

Developing Diagnostics in a University setting

Professor Graham Cooke
Vice-Dean Medicine (Research)
BRC Lead Infection and AMR

Discovery

Biomarkers

Sensors

Algorithms

Translation

Signature validation

**Proof-of-concept
tests**

**Real world validation
(including in silico)**

Adoption

**Acceptability and
Implementation**

Economic evaluation

**Licensing and spin-
outs**

Regulation

Discovery

Discovery

Biomarker
discovery
Adults and
children



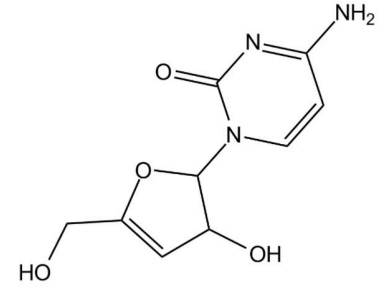
>3000 participants



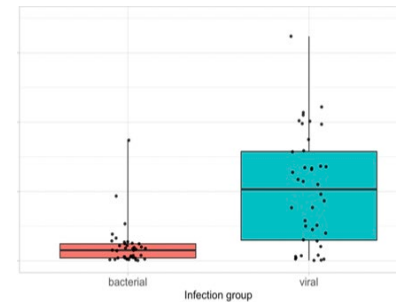
BIOAID cohort



Colebrook Lab
