across the UK, enabling AI-powered analytics for population health, predictive modelling, and personalized medicine.**

**HiGHmed Consortium (Germany)**

**Using OpenEHR to facilitate AI-driven research and clinical decision support, focusing on oncology, cardiology, and infectious diseases.**

**Better Platform (Global)**

**Supporting AI integration in healthcare systems by providing OpenEHR-based platforms for advanced analytics, real-time insights, and decision support.**

**Australian Digital Health Agency (ADHA)**

**Utilizing OpenEHR to enable AI applications in national electronic health records, enhancing diagnostics, disease prevention, and health service delivery.**

**Catalonia Health Region (Spain)**

**Implementing OpenEHR to create a unified health data platform, supporting AI applications in chronic disease management and clinical research.**

**Norwegian Health Network (Norway)**

**Developing AI models for predictive healthcare and decision support, powered by OpenEHR's standardized and interoperable data framework.**

**Karolinska Institute (Sweden)**

**Exploring AI-driven clinical trials and personalized medicine initiatives, leveraging OpenEHR's archetype-based data models.**

**Brazilian Health Informatics (SBIS)**

**Adopting OpenEHR for AI research in public health, focusing on infectious disease outbreaks, epidemiological modeling, and resource optimization.**

**VHIR (Vall d'Hebron Research Institute, Spain)**

**Utilizing OpenEHR for AI applications in genomics, integrating structured clinical and genetic data for advanced analytics.**

**These initiatives demonstrate how OpenEHR provides the foundational framework for unlocking the transformative potential of AI in healthcare worldwide.**

Our aim is to remove the variability of data quality and completeness as a factor in the performance of AI.

We are enabling inter-country collaborations and AI research based on semantically harmonized data.

Research is currently being undertaken in Germany to look at the quantified performance benefits of openEHR as a data source for AI training

