

Orchestration of innovation: Enabling infrastructure

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NHS
Greater Glasgow
and Clyde

West of Scotland
Innovation Hub



University
of Glasgow

An aerial night view of a city, likely Seattle, featuring a large river and a prominent bridge. The city lights are visible in the background, and the water reflects the lights. A large, illuminated structure is visible on the riverbank. The word "Disclaimer" is overlaid in white text on a blue background box.

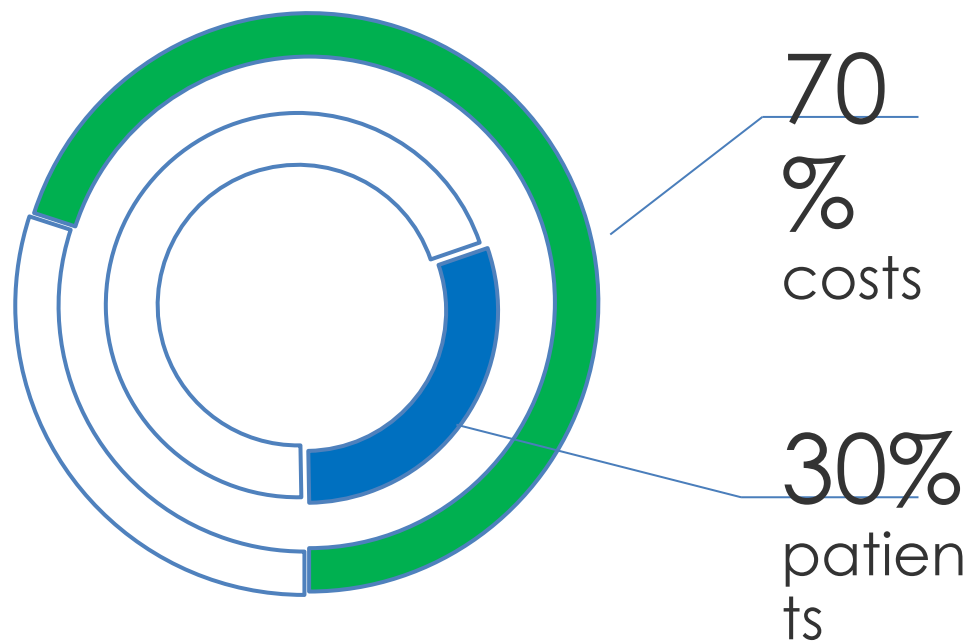
Disclaimer

Demand



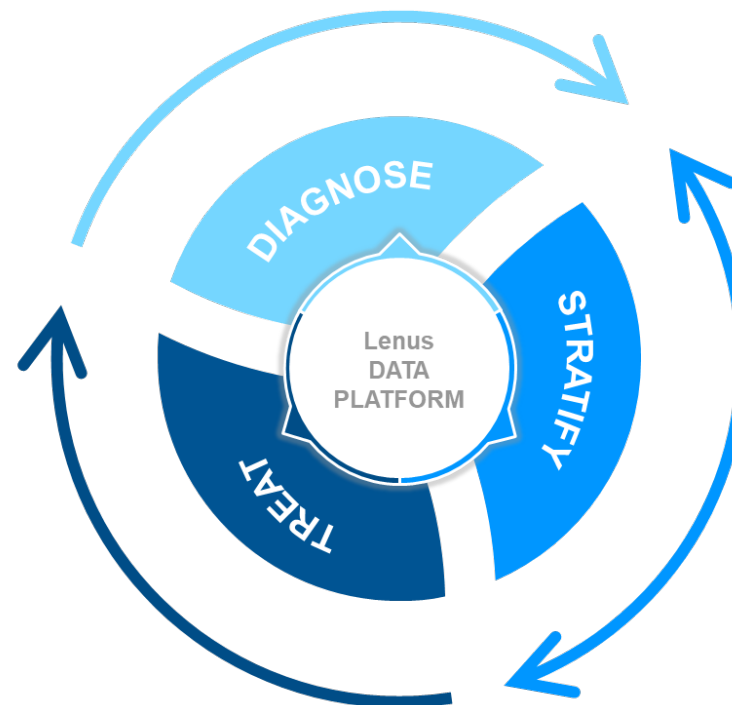
The challenge

Chronic conditions like COPD / HF account for a disproportionate share of healthcare resources and are tied to inequalities



