

AI Centre OLS Programme Final Board

25 April 2024

@AI4VBH



Mission

The AI Centre for Value Based Healthcare is pioneering AI technology for the NHS.

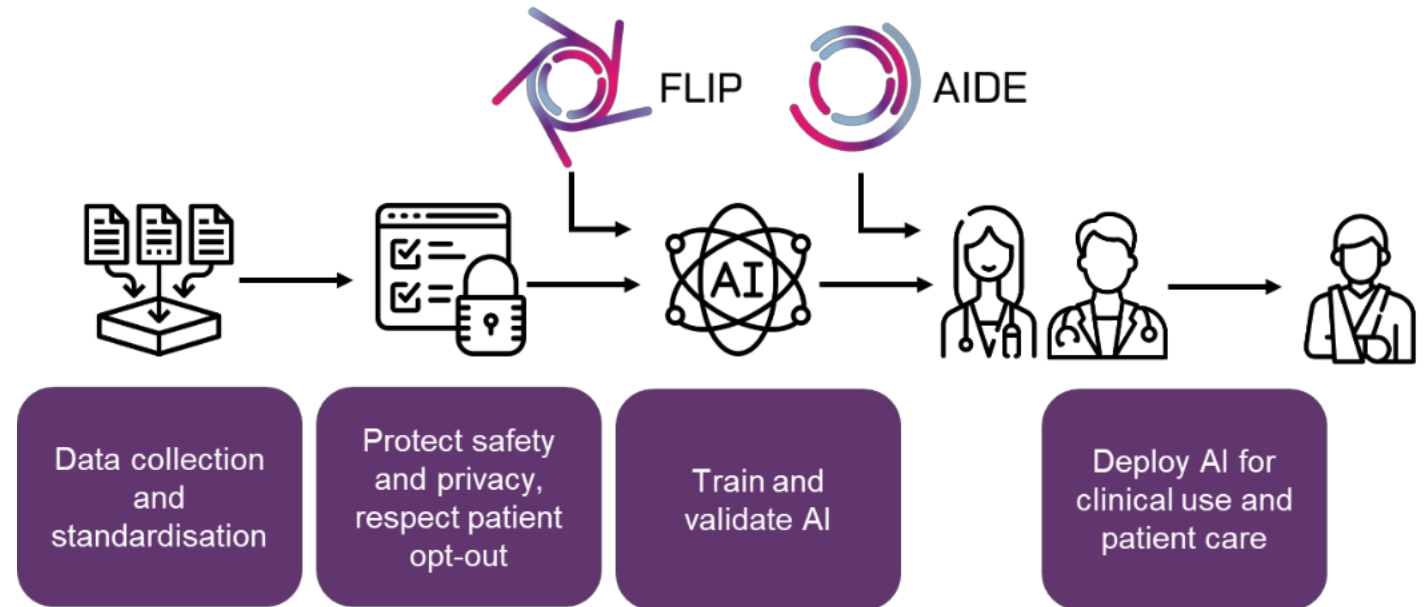
Artificial Intelligence (AI) improves healthcare by helping to deliver earlier diagnosis and better treatment based on accumulated learning far beyond even the most experienced clinician.

AI will help the NHS increase efficiency, improve therapies, drive safety, and reduce costs all of which benefit patients, medical staff, and the wider society. It is one of the most exciting and inspiring areas of healthcare currently being researched and developed, and it's our mission, at the AI Centre, to spearhead innovation and opportunities for the NHS both now and in the future.



Supporting the whole AI lifecycle

- A. Collect and Standardise Data
- B. Safety and Privacy
- C. Respecting Patient Opt-out
- D. Training and Validating AI
- E. Deploying AI for patient care
- F. AI marketplace
- G. Standards (MHRA/BSI/MONAI)
- H. Scaling across the NHS



AI Centre Partners



- 10 NHS Trusts
- 17 Industry partners
- 4 Universities



Deliverables

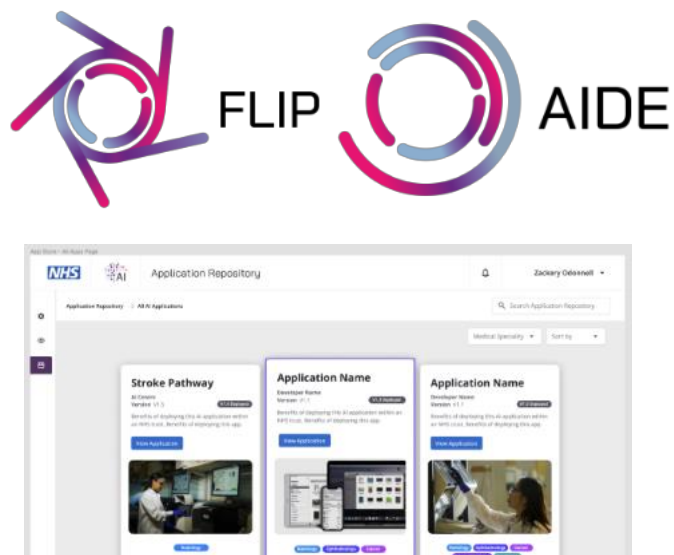
1) Hardware Infrastructure



Hardware already installed in 7 partner Trusts for training and running AI models

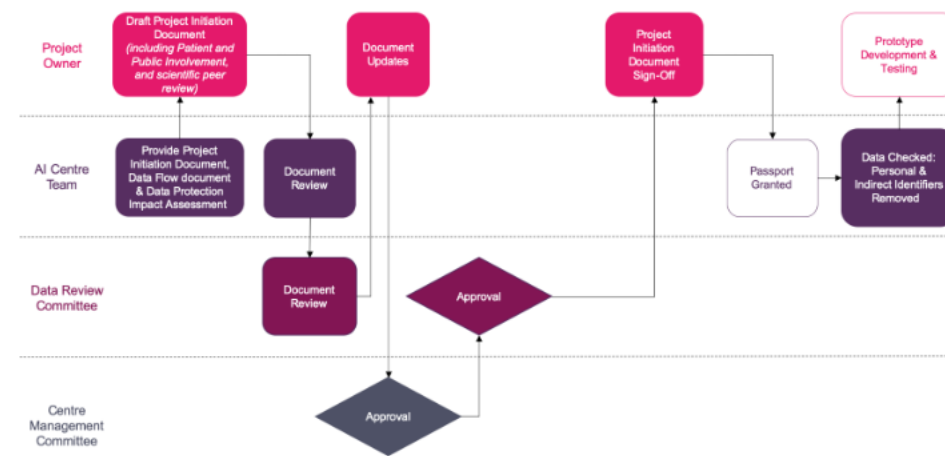


2) Software Infrastructure



Software platforms developed and installed to enable Federated learning and AI deployment

3) Regulatory Infrastructure



Approval processes for access to patient data for research purposes for our partners

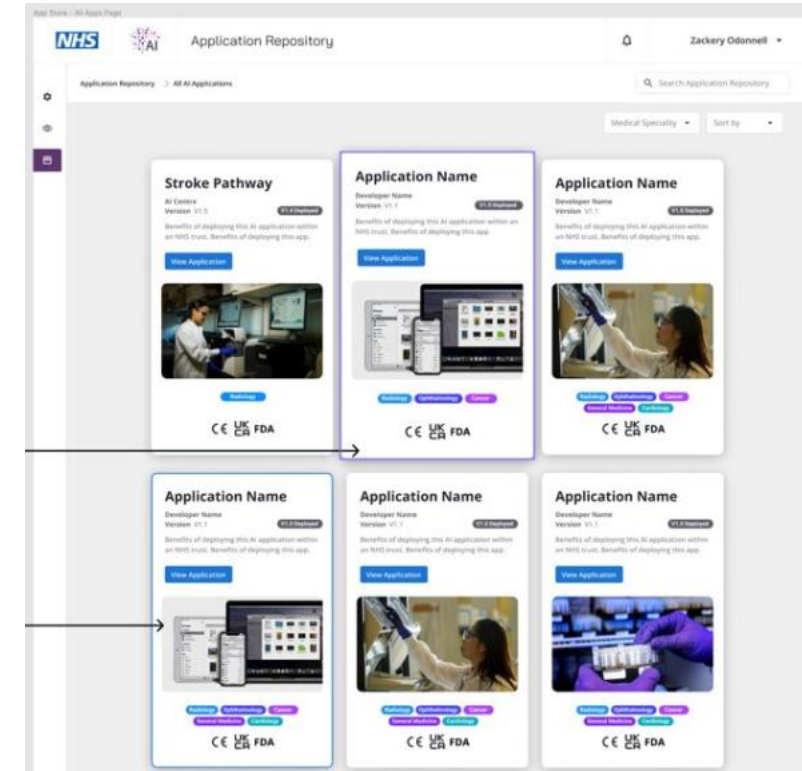


FLIP and AIDE implemented

FLIP hardware and software is installed at 5 of our partner trusts. Data Ingestion is ongoing. Next steps include incorporating FLIP into the London Sub National Secure Data Environment (SNSDE)



AIDE hardware and software is installed at all 7 of our partner trusts. Trusts are testing apps and evaluating various radiology applications.