# openEHR Industry

## Contributing to the community for better data in Healthcare


Rachel Dunscombe –
Rachel.Dunscombe@openehr.org

CEO openEHR

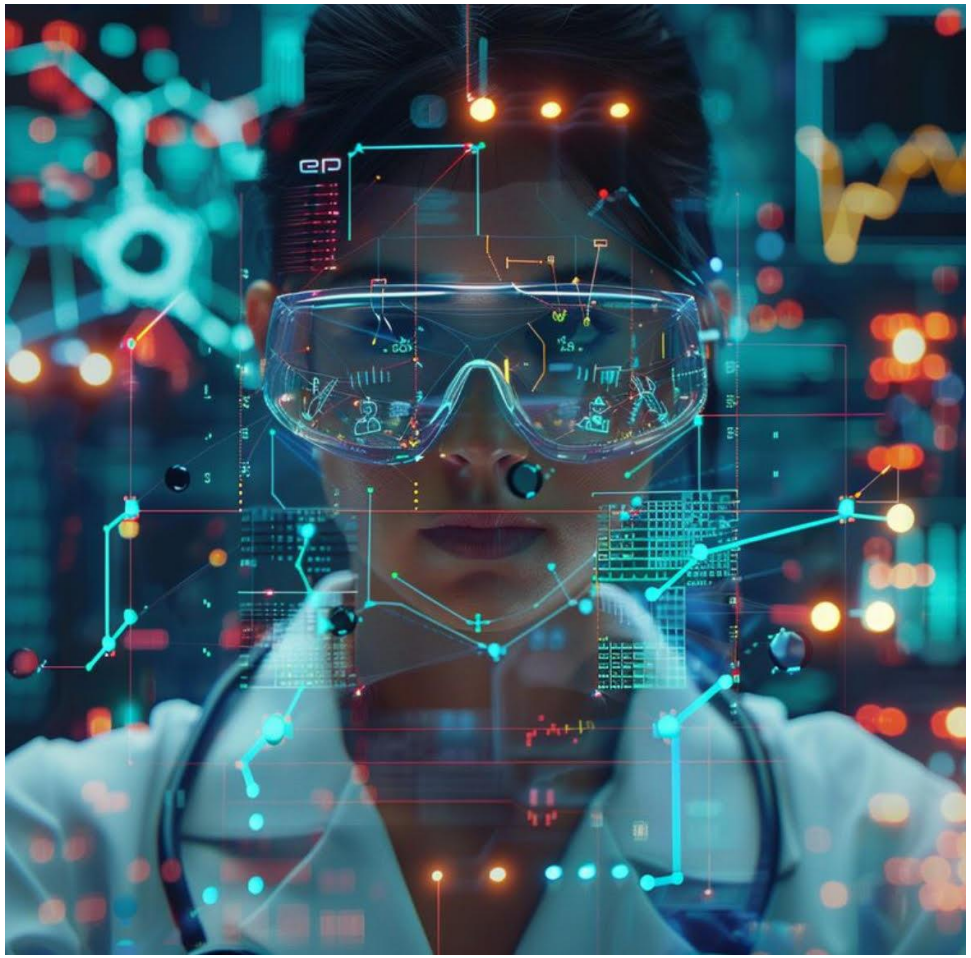
DIGITAL FOR CARE

CONFERENCE

Digital for Care Transforming Healthcare with Data Standards including SNOMED CT

# ARTIFICIAL INTELLIGENCE

## Applications in Healthcare



Prof. Patricia B. Maguire,
University College Dublin

*patricia.maguire@ucd.ie*

# Unlocking value in Healthcare Data

Lots of Challenges, therefore how?

Large and Complex Data Sets

Multiple Industry Standards

Standards Not Suited for Analytics

Limited IT Staff



Data Duplication due to Multiple Sources and Solutions

40% Increase from 2010 to 2020

23% Expected Increase by end 2025

2% Data Retained in 2021

97% Unused

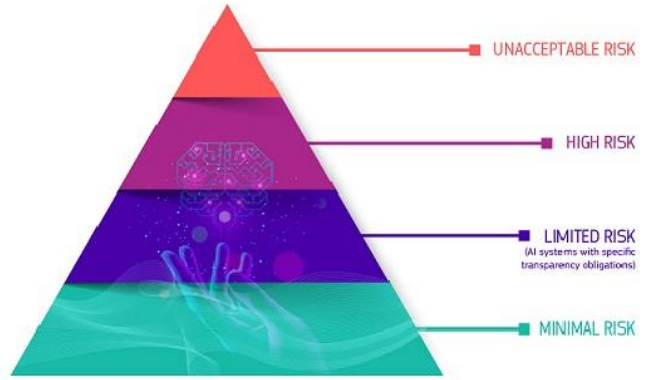
**It is all about the data!!**

*https://www.deloitte.com/be/en/Industries/health-*

# Balancing AI Innovation with Ethical Considerations in Healthcare

Ensure equitable AI-driven healthcare solutions

- **Adherence to EU AI Act:** Ensure AI systems in healthcare comply with the EU AI Act, which mandates safety, transparency, & accountability to foster trustworthy AI.
- **Risk Management:** Implement robust risk management strategies to identify and mitigate potential harms associated with AI applications in healthcare.
- **Data Privacy and Security:** Prioritise patient data privacy & security, aligning with GDPR requirements to maintain confidentiality and trust.
- **Human Oversight:** Maintain human oversight in AI-driven healthcare decisions to ensure ethical standards and patient safety.
- **Continuous Monitoring and Evaluation:** Establish processes for ongoing monitoring and evaluation of





https://www.coalitionforhealthai.org/papers/blueprint-for-trustworthy-ai_V1.0.pdf

# Developing and deploying trustworthy AI systems

## Ensuring they are ethical, fair, and safe for society

**1. Transparency**
Clear, understandable AI models and decision-making processes.
Open communication about AI capabilities, limitations, & potential risks.

**2. Fairness and Non-Discrimination**
Ensuring AI systems are free from bias.
Equal treatment and fairness across all demographic groups.

**3. Account**
Clear respor
Mechanisms

**4. Privacy and Data Security**
Robust protection of personal data.
Compliance with data protection regulations (e.g., GDPR).

**5. Reliability and Safety**
Consistent, accurate, and safe AI performance.
Rigorous testing and validation processes.

**6. Ethical Considerations**
Alignment with societal values and ethical norms.
Regular ethical reviews and updates.

**7. Human-Centred Design**
Ensuring AI augments human capabilities.
Keeping humans in the loop in critical decision-making processes.