The approach

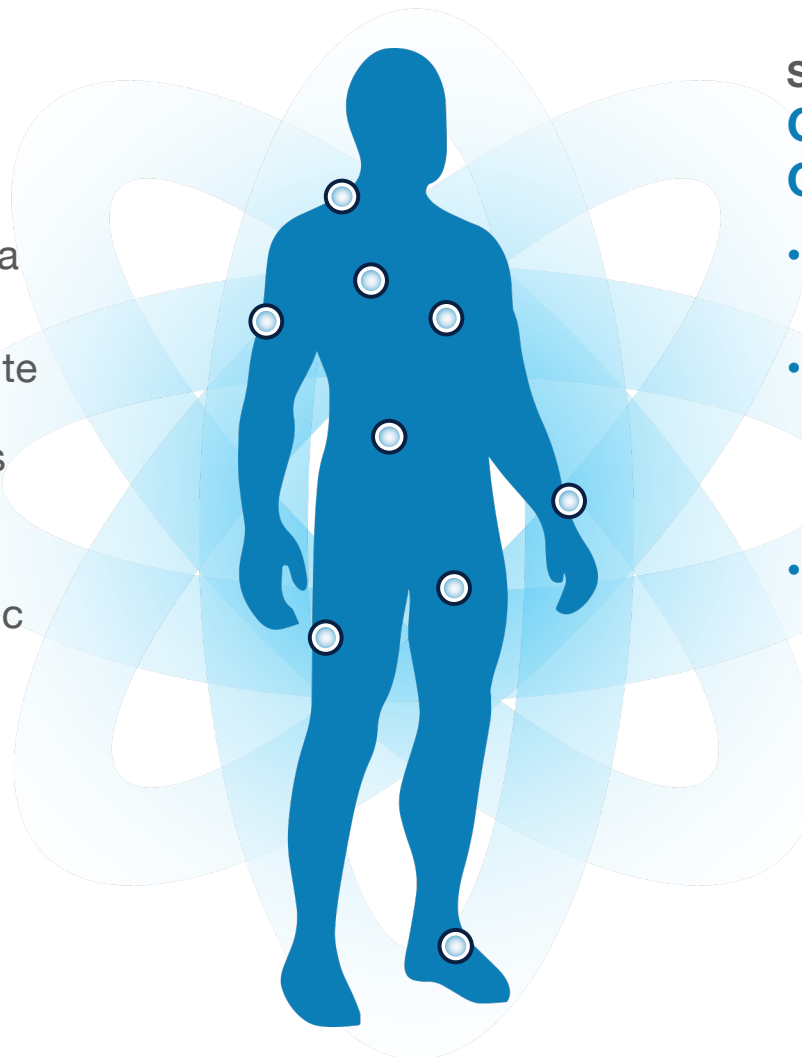
Build an end-to-end pathway that enables machine learning to support case finding and risk stratification



Context

Emerging Role of Data & Artificial Intelligence

- The centre of gravity of healthcare data is shifting.
- Data generated outside traditional acute settings from sensors, devices, smartphones, point of care testing kits will become as valuable as the data generated in it
- Machine learning models for diagnostic and decision support will rely on new, structured datasets combined with longitudinal patient record data from legacy IT systems



Shift to Community Healthcare / Care at Home models

- Policy focused on moving burden of care from acute setting into community
- Need to breakdown barriers between care institutions and funding streams to deliver care rather than each encounter being a single unconnected episode
- Diagnose LTCs early and managing patients key to addressing:
 - Outpatient waiting times
 - Hospital readmission rates

Blockers to adoption

1. LEADERSHIP



DEMONSTRATE THE WILL

If we want to be an AI powerhouse, then make a real commitment and support those who want to make it happen

2. COORDINATION



GET ALIGNED AND ORGANIZED

Act as a nation, remove duplication, thin the herd, focus on the national priorities and growth hack

3. EVIDENCE



SIMPLIFY EVIDENCE GATHERING

Agree an evidence framework, lower the cost, build evidence iteratively and focus on value

4. CONSISTENCY



FOCUS ON PATHWAYS

Focus on clinical pathways and patient journeys, consider AI a facilitator of service redesign and alignment

5. SCALABILITY



PROVIDE THE PLATFORMS

Start with scalability in mind, use a platform approach, 'connect the nation' rather than individual territorial boards