Lessons learned

- **Early engagement is needed across Trust IT teams, IG , data and commercial**

Key factors for success in the programme was to ensure buy-in from the teams who will implement the change, as each NHS trust required certain adjustments, depending on their set up, processes and infrastructure. Signing off the IG and getting the data into systems should not be underestimated in terms of both timeframes and costs.

- **Roles, responsibilities and accountability**

Defining clear roles and responsibilities for internal teams and within the partners is key to ensure that there is clear accountability for deliverables throughout the project. This included the technology suppliers management as a partnership but with clear accountability for deliverables on time and budget.

- **Technology speed**

BARTs and SLAM opted out of the programme due to cloud-only strategy, this was not anticipated in 2020 when the programme started and defined mainly as on-prem solution, due to cost and nature of the funding (as capital)

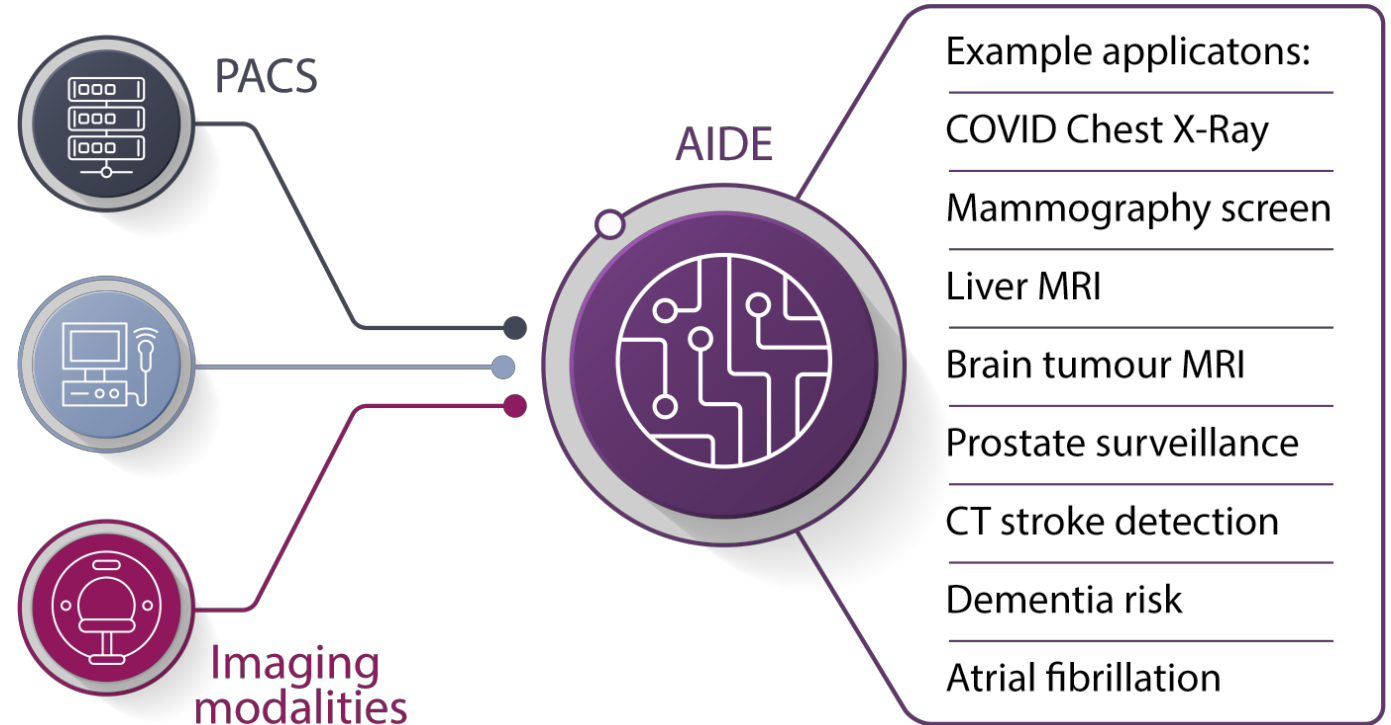
- **Internal capabilities for AI adoption**

AI is a relatively new field: even technology teams, especially 'traditional' IT departments, struggle with some of these concepts. They are not familiar with Python, docker containers and there is a big learning curve. On the clinical side there is more enthusiasm but not always internal skills for adoption at scale. Investment is needed for upskilling existing teams and creating new roles within the NHS.

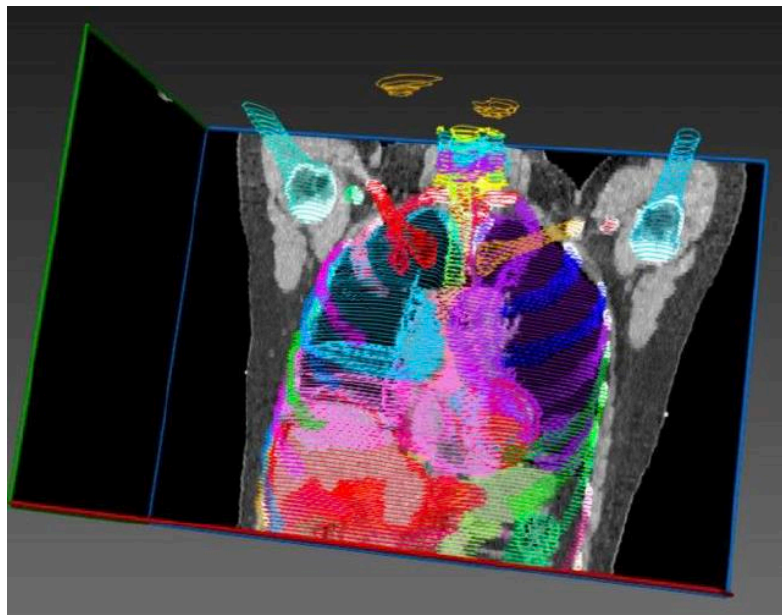
Outcomes – AI integration

Technology enabled radiology AI through AIDE to

- Builds complex and composable pipelines.
- NHS repository to share and distribute in-house algorithms.
- Safe and robust pipeline to test and use AI tools developed to improve patient care.



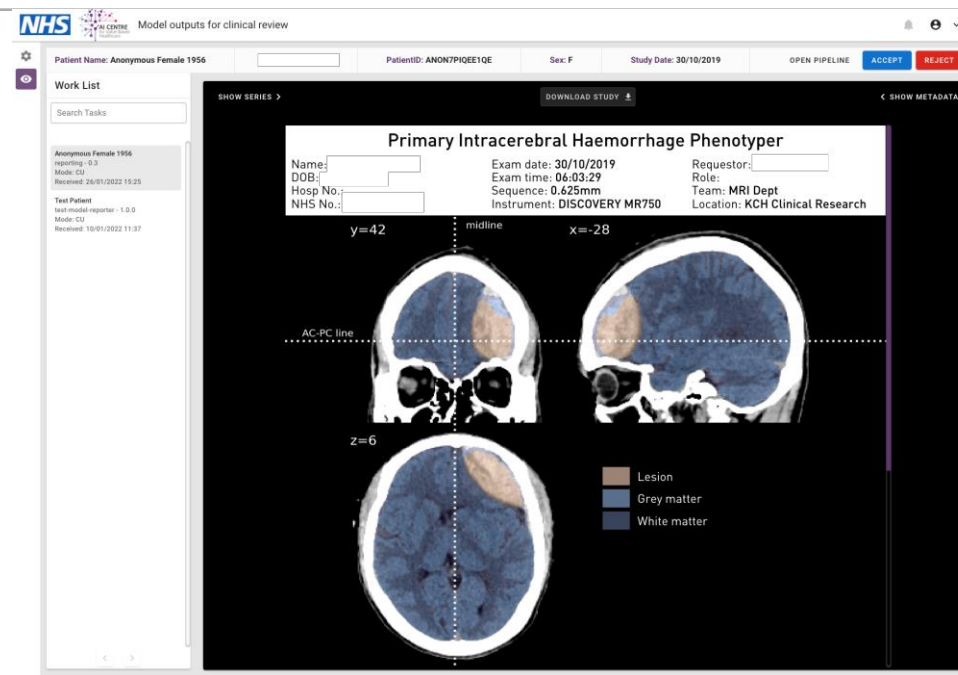
Outcomes – AI applications on AIDE



At GSTT

AutoSegCT—Auto-contouring for radiotherapy

Tool for robust segmentation of >100 important anatomical structures in CT images, segmentation. Manual contouring can take 30mins –3 hours, the aim is to reduce to 10-15 mins using AutoSegCT application. In trial stage.

