“Democratising Health Data Research for Better Care”

Krish Nirantharakumar

Professor of Health Data Science and Public Health, University of Birmingham

Joint Director, Centre for Health Data Science, University of Birmingham

Chair for Data and Data Standards, West Midlands Secure Data Environment

Chief Scientific Advisor – DEXTER Software

Centre for Health Data Science

Semantics & Standards

PARC
European partnership for the assessment of risks from chemicals

BigData@Heart

Royal College of Physicians

UHB & RCP

Multimodal multiomics integrative analytics

HDRUK Health Data Research UK

MAESTRIA

UHB

Bioinformatics

THE TLC STUDY

BIOBANK and other cohorts

Natural Language Processing

NHS
University Hospitals Birmingham
NHS Foundation Trust

HDRUK Health Data Research UK

UHB data and THIN

Artificial Intelligence

The Alan Turing Institute

HDRUK Health Data Research UK

UHB & CPRD

Automation for Clinical Epidemiology

MuM PreDiCT

DExTER

Primary care, Secondary care & maternity care

Computer Executable CDSS

OpenClinical

UHB, & SATH

Informatics Consult

HDRUK Health Data Research UK

UHB, CPRD & SATH

EHR Enabled Clinical Trails

DaRe2THINK

RADIANT

ICS, THIN, CPRD

Value based care & Automated Econometrics

ICS, Primary care, Secondary care

Regulatory Science

DEMAND Hub

Centre for Regulatory Science

MHRA & NICE

Education

MSc Health Data Science

National Academy for Health Data Science

HDRUK Health Data Research UK

OPEHRRA

UoB & HDRUK

West Midlands SECURE DATA ENVIRONMENT

Part of the NHS Research Secure Data Environment Network

DEXTER

Keele UNIVERSITY

75 years 1949-2024

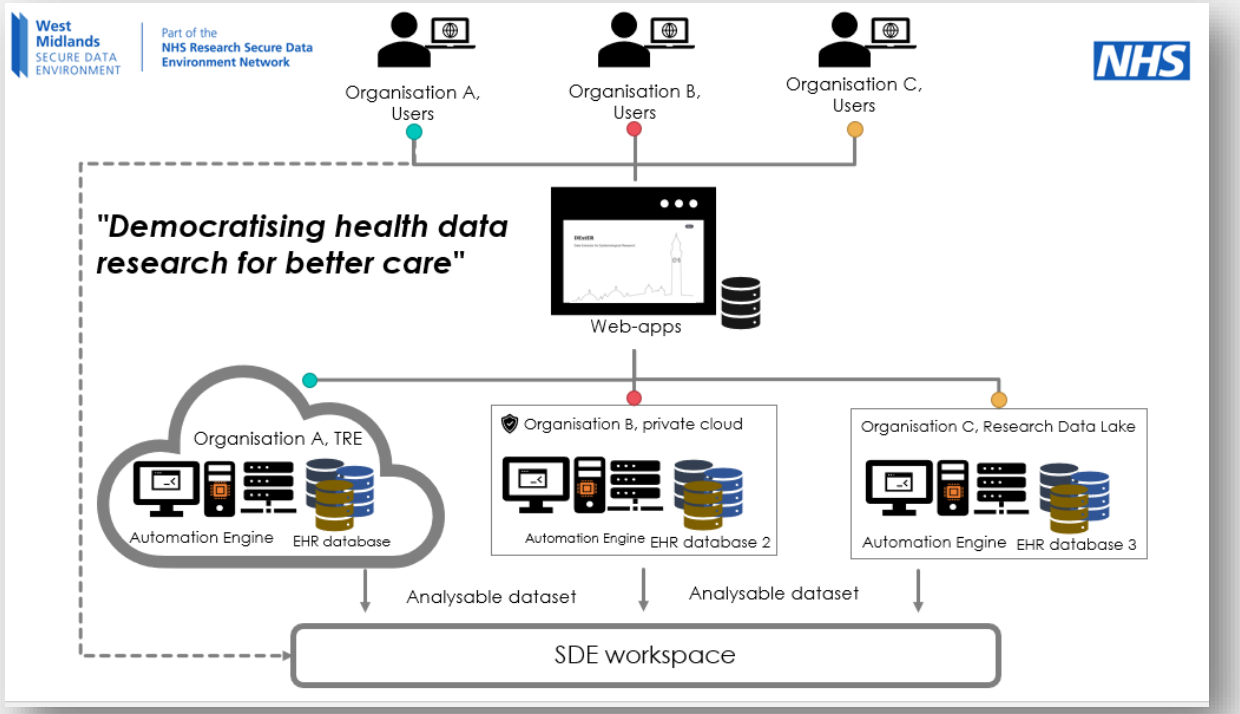
Democratising Health Data Research for Better Care