6. MONEY

TAKE A PORTFOLIO APPROACH

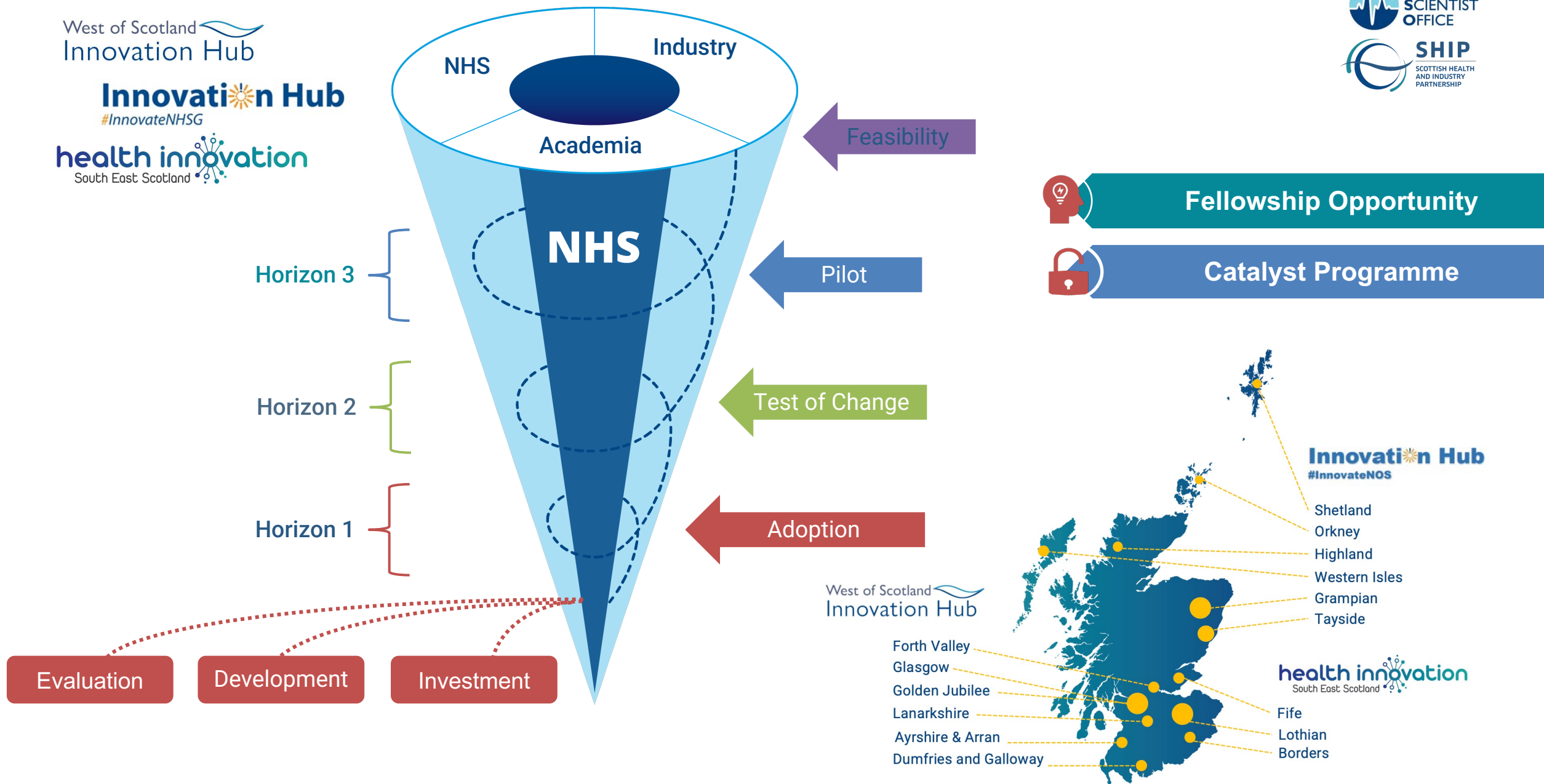
There is no money in the public sector, so leverage highly capitalised industrial partnerships in combination with grant funding, third sector funding and the money markets.