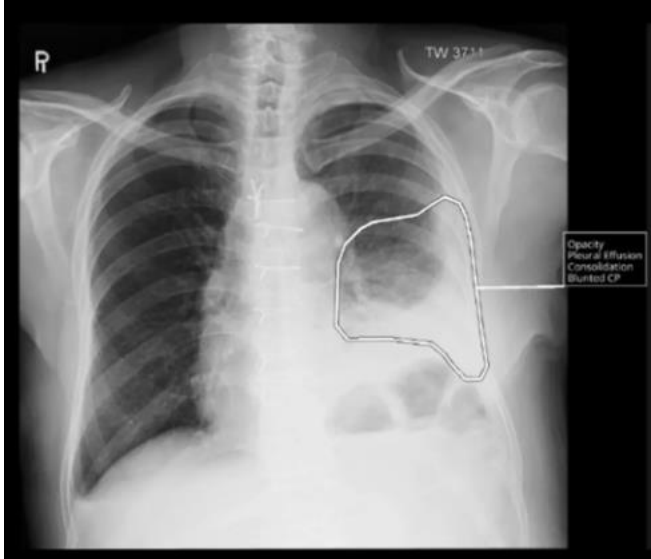


At KCH –

Intracerebral haemorrhage Phenotyper (ICH)

Detects which parts of the brain are affected by the haemorrhage and the likely side effects, as a way to inform downstream treatment. Installed at KCH – for decision support - evaluation is on-going.

Outcomes – AI applications on AIDE



at East Kent and Lewisham & Greenwich

Installed Qure.ai - automated labelling of chest Xrays- it has great value in reducing false negatives, catching incidental findings, prioritising scans to optimise radiologist time.

Available as a one-click install on AIDE

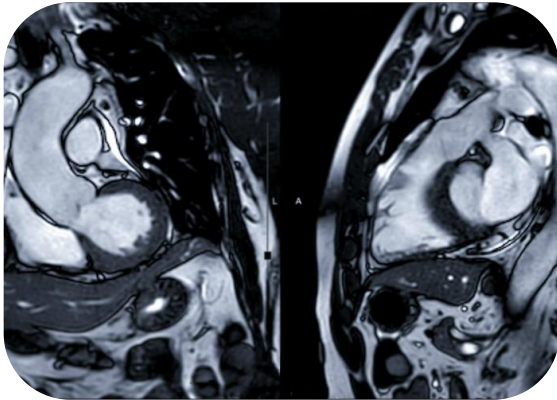
<https://www.quire.ai/product/qxr>



quire.ai

Outcomes – AI pathways

World leading expertise to every clinic room



Coronary Artery Disease

Creating a computer-aided software to help guide clinical decisions and diagnosis

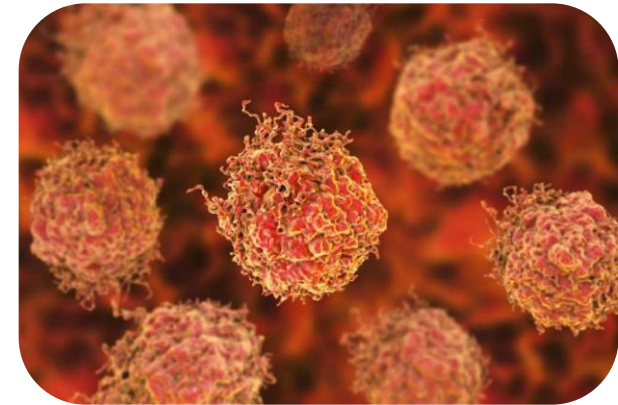
Creating intelligent **safety systems**



Lung Cancer

Incidental detection, aiming to improve detection of disease early.

Automating laborious and simple tasks



Prostate Cancer

Only patients whose cancer shows signs of progressing are considered for radical therapies.

Outcomes – skills: AI fellowships

This is now a national Fellowship programme in Clinical AI funded by Health Education England. 12-month programme which is integrated part-time alongside clinical work.

Fellows are recruited competitively from 7 participating regions across the NHS, drawn from a diverse clinical workforce.

Fellows will adopt clinical artificial intelligence technology, they gain experience deploying AI in clinical workflows, under expert supervision in multidisciplinary teams.

This unique programme is featured in the NHS Long Term Workforce Plan as an exemplar of upskilling staff to maximise the transformational benefit of AI technologies in the NHS.

<https://gstt-csc.github.io/fellowship.html>

11 / 11

“ I am developing a clinical AI decision support system which enhances the acquisition of cardiac MRI. Translating AI science into practice is challenging; this Fellowship will give me a transferable skillset for deploying and implementing such projects. Looking ahead, I'd like to take on a hybrid cardiologist-data scientist role in the NHS and assist in delivering the AI Roadmap. ”



KAVITHA VIMALESVARAN
ST6 Cardiology



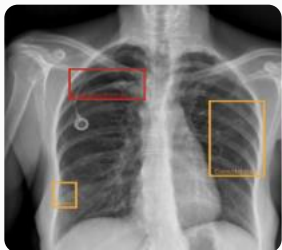
Outcomes – sustainability

In order to secure and sustain the AI products and capabilities, we are partnering with DeepC. This partnership will extend and scale the AIDE and FLIP products - to enhance the adoption of AI applications in radiology pathways and large-scale research, and will support our consortium NHS trusts in our adoption AI journey.

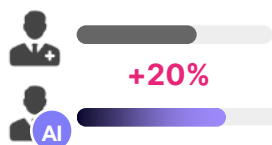
Further scale up across London through the OneLondon SDE programme will also support research and population health impact across millions of patients.



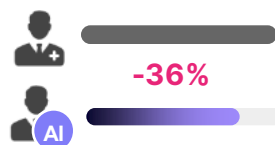
X-Ray Chest Finding Detection



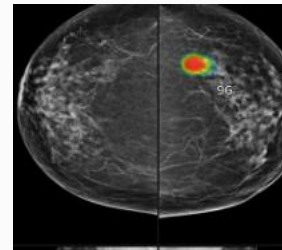
Detection Rate Critical Findings



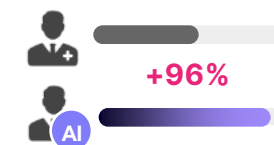
Reading Time CXR Findings



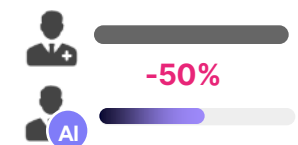
MMG Breast Cancer Screening



Detection Rate Breast Cancer AUC



Reading Time Mammography

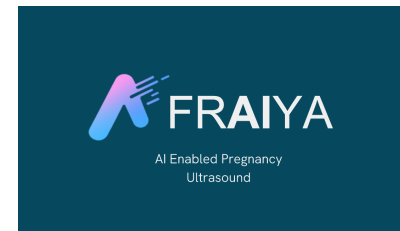


Outcomes – commercial partnerships

A number of the innovative AI technologies that were created as part of the AI Centre programme and funding, had span-out into successful AI products.

For example: AI Centre's 3D medical modelling spin-out- Innersight Labs- was acquired by international MedTech company KARL STORZ.

Our own AI Centre Director - Prof Reza Razavi – has also launched a new spin-out company, Fraiya, that is developing AI tools to transform obstetric ultrasound.