**Always need a human in the loop**


https://www.socialtechla
.eu/

# AI at the Mayo Clinic

## An Exemplar in the Science of Artificial Intelligence

John Halamka MD

https://www.mayo.edu/research/faculty/halamka-john-d-m-d-m-s/bio-20542748

With emerging capabilities in the science of AI, we at the Mayo Clinic can reach even more patients and create new ways to diagnose, treat, predict, prevent and cure disease.

We see a future in which AI will:

- Help select and match patients with the most promising clinical trials
- Develop and deploy remote health monitoring devices,
- Leverage imaging technology to detect currently imperceptible conditions
- Anticipate disease-risk years in advance.

*"Teams of data scientists, clinician & researchers working together"*

*"more than 200 on-going AI projects…"*

*"Built a new Research Department for AI and Informatics, established a Center for Digital Health and a Department of Quantitative Health Sciences, and launched the Mayo Clinic Platform."*

https://www.mayoclinic.org/giving-to-mayo-clinic/our-

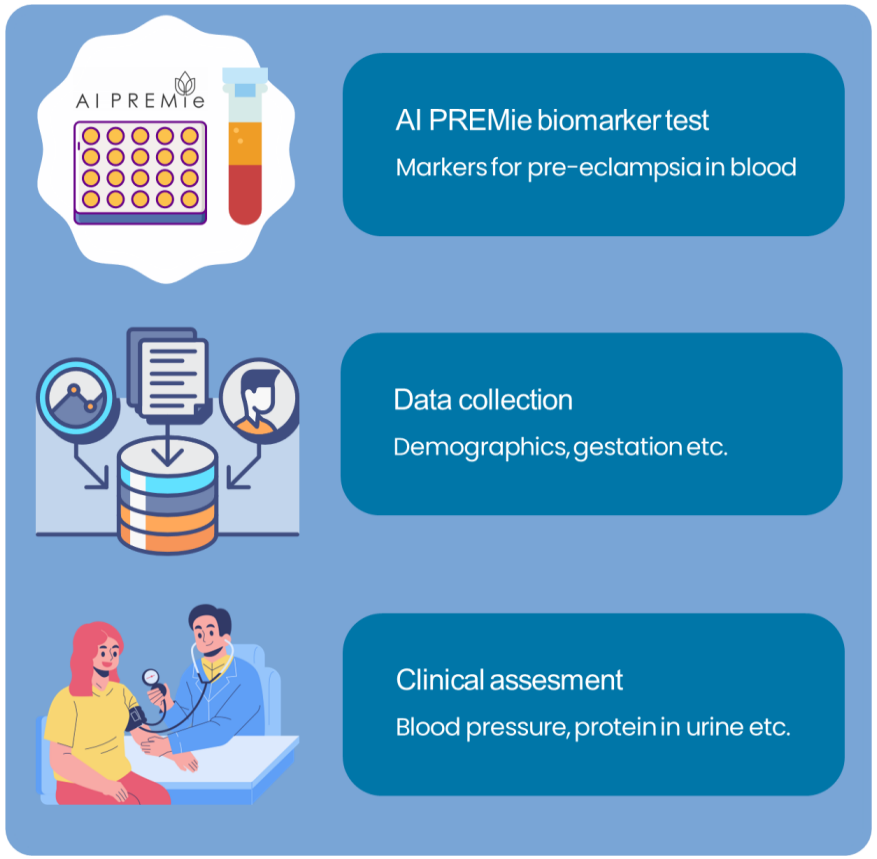
# The UCD AI Healthcare Hub

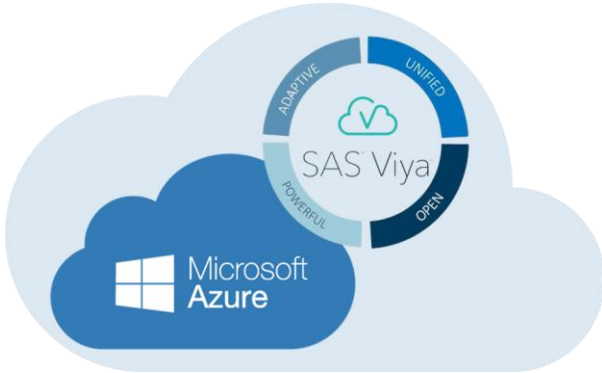
The vision of the UCD AI Healthcare Hub is to revolutionise healthcare through AI-driven translational research to rapidly translate scientific discoveries into tangible patient benefits.