Molecular Diagnostics
Unit



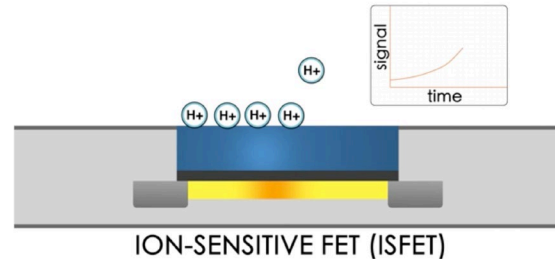
ddhCTP



Mehta et al Med 2022

Translation

Opportunity favours the prepared



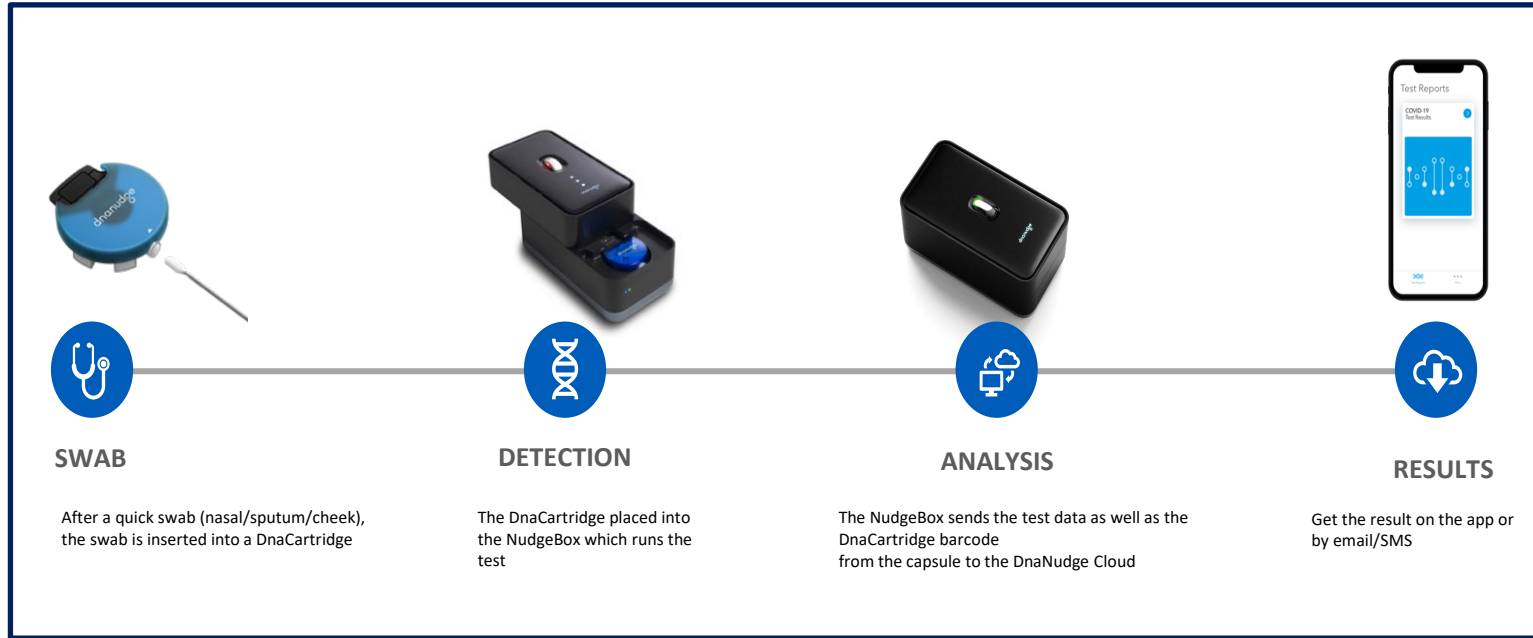
April 2020

Major challenges to hospitals – diagnosis and infection control

Lack of robust laboratory assays

Shortages of reagents, swabs, etc ,etc

CovidNudge | RT-PCR at the point of care



Clinicians

Physical
sciences



Pathology

Industry

Early Clinical Evaluation (April 2020)



Multi-site evaluation (May 2020)

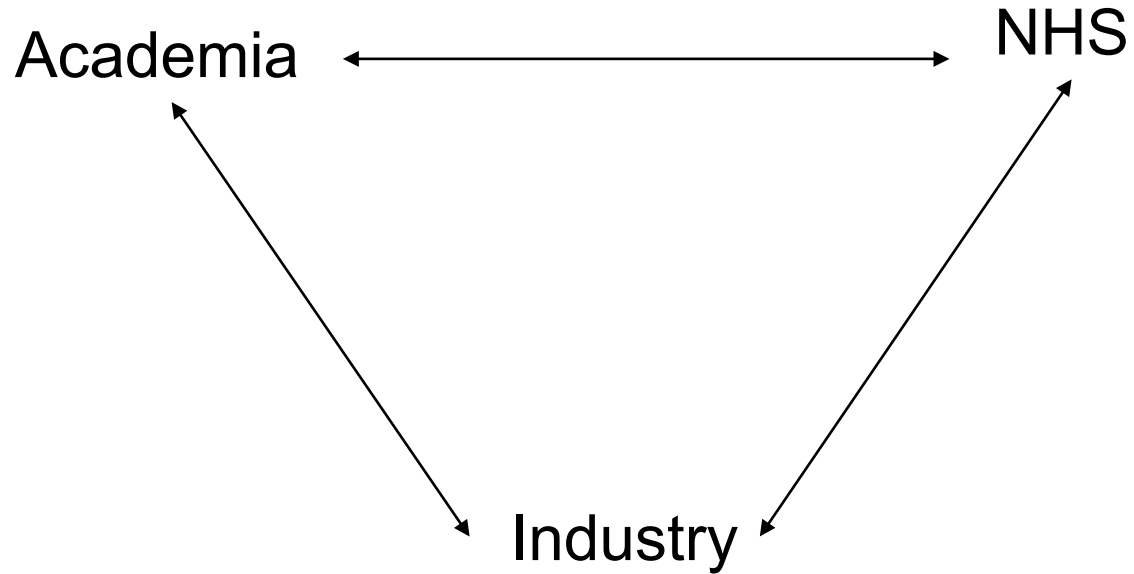


Adoption and Scale up (July 2020)