AI Enabled Pregnancy
Ultrasound

Professor Reza Razavi

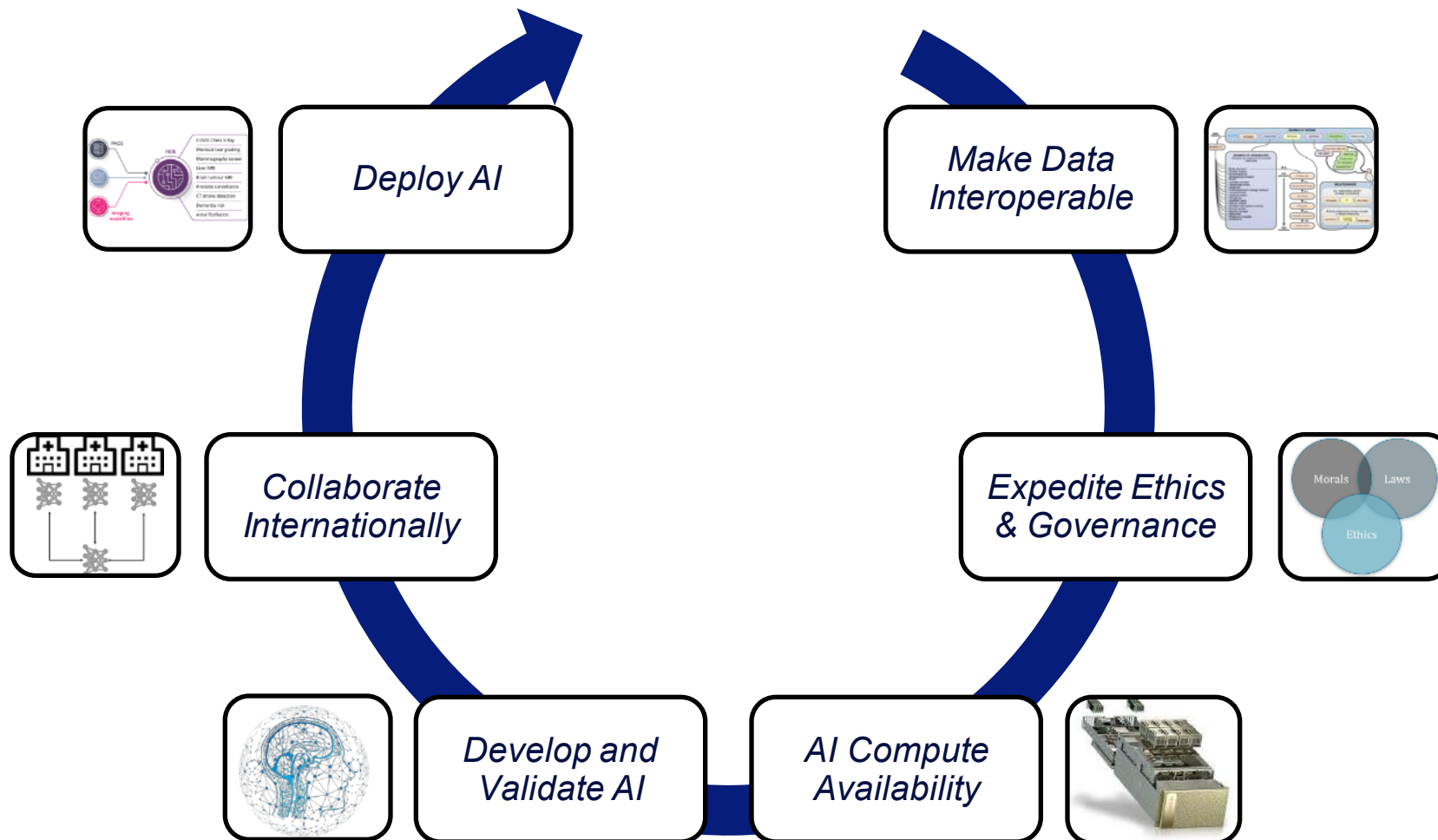
Future vision and OneLondon phase

Professor Sebastien Ourselin
& Sigal Hachlili Dwyer

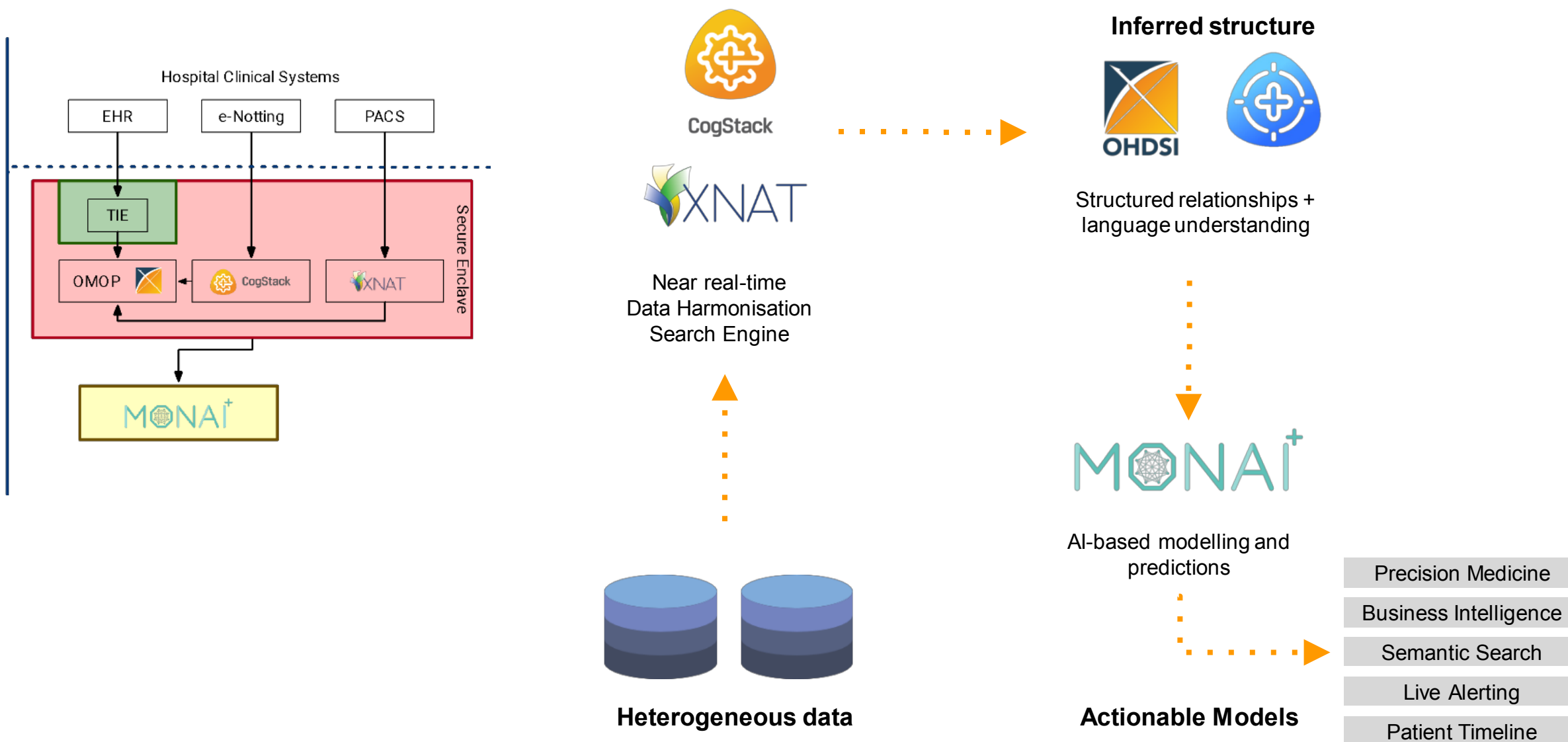
@AI4VBH



Next Stage: Accelerating end-to-end Digital Health Lifecycle



Full Stack Delivered and Tested

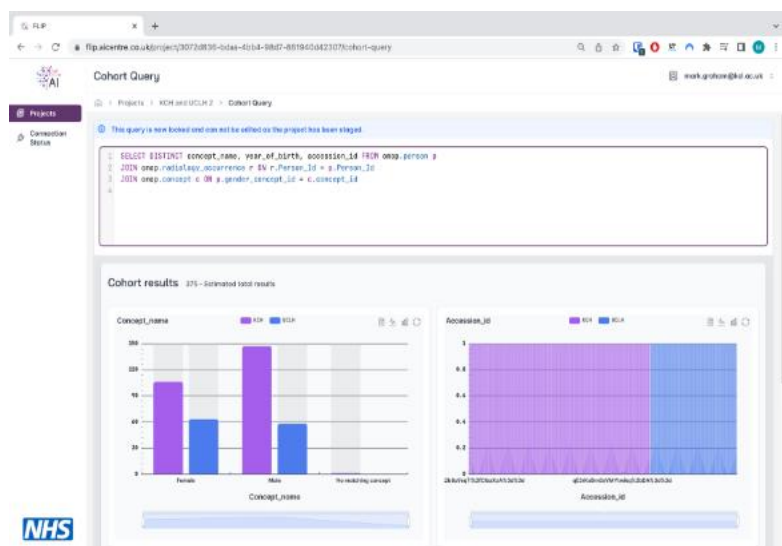
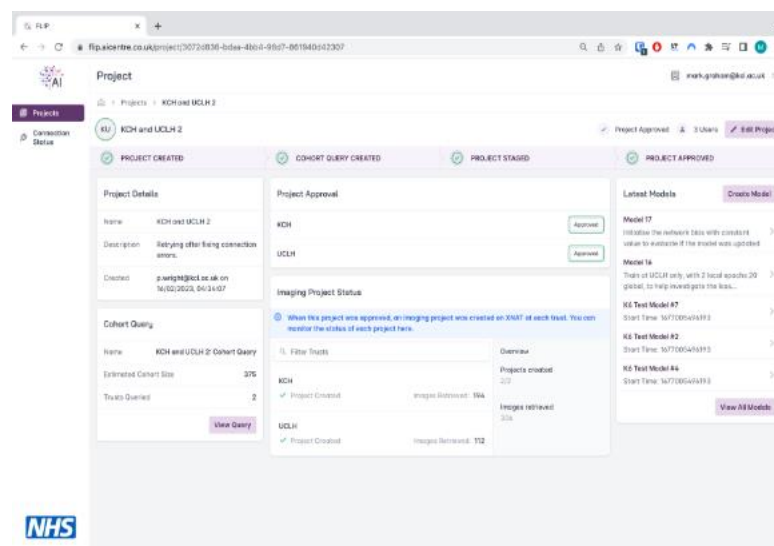
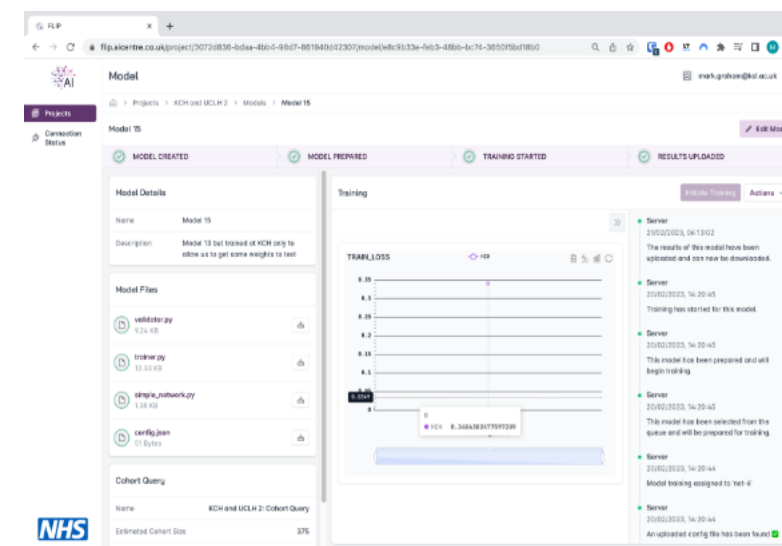


Federated Learning and Interoperability Platform (FLIP)

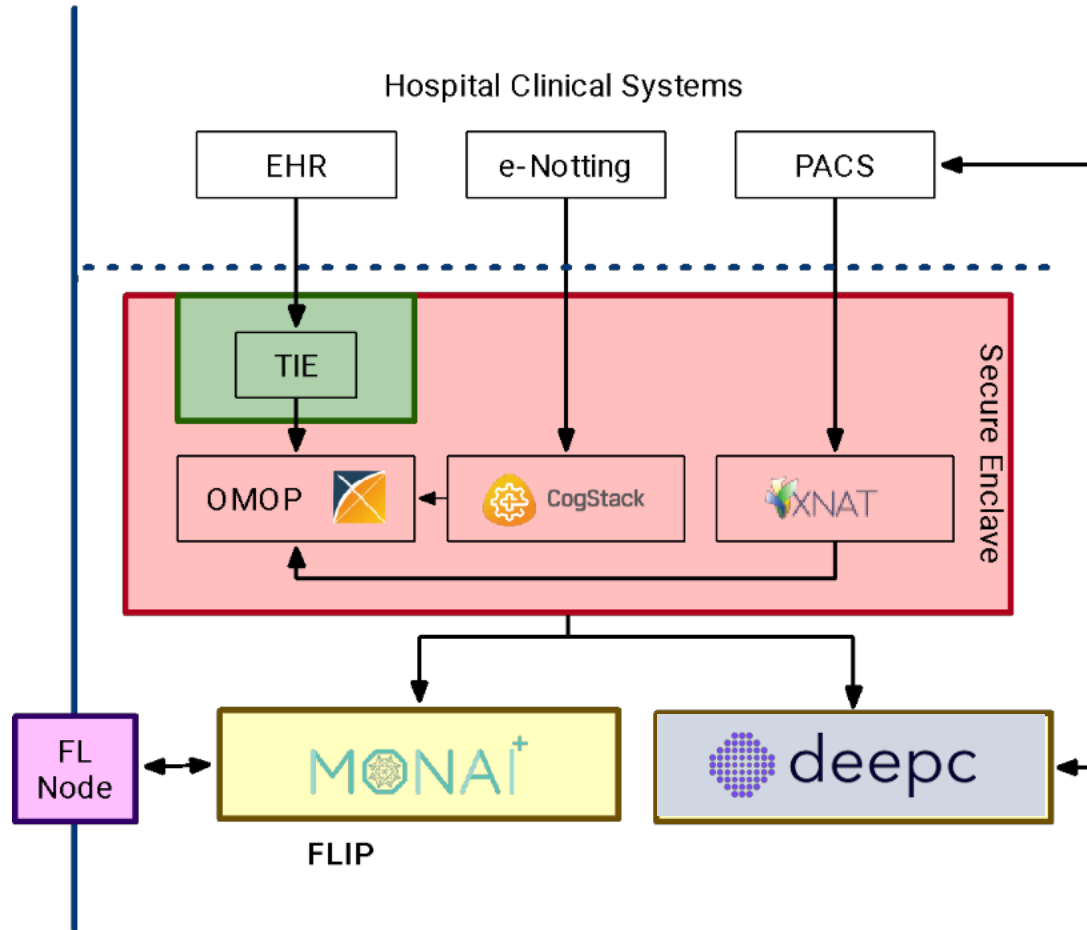
Find
Data

Manage
Approvals

Run
Analytics

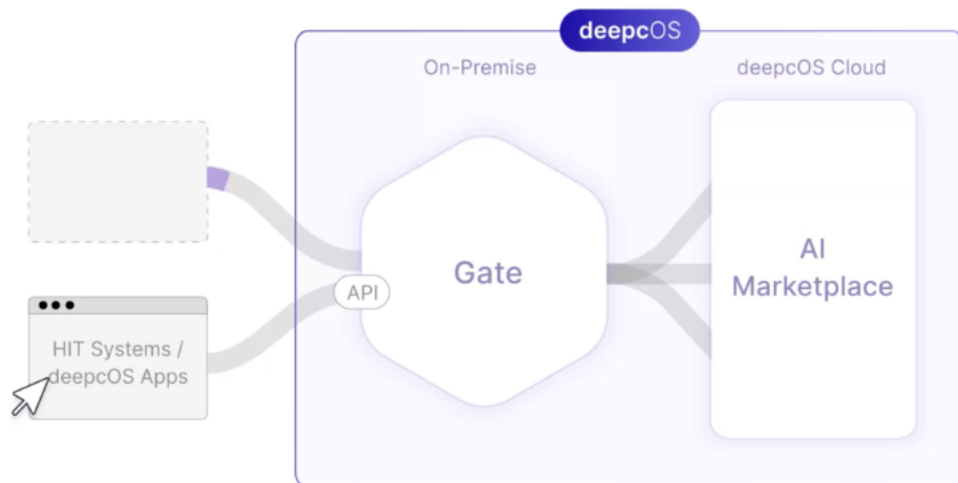


Transition from platforms development into AI deployment



- Vendor Neutral inferencing engine
- Data Ingress:
 - DICOM via PACS
 - Non-imaging data via FLIP
- Well documented and tested
- Deploy under in-house exemption
- Model validation/evaluation with dedicated *AI Evaluation Unit (in collaboration with NHSX)*

AI deployment – deepc Collaboration



Vendor-agnostic AI
model deployment
platform

DICOM support for
imaging data

FHIR integration
supporting non-
imaging data

QA mode validate AI
applications in safe
environment

Approval workflow
for integrated
deployment process

Central repository of
clinical/research
applications

The **London Sub National Secure Data Environment (SNSDE)** and **London AI Centre (AIC)** are collaborating to maximise impact from using patient data, by enabling advanced capabilities for data science, artificial intelligence, and privacy-preserving access to unstructured and multi-modal data.

Grow and expand the London Datastore and SNSDE technology stack

Centralised deployment of technology that enables extraction of more granular data, that addresses imbalances in data inequality, with greater visibility over cohorts and morbidity.