It brings together a growing interdisciplinary community of practice at UCD and associated hospitals that are engaged in transformative and highly multidisciplinary, data-rich, translational research projects.

SOLUTION

# AI_PREMie




Preeclampsia risk score

Effective, Efficient Clinical Decision Making in the diagnosis & risk stratification of Preeclampsia

## Clinical


Prof Fionnuala Ní Áinle


Assoc Prof Mary Higgins


Prof Jennifer Donnelly


Assoc Prof Neil O'Gorman


Prof Amy O'Higgins


Dr Shauna Callaghan

## Lab Management


Dr John O'Loughlin


Prof Patricia Maguire

## Data Analytics


Dr Brian Mac Namee


Ms Ana Le Chevillier


Dr Luisa Weiss


Dr Suzy Whoriskey

## Health Economics


Prof Gerardine Doyle


Dr Kate Cullen

## Lab/Research/Data Collection


Ms Ella Fouhy


Dr Martin Kenny


Ms Sirisha Bellamkonda


Vanessa Carvalho


Molly Hong-Minh


Dr Zara Molphy

## Project Management


Dr Katrina Comerford

## Partners


Mr Andrew Warrington


Mr John Curran


Ms Mandy Daly

## Commercial


Mr Edward Simons


Ms Cora McCann

AI PREMIe

The National Maternity Hospital
Vita Gloriosa Vita ~ Life Glorious Life

THE ROTUNDA HOSPITAL DUBLIN

The Coombe Hospital

sas

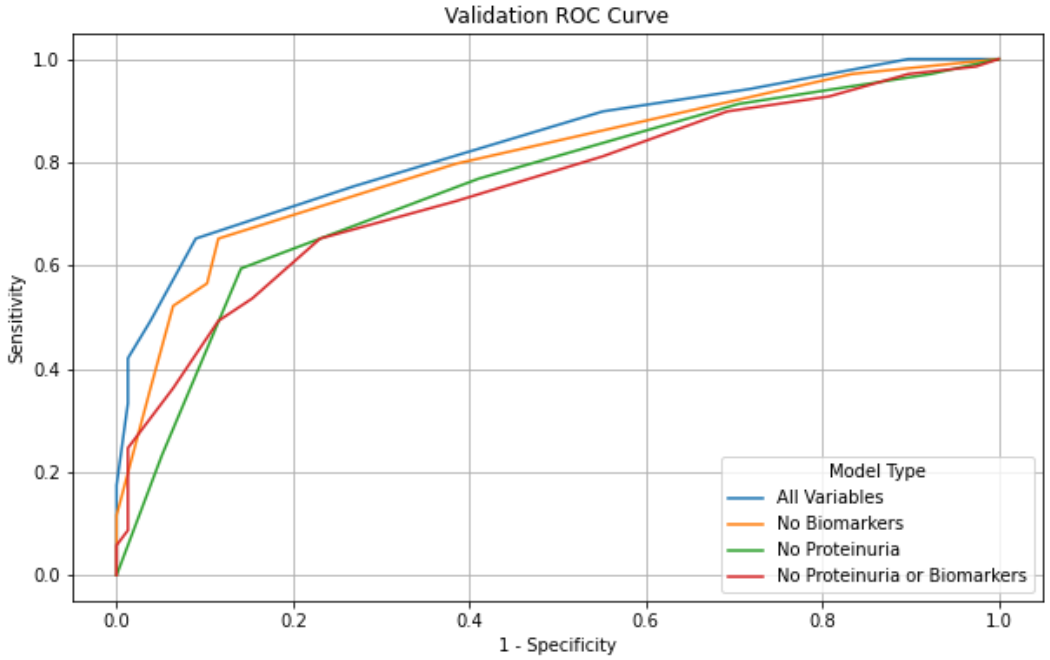
Science Foundation Ireland sfi For what's next