5 Safe Principles

Safe people, Safe projects, Safe setting, Safe data and Safe output

Automation and AI

Innovation at the heart of NHS Trusts



Efficient and Equitable Access to Data

Streamlined approval process, curated data , automated study design and analytics

Building Skills and Embedding Research Culture in Work Force

Data and Digital Skills development

The Shrewsbury and Telford Hospital NHS Trust

Keele University 75 years 1949-2024

The UK's Beleaguered Maternity Services

"Opportunities for SaTH to lead maternity care innovation"

Professor Will Parry Smith

Professor of Obstetrics and Gynaecology
Keele University School of Medicine

Honorary Consultant Obstetrician and Gynaecologist
Lead Clinician for Research and Innovation
Shrewsbury and Telford Hospital NHS Trust

The Shrewsbury and Telford Hospital NHS Trust

OCKENDEN REPORT

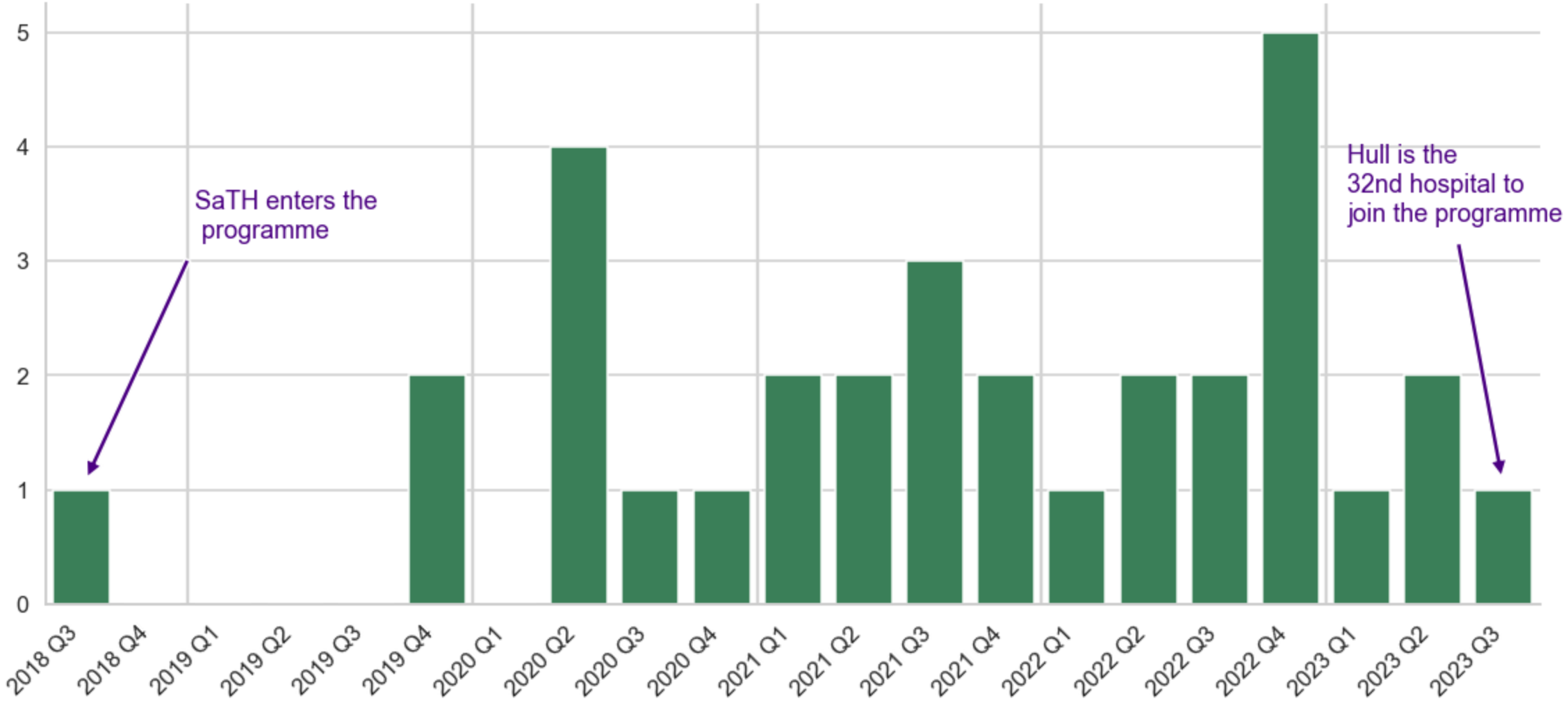
Emerging Findings and Recommendations from the Independent Review of