Access to linked, multi-modal data, representing the complete longitudinal healthcare journeys of the London population

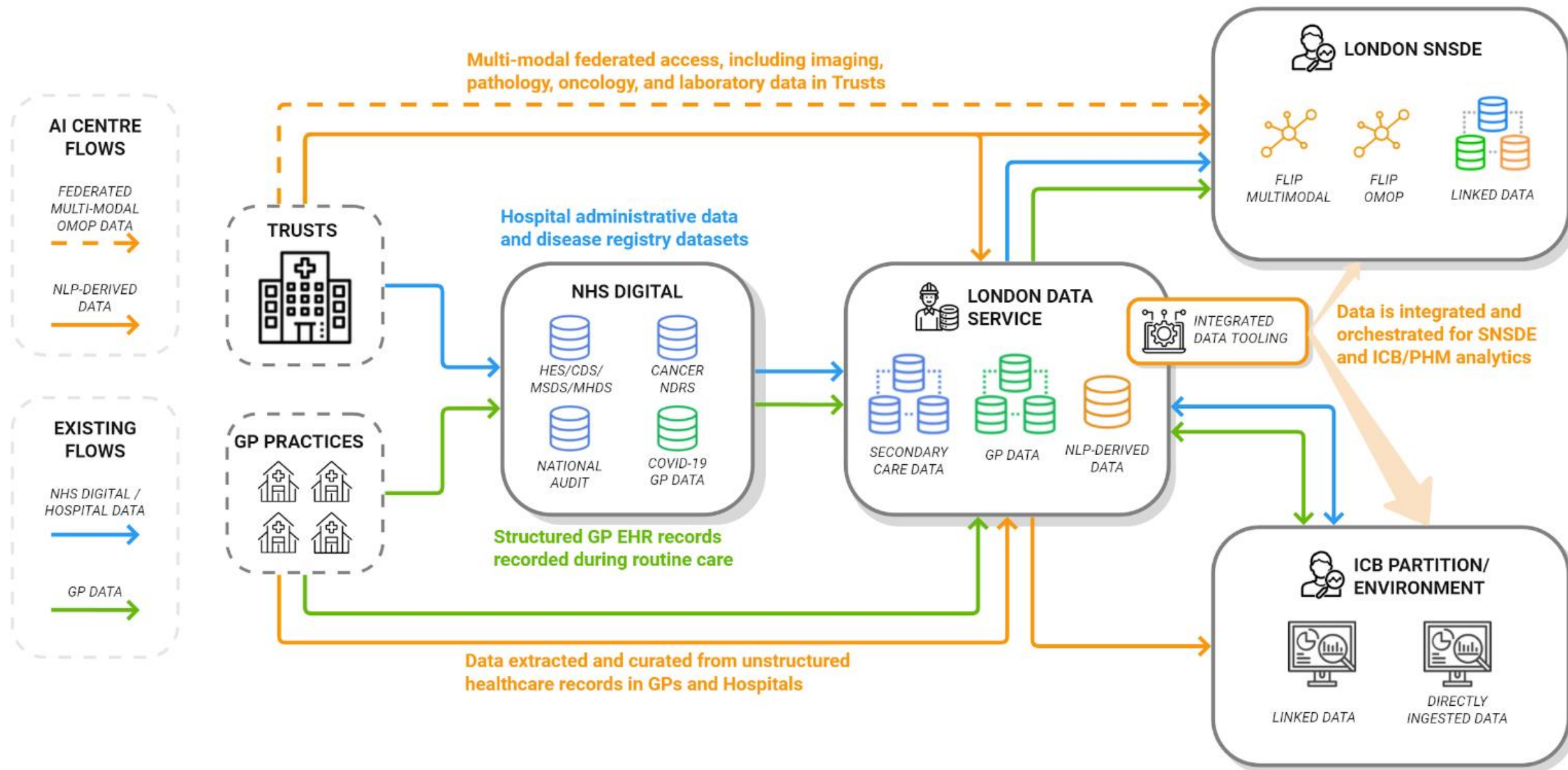
Provision of data science environments that integrate AI functions, where requested, for NHS, ICBs, academic users, and research partners. Resulting technology that is developed by NHS, tailored for NHS patients, and owned by NHS.

Enhance ICB capabilities through AI and predictive analytics functions

Greater completeness and precision in patient-level and population representation across diagnoses, findings, symptomology, and patient experience and outcomes, that will personalise PHM analytics

Capture of detailed hospital journeys, including findings and outcomes, will enrich and de-bias patient-level analysis, enabling precision insights

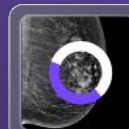
Directly supporting ICBs with AI and clinical data science capabilities. Multiple routes for collaboration including: (1) data science environments with supported development; (2) upskilling and training; (3) direct collaboration on key NHS and London-wide priorities



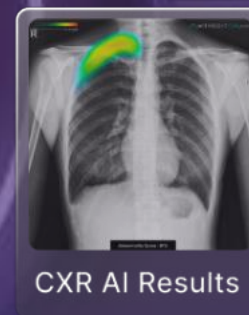


deepcOS

The AI Operating System
for Radiology Institutions



Status: AI Processing
Mammography



🚩 Caleb Coleman

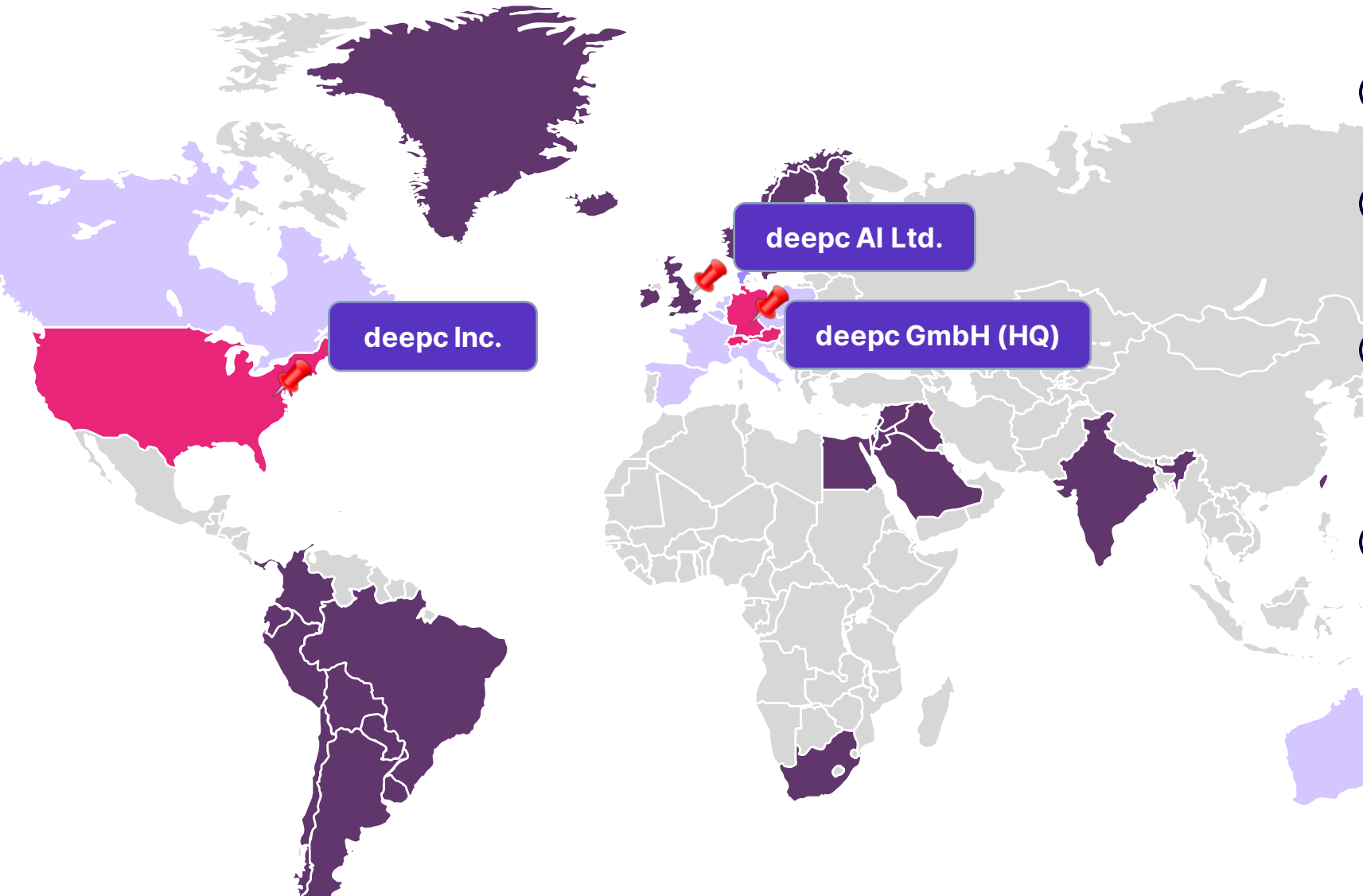
VIEW

large vessel occlusion

CLOSE

History and global business activity

deepc is active in EMEA, USA & APAC



2019

Foundation deepc GmbH

2020

Development deepcOS
Seed-Funding

2021

Beta Testing deepcOS

2022

Product Launch deepcOS
Series-A Funding

2023

Expansion EMEA, USA, UK
Global reach through 15 distribution
partners

02/2024

Acquisition of Osimis S.A.