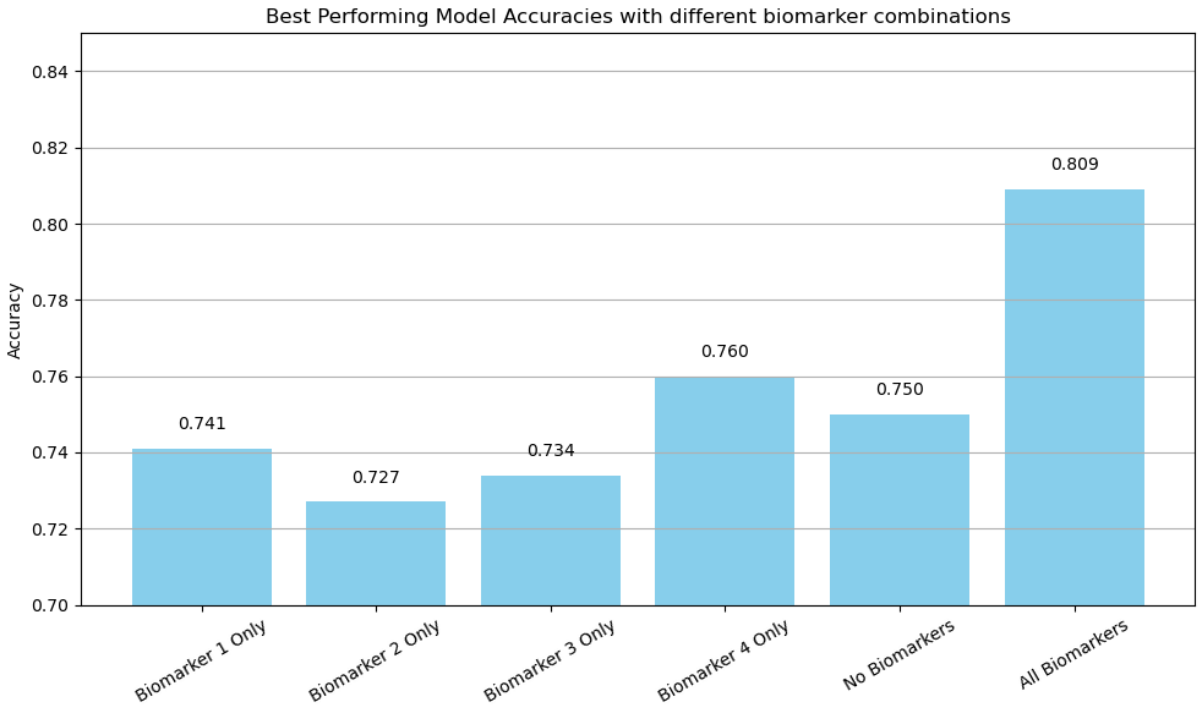
ENTERPRISE IRELAND

RCSI

UCD DUBLIN

# Status: Jan 2025



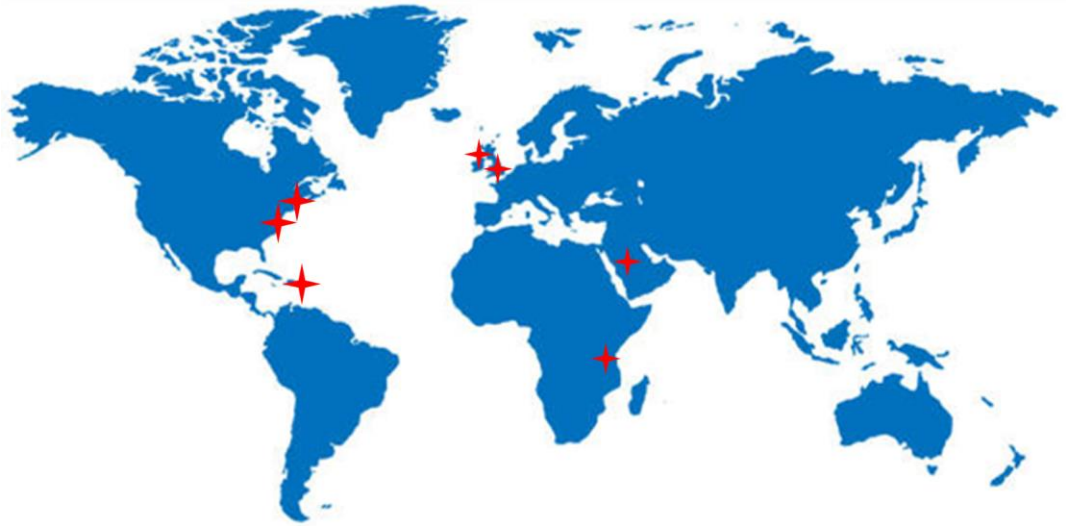




All metrics from the validation set (n = 124)
Unpublished data

OUR VISION

# Revolutionising Maternity Care

Our team wants to get our test to every person who needs it across the world