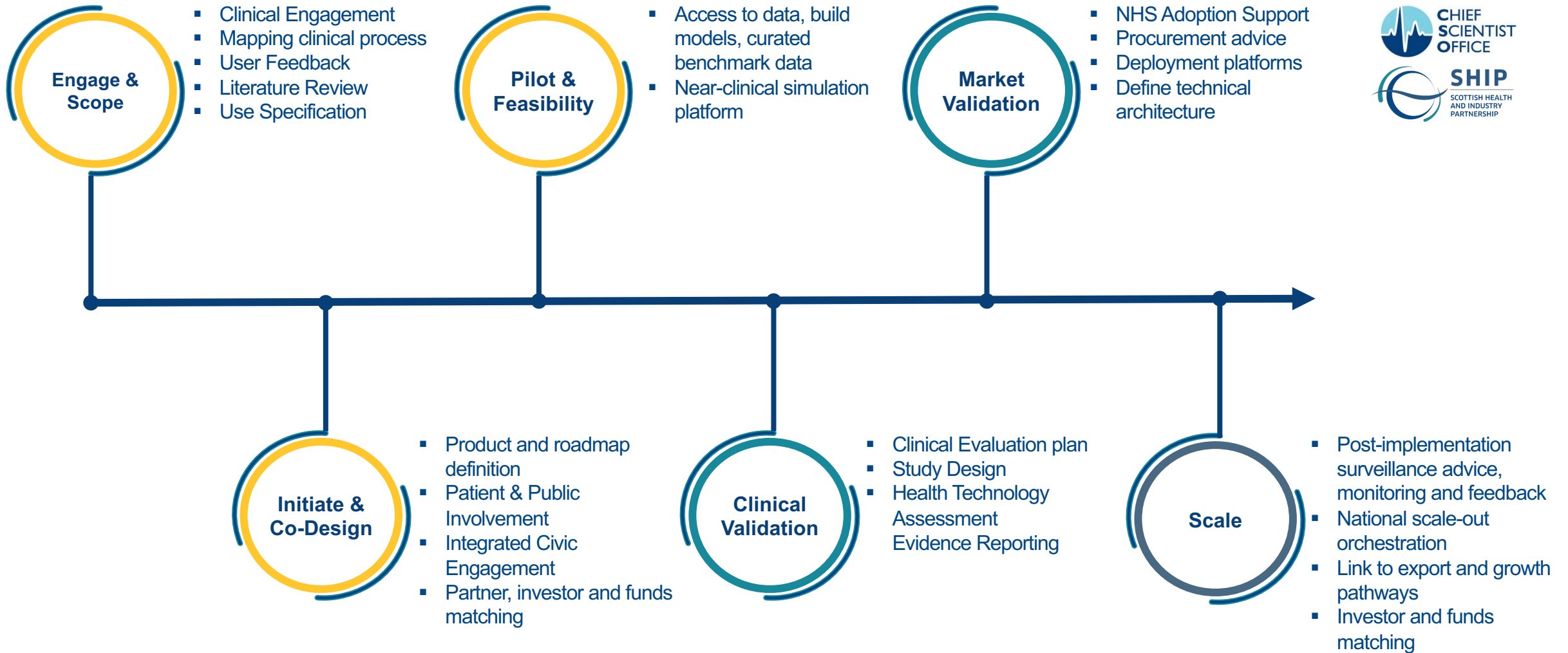


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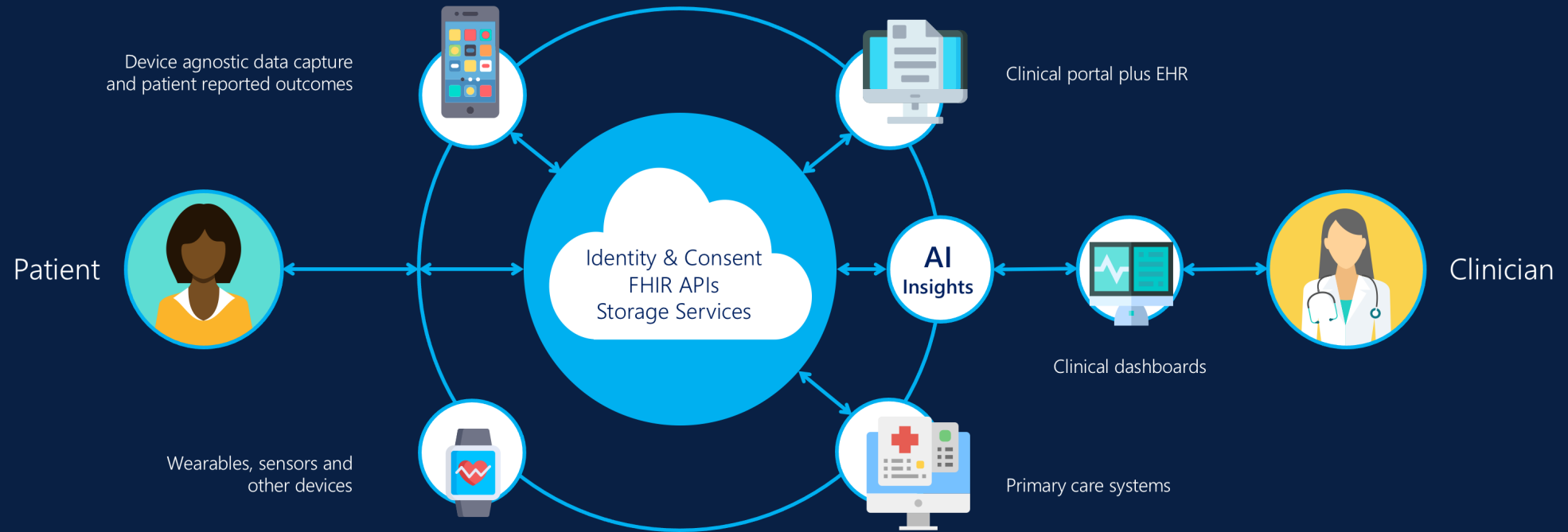




The image features a pair of blue nitrile gloves holding a blue, porous foam tube. The tube is held horizontally across the frame. Below the tube, a dark blue background displays a white line graph with red data points and a red trend line. A red rectangular box highlights the text 'Triple Helix' in the center of the image.