KING'S HEALTH PARTNERS

An Academic Health Sciences Centre for London

Pioneering better health for all



+



2019

Foundation deepc GmbH

2020

Development deepcOS
Seed-Funding

2021

Beta Testing deepcOS

2022

Product Launch deepcOS
Series-A Funding

2023

Expansion EMEA, USA, UK
Global reach through 15 distribution
partners

02/2024

Acquisition of Osimis S.A.

H1/2024

deepc joins King's Health Partners
Digital Health Hub, partners with
NHS England, KCL, and the AI
Centre and opens first UK office



The deepc team today

A proven, diverse, highly-skilled & experienced global team of 60+ people that is able to execute at scale



Dr. F. Pfister, MBA | CEO / MD (Co-Founder)



Dr. J. Moosbauer | COO (Co-Founder)



Mike Rochow | Commercial Director



Craig Rhodes | Director Strategic Partnerships



Arno Koldewee | Head of Product





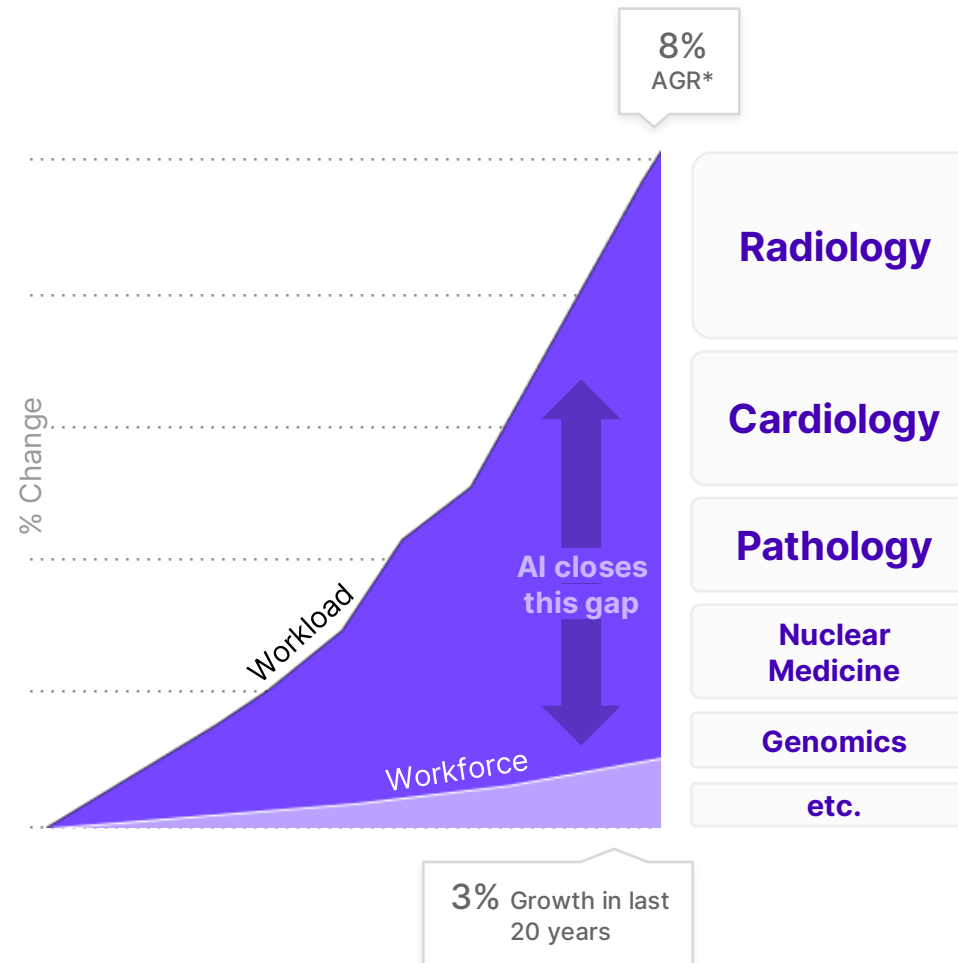
AI adoption in diagnostics is happening

Diagnostics such as Radiology is experiencing massive challenges

54% Physician burnout

76% Lacking staff for safe and effective care

30% Diagnostic errors due to work overload



“

AI won't replace physicians, but physicians who use AI will replace physicians who don't.



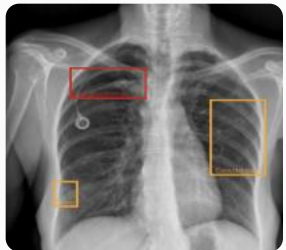
Prof. Curtis Langlotz
Radiologist, Stanford &
Director, AIMI Center



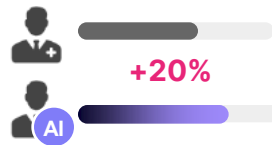
AI Products are poised to address the existing challenges

Already today, there are numerous fields of application across all areas with great clinical impact