Adoption

Enabling adoption



NIHR

Diagnostic Evidence Co-operative

2014-8

NIHR

London In Vitro Diagnostic Co-operative

2018-24

NIHR

Health Research Centre

2024-

IMPERIAL



Imperial College Healthcare



The **ROYAL MARSDEN**

NHS Foundation Trust

LONDON SCHOOL of HYGIENE & TROPICAL MEDICINE



BIVDA

ABHI HealthTech for Life



MEDCITY

PADDINGTON LIFE SCIENCES



MedTech SuperConnector™

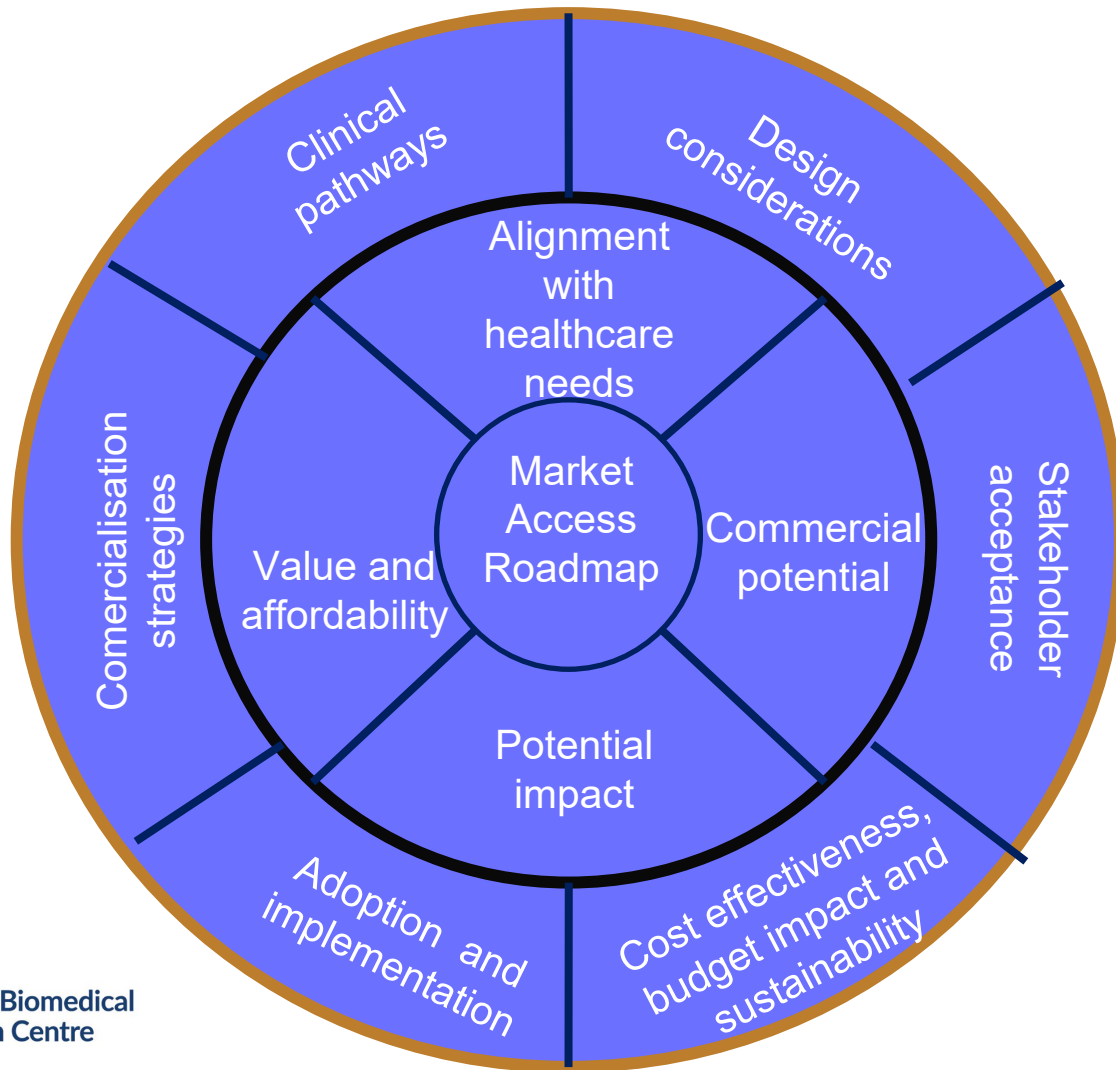
CANCER

INFECTION & RESPIRATORY

CRITICAL & ACUTE CARE

PRIMARY & SOCIAL CARE

METHODOLOGY



BREATH TEST

Volatile Organic compounds (VOCs)