Triple Helix

Health Data Exchange Platform



A virtual care platform providing a system of interoperability for secure health data exchange:

Infrastructure Layer

Offers identity, consent, security, data capture, curation, storage and two way integration with secondary and primary care clinical systems.

Data Analytics Layer

Converts structured data into AI driven actionable insights to support proactive vs reactive screening and monitoring of high-risk patients

Services Layer

Provides an open environment for co-development of digital services enabled through platform APIs

Respiratory Patient Management Platform

The **PneumoWave** monitoring platform captures and analyses data in real-time, detecting adverse events and alerting patients, caregivers or first responders



PneuMoWave incorporates wearable biosensors, a patient gateway, and proprietary data analysis algorithms designed for usability, accuracy and scalable manufacture at low cost. These features enable use in a wide range of respiratory conditions.

BIOSENSOR

- Ease of use
- Accurate
- Low-cost
- Reusable
- Scalable

DATA ANALYSIS

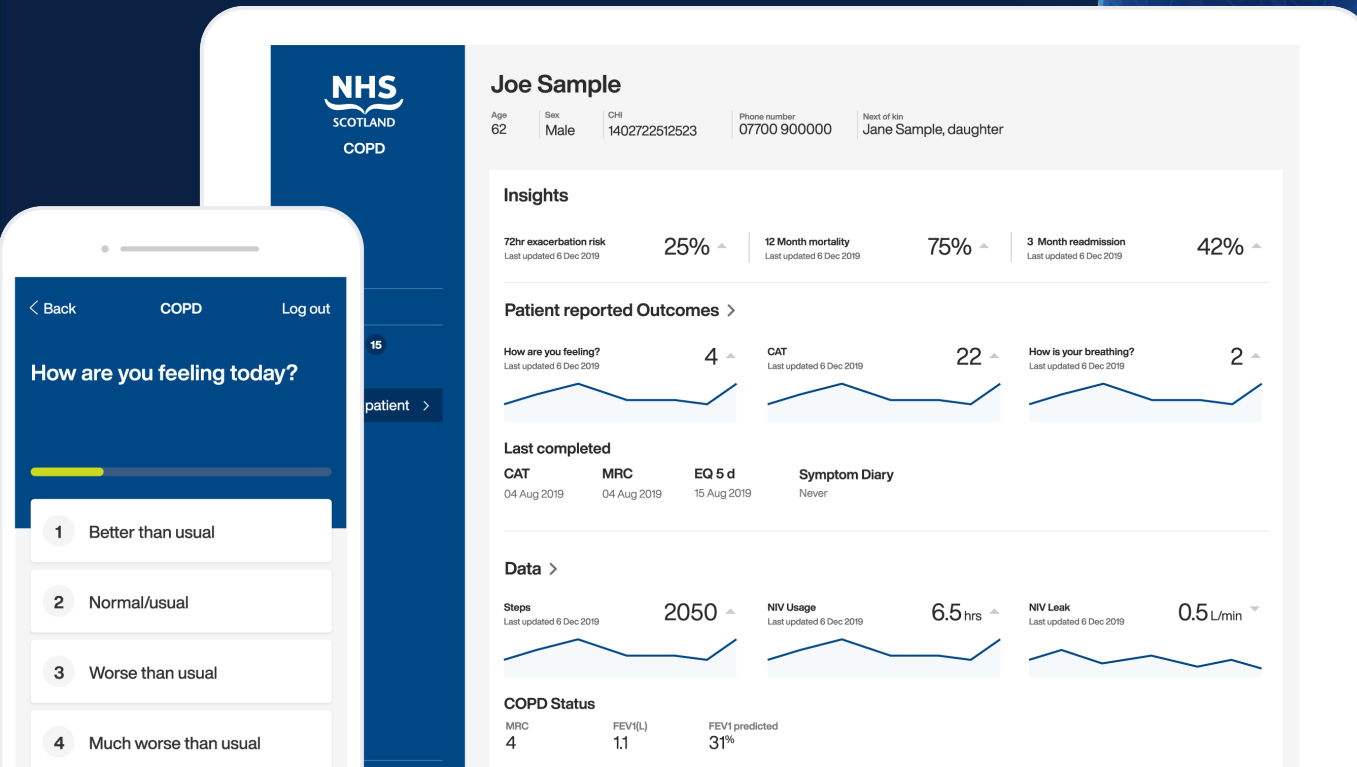
- Continuous
- Real-time
- Event Detection
- Alerting
- Response

Management

DYNAMIC

Digital transformation with machine-learning models to improve outcomes in patients with high-risk COPD