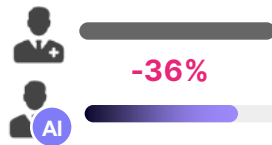
X-Ray Chest Finding Detection



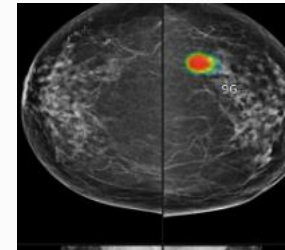
Detection Rate
Critical Findings



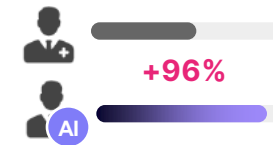
Reading Time
CXR Findings



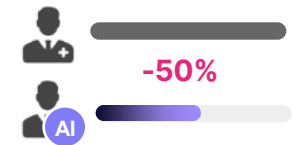
MMG Breast Cancer Screening



Detection Rate
Breast Cancer AUC



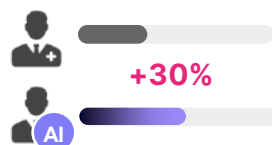
Reading Time
Mammography



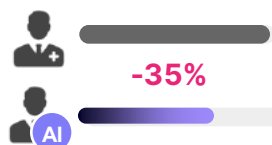
X-Ray MSK Fracture Detection



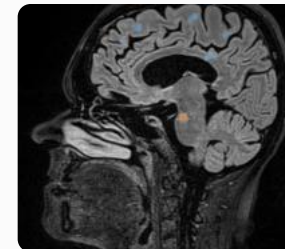
Detection Rate
XR Fractures



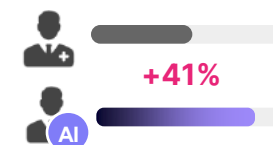
Reading Time
XR Fractures



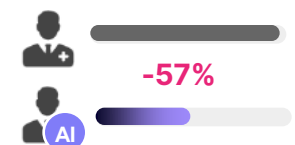
MRI Brain MS & Volumetry



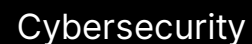
Detection Rate
AUC



Reading Time
Volumetry

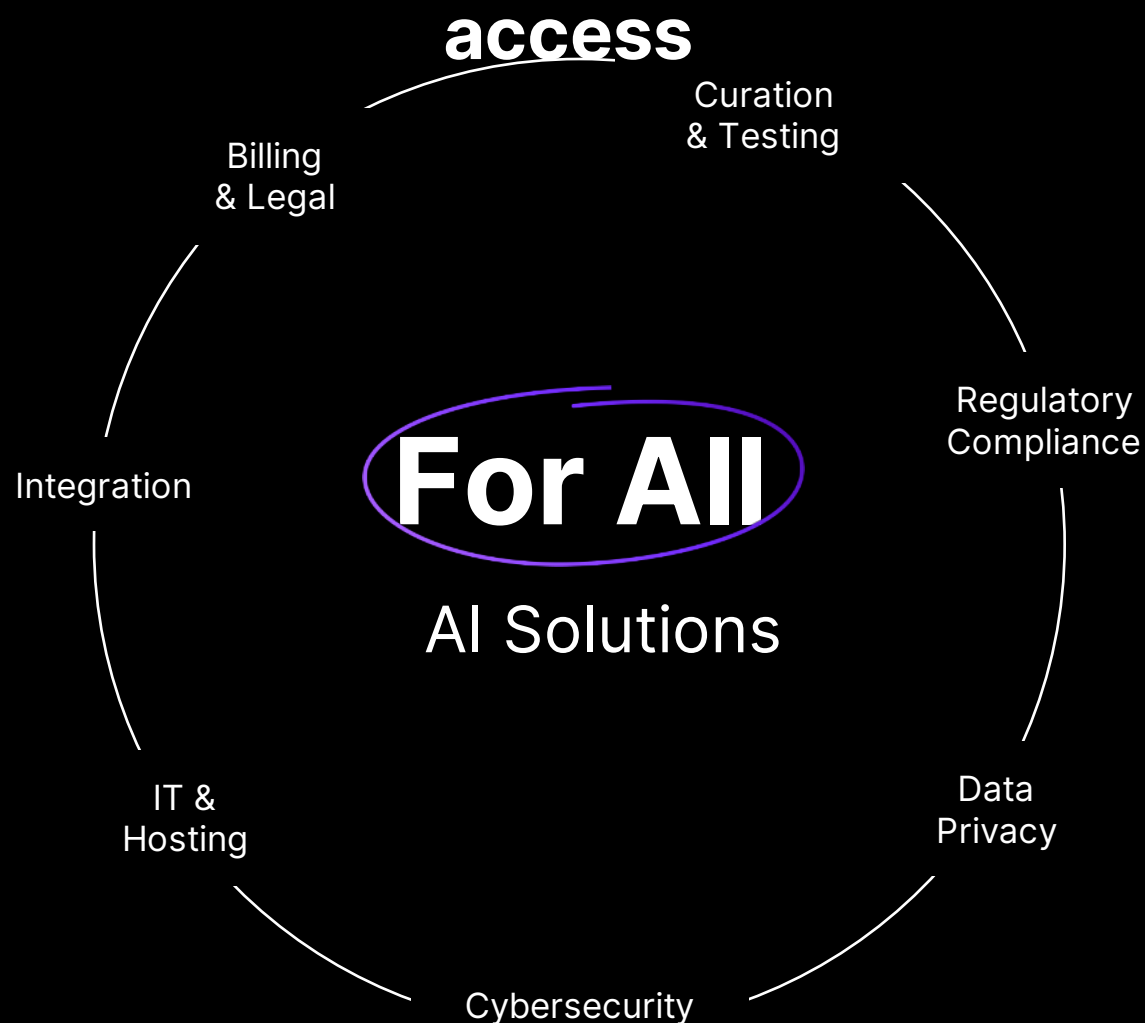
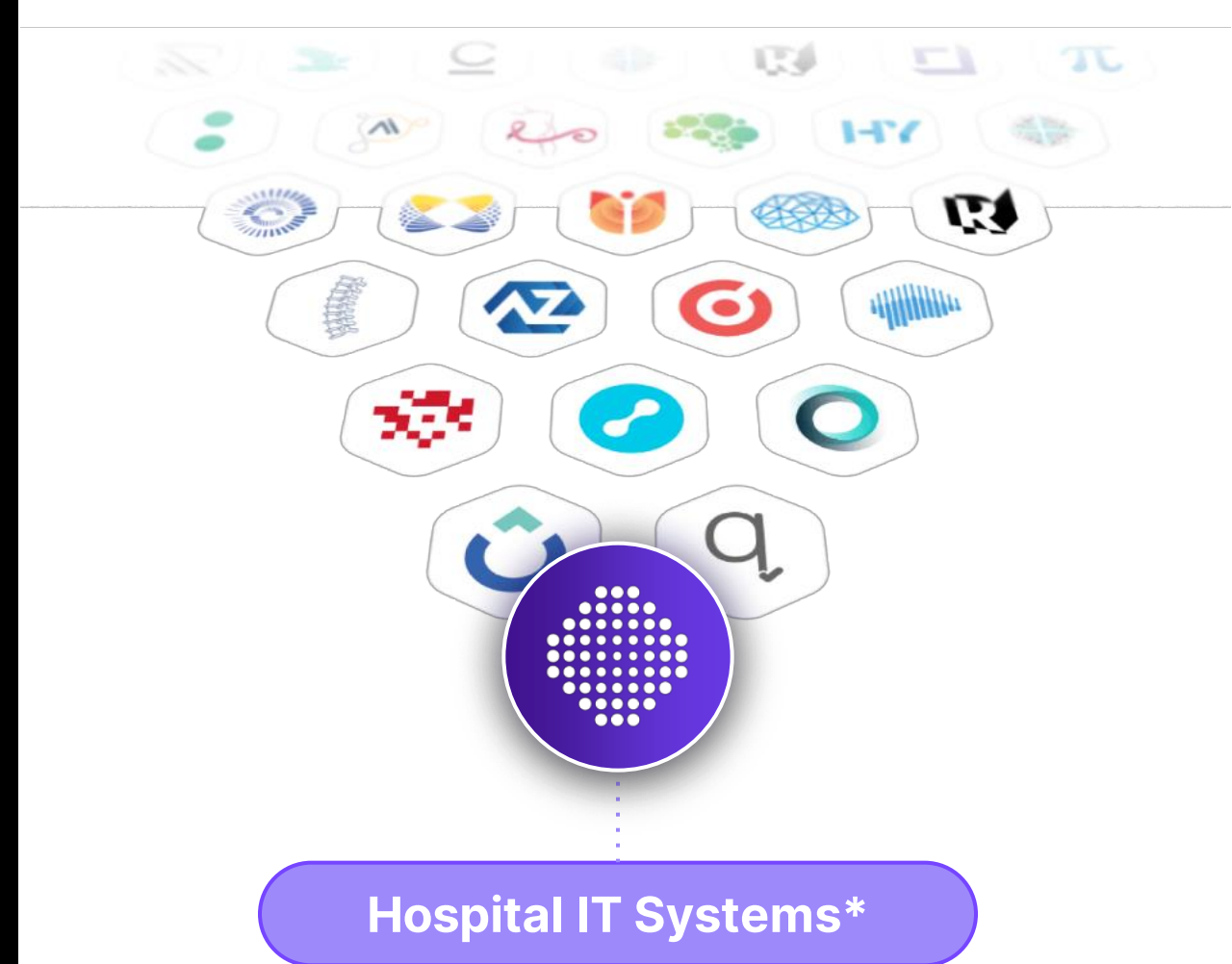


Process



A myriad of more than 1000 AI solutions makes it impossible for customers to manage AI

Single Platform & Procurement Process enables scalable AI



Only one AI operating system -
deepcOS® - is needed to manage
all AI solutions

Plan for Transition

AI technologies and evidence



deepc and AI Centre proposal

Objective – to deploy deepcOS platform across all trusts and allow specific AI applications to be deployed, integrated and utilised in clinical workflow

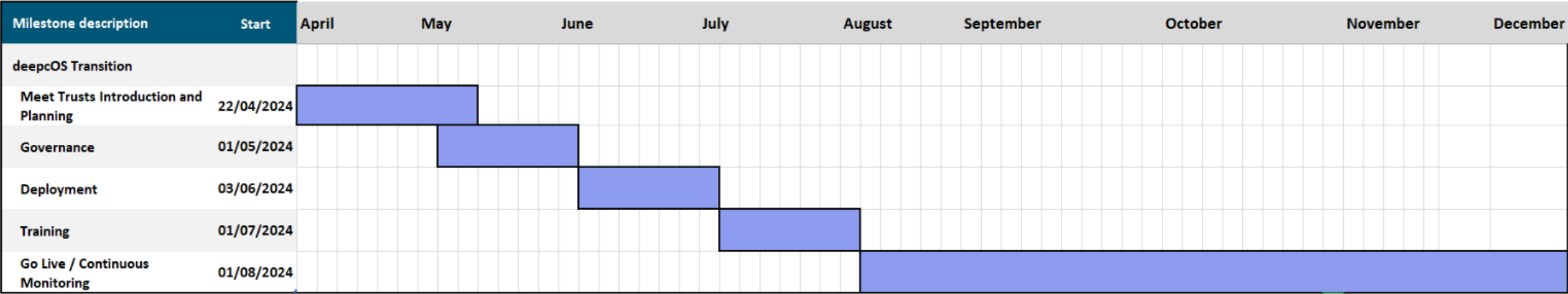
Activities

- Deploy deepcOS platform across each NHS Trust (who sign up)
- Identify an AI application that can run across all Trusts e.g Chest X-Ray (trial program)
- Deploy and integrate the AI application to each Trust and into the radiology workflow
- Train users and go live
- Collaboration with KCL/GSTT on research program (TBD) to run in parallel to program of work
- Run application for 6 months* (not including implementation and integration)
- Manage all support or training queries
- Manage the program

Goal – Radiologist have deepcOS platform integrated into their workflow, providing AI analysis on a specific use case (e.g. Chest X-Ray)

The cost of the above activities in the first phase will be borne by deepc and the AI Centre

Platform Transition Plan



Thank you

To our funders and partners