# PRE-CLINICAL HEART FAILURE

## CASE STUDY

- 1,425 Enrolled Patients
- 64% Stage A at Baseline
  36% Stage B at Baseline
- 55% Female Patients
  45% Male Patients

## CARDIAC STAGE EVOLUTION

**A**

- 74% remained in A
- 24% progressed to B
- 02% progressed to C

**B**

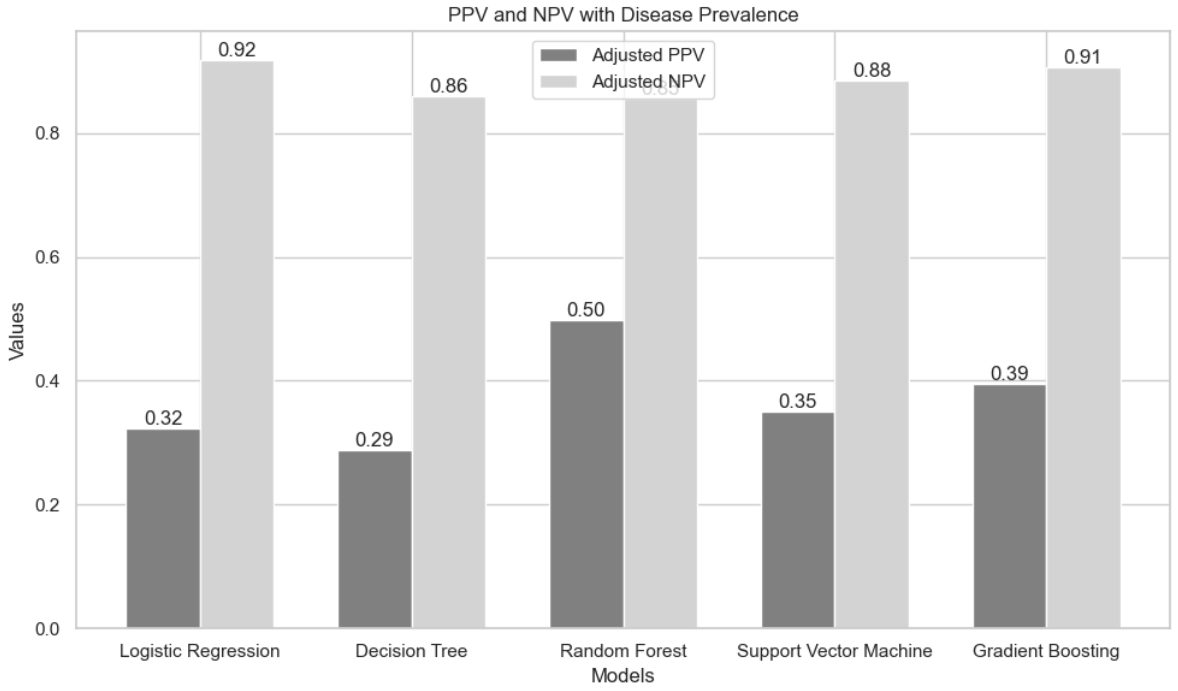
- 65% remained in B
- 11% progressed to C
- 24% regressed to A