Carbon-containing compounds, sufficiently volatile to be detectable in the gas phase at room temperature



Breath collection system



- 30s breathing into bag
- Good utility
- Low level of contamination
- Low cost

Breath transfer



- Stainless steel
- 89 mm long
- 64 mm outer diameter
- No VOC loss for 3 months

Breath analysis



- Automated system
- Quality management
- Standard operating procedures

HIGH-THROUGHPUT AUTOMATED SYSTEM

Conditioning tubes



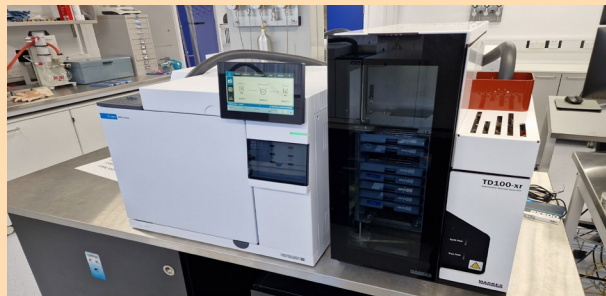
80 tubes every 3 hours

Robot for addition of standards in tubes



>300 tube per day

Autosampler per analytical instrument



100 tube position instrument

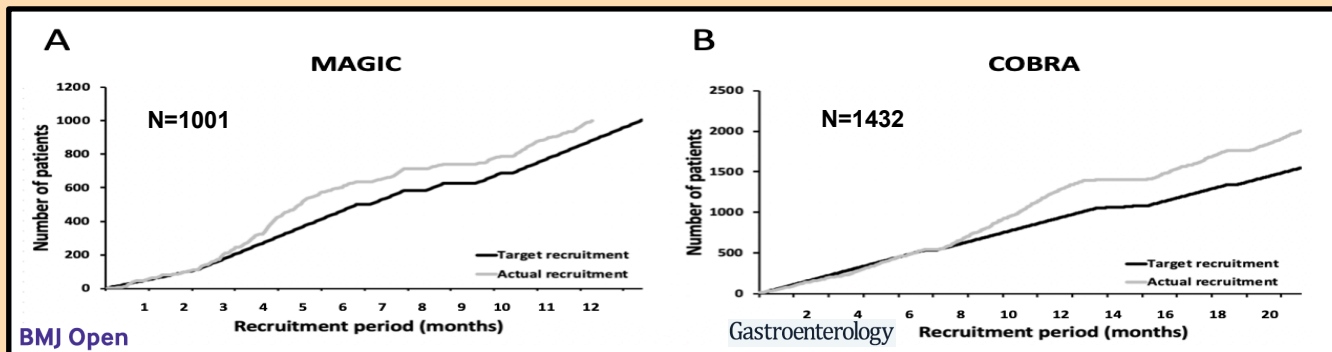