Towards implementing live AI scores in a COPD MDT



NHS Landscape | Lung Cancer Diagnosis

Diagnostic Imaging Challenges

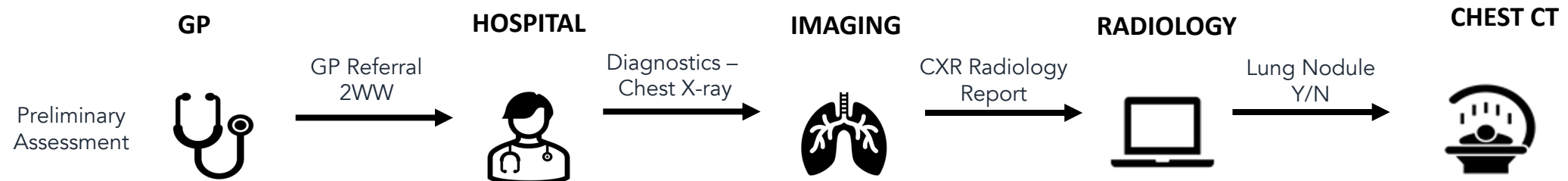
- HIGH IMAGING VOLUMES – 7.3 Mn GP chest x-rays for cancer (2021-22)
- LATE DIAGNOSIS – 74.3% of lung cancers diagnosed at Stage 3 or 4
- LONG WAIT TIMES – 2 days median wait for GP CXR report TAT
- POOR COMPLIANCE – Poor compliance with 62 day target to First Treatment

Source – NHS Diagnostic Imaging Dataset, NHS Cancer Programme Handbook



- Detects and localizes 23 different, Class IIb certified abnormalities including lung nodules
- Triage, prioritises and notifies critical Chest X-ray scans
- Generates AI Secondary Captures
- Pre-populates Chest X-ray editable Radiologist report

Standard Imaging Pathway – Lung Cancer Diagnosis



1

Scalable digital HF diagnostic pathway

Primary Care



Patients referred from primary care

Multiple GP clinics with central referral process including existing backlog

1st Line Tests

ECG
NT-proBNP



digital Active Clinical Referral Triage (dACRT)

Priority for diagnosis based on patient symptoms, history, reported outcomes e.g., raised NTproBNP

Vetting



Higher priority patients

Lower priority patients

Scheduling & PROMs

For diagnosis appointment at the hub
Patients submit PROMs in advance

Diagnostic Hub

2nd Line

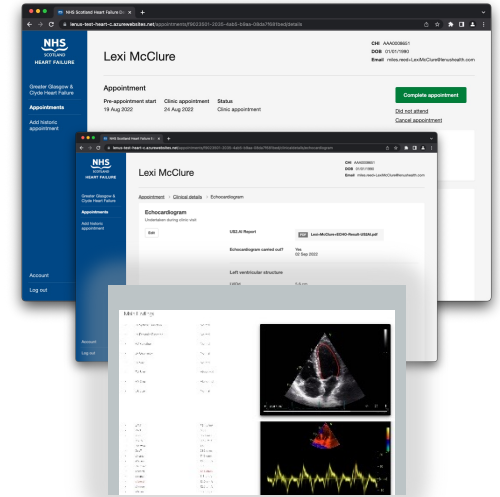
Echo



Patient attends hub

Patient may receive diagnosis as 'one-stop'

Virtual Review & Outcome



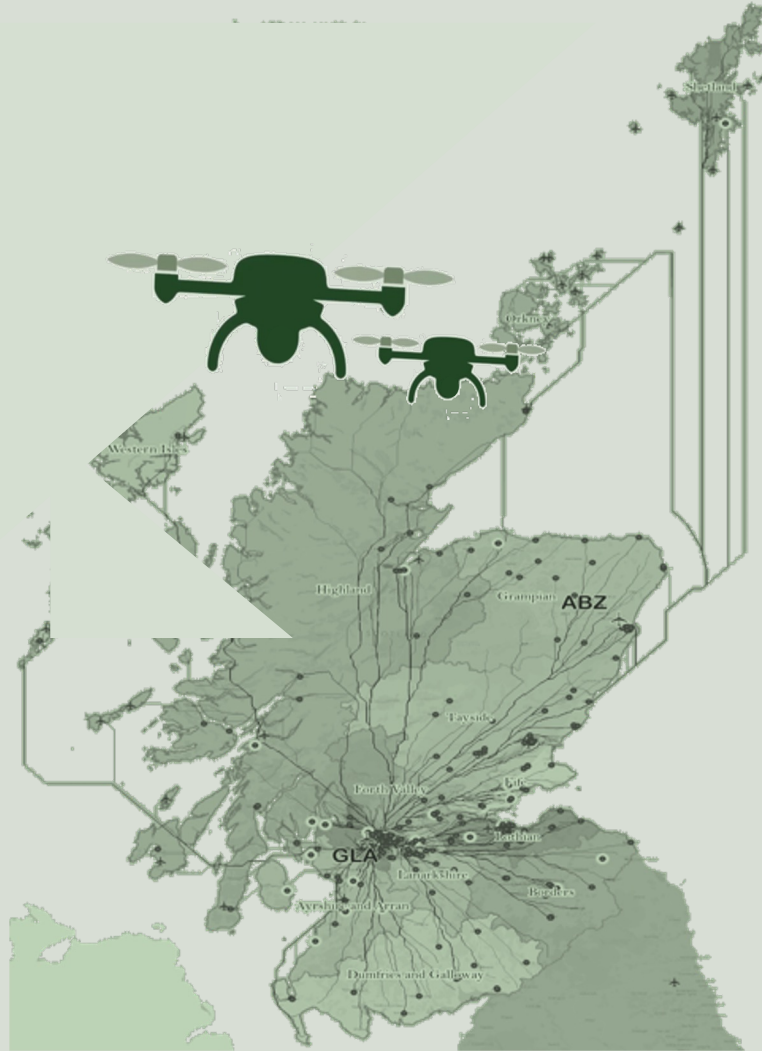
Remote Specialist diagnosis and treatment initiation