ST. VINCENT'S UNIVERSITY HOSPITAL
Elm Park

# DATA MODELLING

## STRONG CORRELATION FEATURES

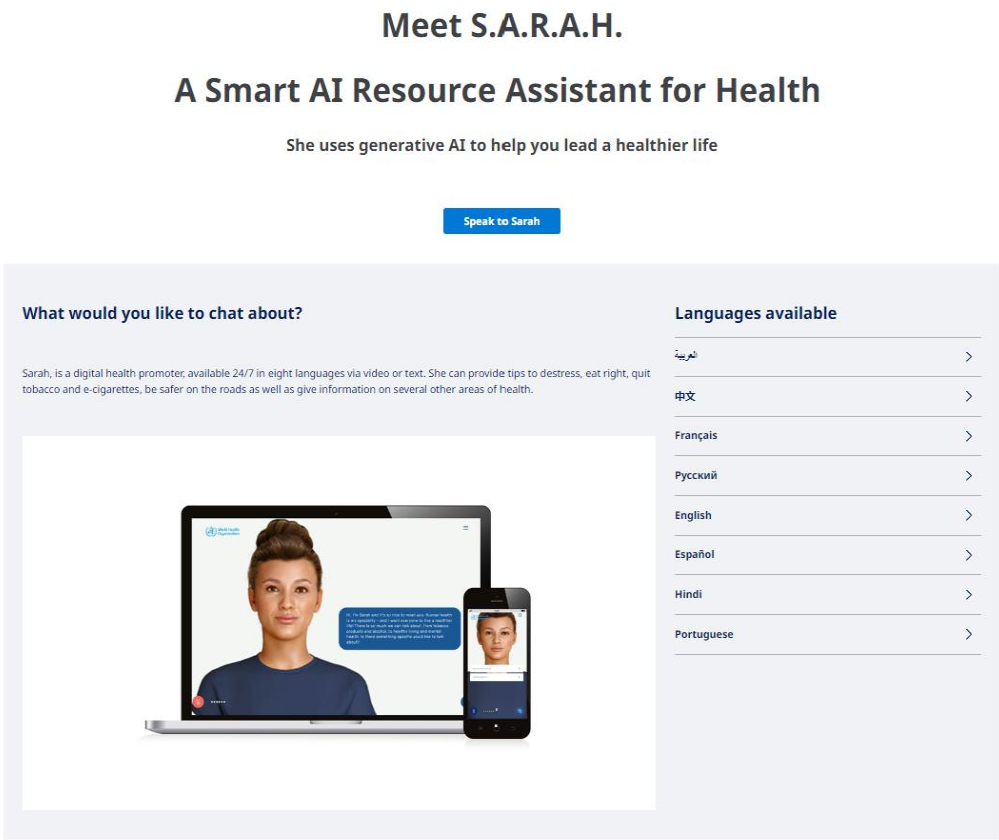
| MODEL | ACCURACY | SENSITIVITY | SPECIFICITY | NPV |
|---|---|---|---|---|
| Logistic Regression | 72% | 65% | 74% | 92% |
| Decision Tree | 78% | 23% | 88% | 86% |
| Random Forest | 83% | 13% | 97% | 85% |
| SVM | 78% | 41% | 85% | 88% |
| Gradient Boosting | 79% | 54% | 84% | 91% |




***Rule-Out Model Recommendation:*** *Gradient Boosting [High Accuracy and NPV]*

Uses Gen AI as a base and has been trained with the latest information and available data from the WHO and trusted partners.

Provides information across major health topics, including mental health, and has expertise to help prevent some of the biggest causes of death in the world including cancer, heart disease, lung disease, and diabetes.




*Answers may not always be accurate because they are based on patterns and probabilities in the available data. WHO takes no responsibility for any conversation content created by Generative AI. Furthermore, the conversation content created by Generative AI in no way represents or comprises the views or beliefs of WHO, and WHO does not warrant or guarantee the accuracy of any conversation content. Please check the WHO website for the most accurate information.*

https://www.who.int/campaigns/s-a-r-a-h

# Thank You