GC-TOF-MS replica instruments



In dedicated VOC laboratory

SCALING UP TO CLINICAL PRACTICE

Acceptability



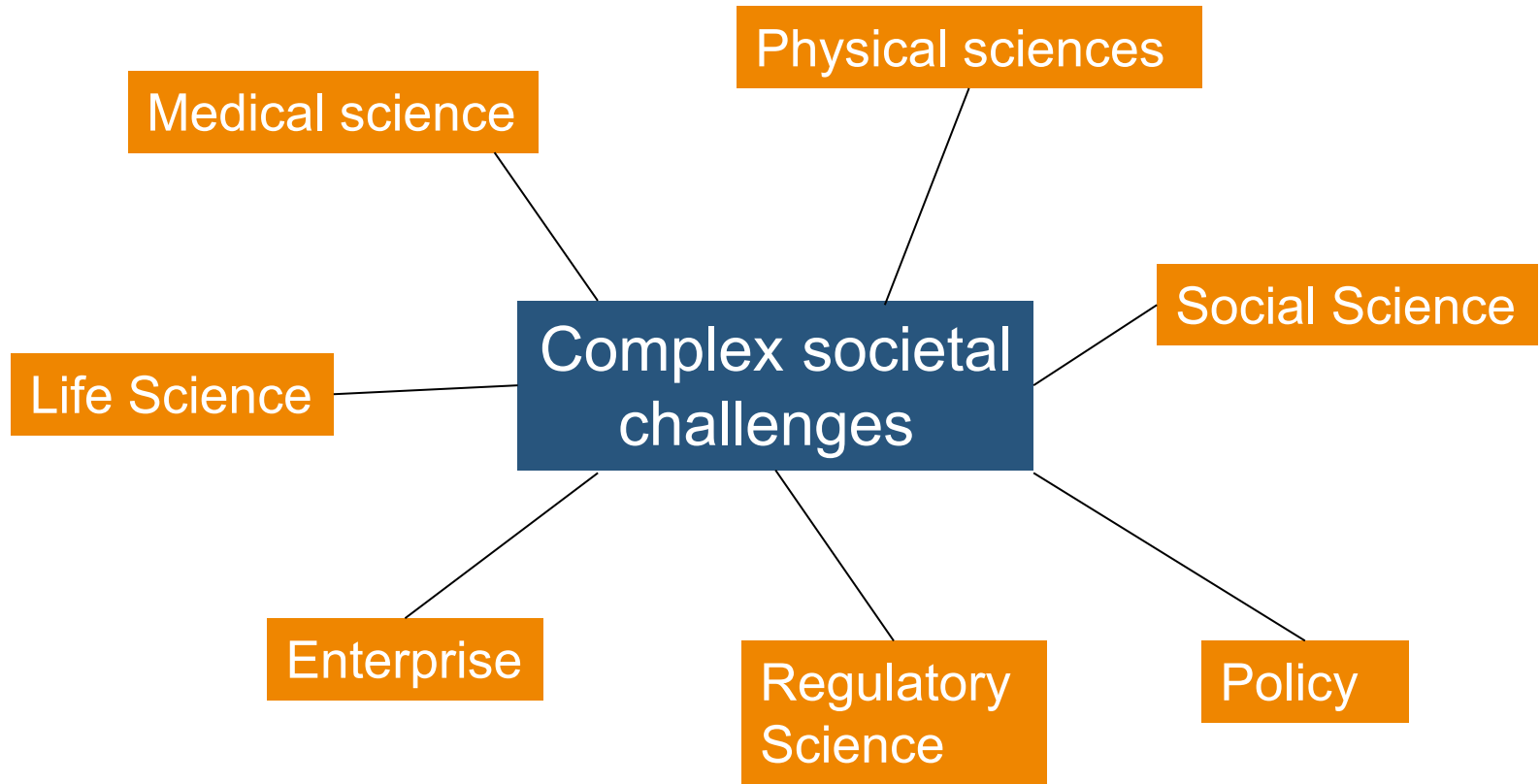
99% very easy/ easy & very comfortable/ comfortable to use

Usability and regulatory

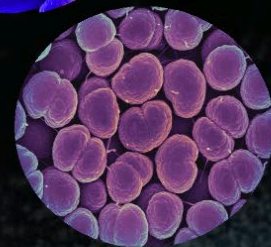
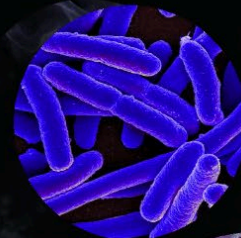
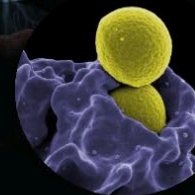
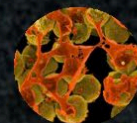
- Human factors studies: triage test in primary care
- Economic modelling: 155M annually cost-saving for NHS in upper GI pathway
- In the process of Lab iso 17025 accreditation
- Registering AROMA, VAPOR, COBRA with MHRA [Medicines and Healthcare products Regulatory Agency].