Diagnosis and follow-up plan (by Cardiologist, Pulmonologist)
Letter to GP confirming outcome.

Manage Reporting

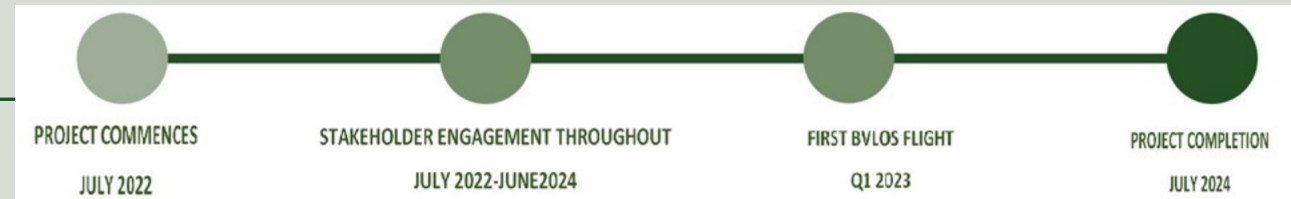
Management reporting for diagnosis outcomes
Up to 25 patients outcomed in 4hrs

CAELUS



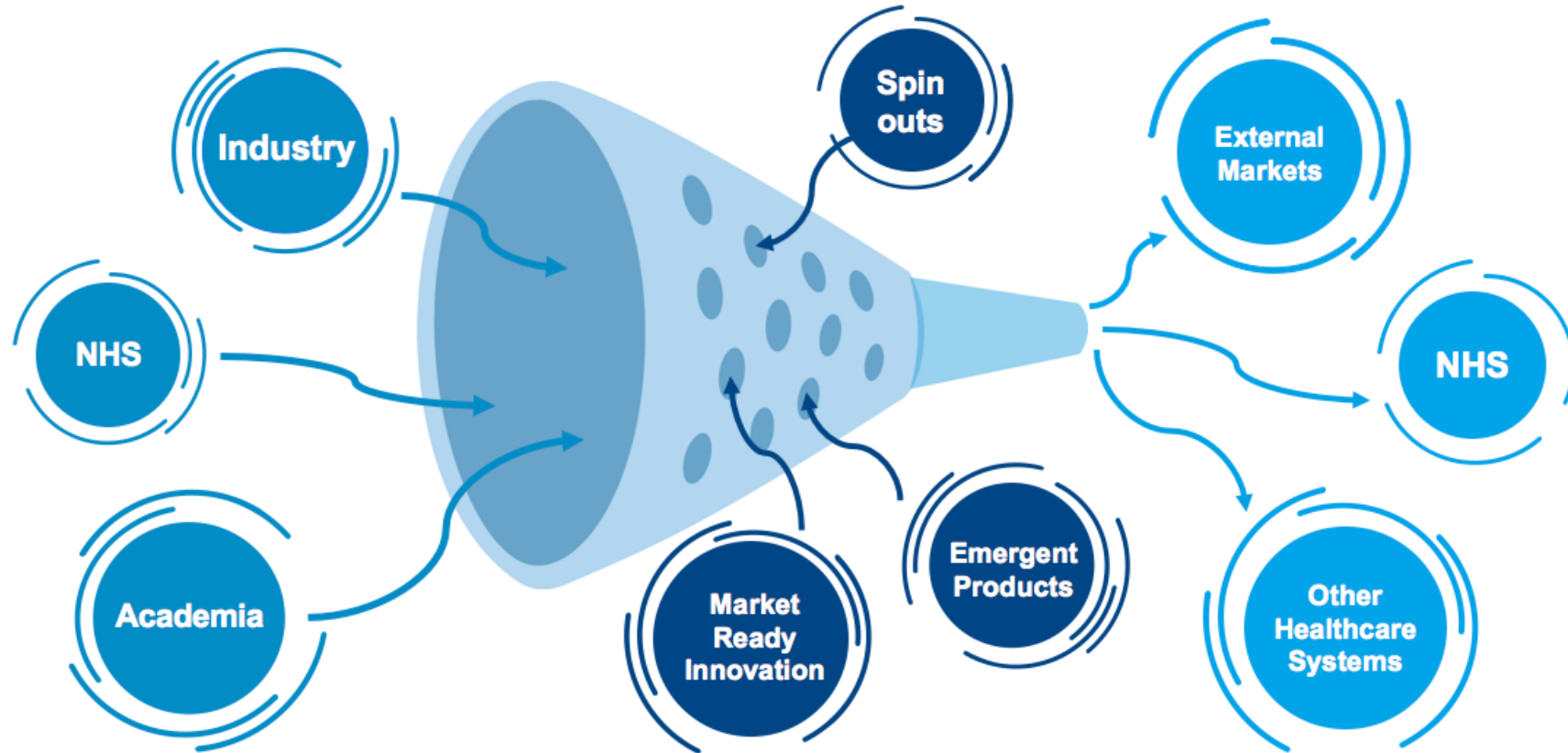
“Demonstration of a drone-enabled medical logistics network for Scotland, serving a variety of validated real-life use cases across urban and rural environments”

- £10m project
- 16 partner
- 24 months (ends July 24)
- 1st flights Jan 23





Open Innovation



A photograph of an industrial facility, likely a refinery or chemical plant, featuring a complex network of blue and yellow pipes and valves. The scene is brightly lit, and the floor is highly reflective, mirroring the equipment above. A pink rectangular box highlights a section of the piping on the left side of the image. The text 'Realising Value' is overlaid in pink on the left side of the image.

Realising
Value

Once for Scotland approach to innovation adoption

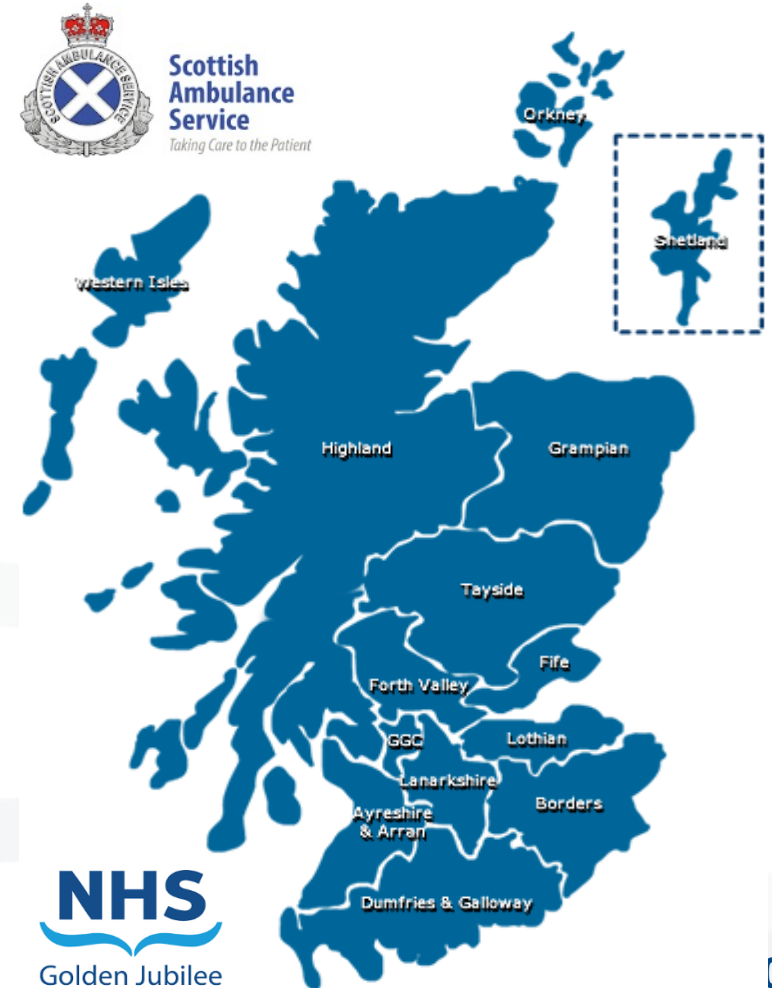


GOVERNANCE
Innovation Design Authority (IDA)
brings together SG & NHS leadership



Proven innovations that can transform how we deliver health care

14 Territorial Health Boards, SAS & NHS Golden Jubilee





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