Funding across the development spectrum

Convergence Science



SIR
ALEXANDER
FLEMING
1881-1955
DISCOVERED PENICILLIN
IN THE SECOND STOREY
ROOM ABOVE THIS
PLAQUE



The Fleming Initiative


Discovery | Engagement | Impact

A Global Collaboration



Imperial College
London

Recreating Fleming's lab virtually



Recreating
*Alexander Fleming's
Laboratory*
Emma Shepley
July 2023

July 2023 Recreating Alexander Fleming's Laboratory 1



www.flemingcentre.org/lab



Transforming convergence science for AMR



A convergent science approach



Consolidating discovery through cross-discipline collaboration



Public-centered behavioural change



Bridging the gap between the public and discovery through engagement



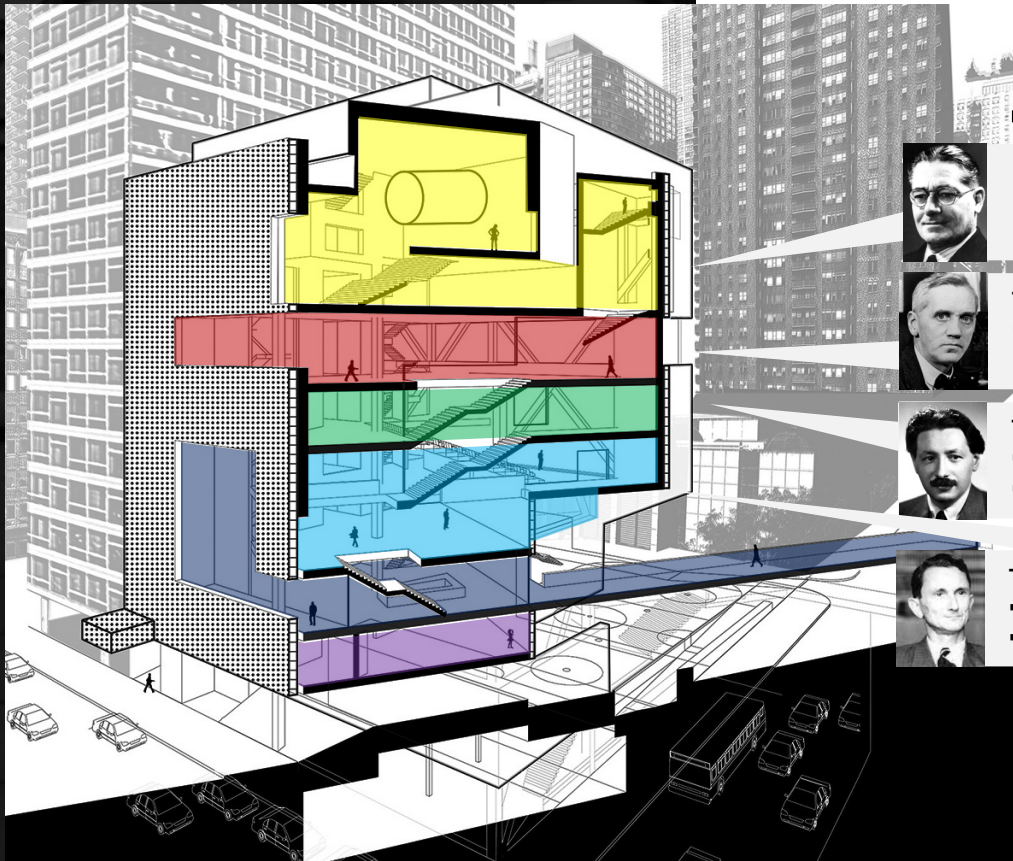
Responsive Policy



Collaborating with local policymakers worldwide to sustain innovation

A Building for public engagement and Convergence Science





A Centre for Change

Discovery | Engagement | Impact



The Florey – (name) Global Impact Centre

- Patient and public involvement and engagement
- The Discovery Centre



The Fleming – (name) Science Centre

- Clinical research (e.g. vaccines) and convergence centres (e.g. diagnostics and therapeutics)



The Chain – (name) Policy Centre

- Centre for co-locating policymakers for a One Health Approach
- Collaborators e.g. UKHSA, Department of Health, DEFRA,



The Heatley – (name) Collaboration Centre

- Collaborative site for visiting partners and media centre
- Space for the WHO, Gates Foundation



- Industry space



- Fleming Fund and Global AMR Innovation fund

Thank You