MATERNITY SERVICES AT THE SHREWSBURY AND TELFORD HOSPITAL NHS TRUST

Maternity Safety Support Programme

The Shrewsbury and Telford Hospital NHS Trust

Number of hospitals entering the Maternity Safety Support Programme after CQC inspection rating of Inadequate or Needs Improvement for safety or leadership



Source: NHS England https://www.england.nhs.uk/mat-transformation/maternity-safety-support-programme/

Missing Staff

Inadequate Data

Missing Evidence

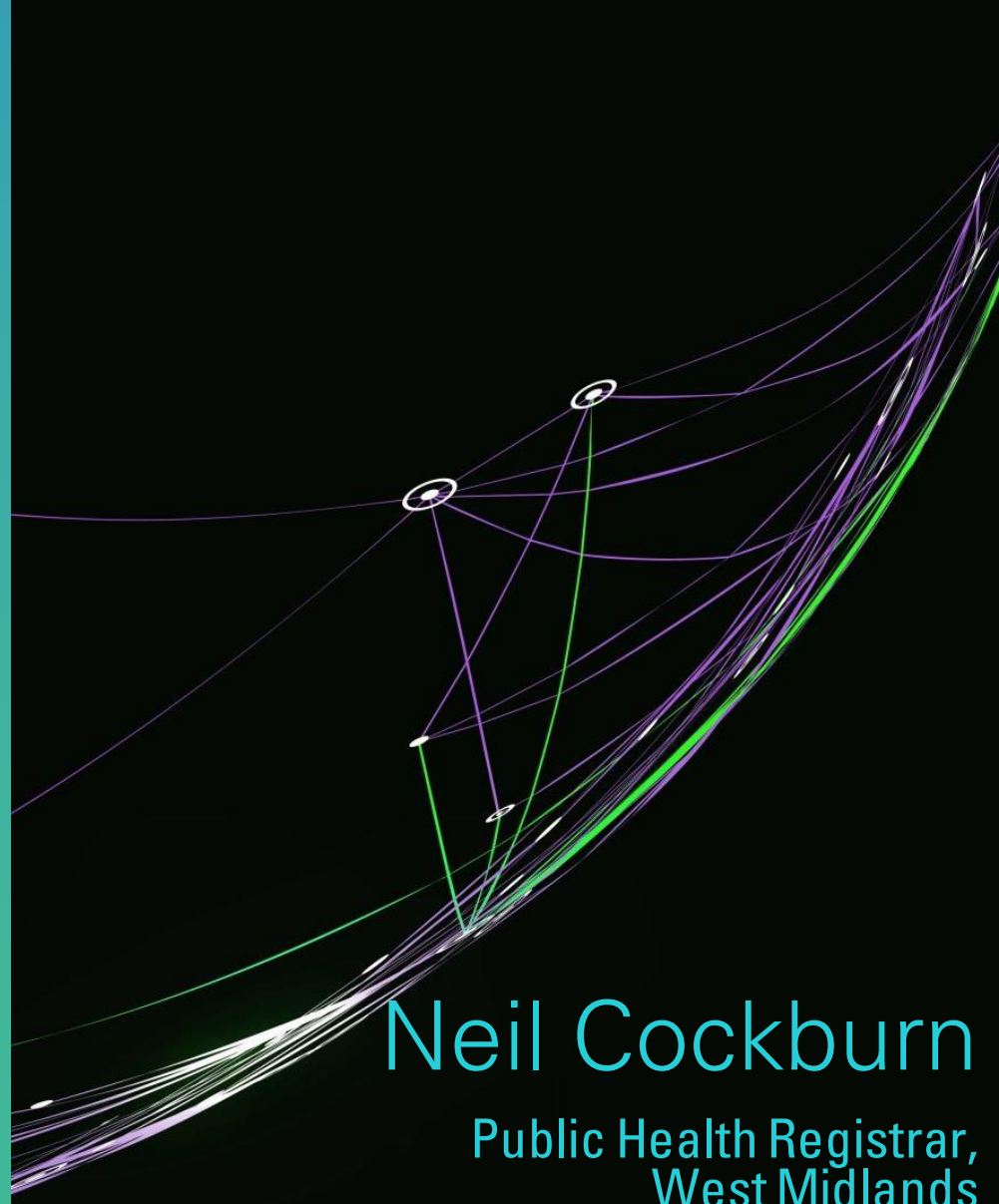
NHS
The Shrewsbury and Telford Hospital
NHS Trust

Feeding the Beast

"…the numbers need to be churned, and they need to be sent out, and they need to go on a dashboard"

LEARNING HEALTH SYSTEMS

Technology deployments at Shrewsbury and Telford Hospitals Trust

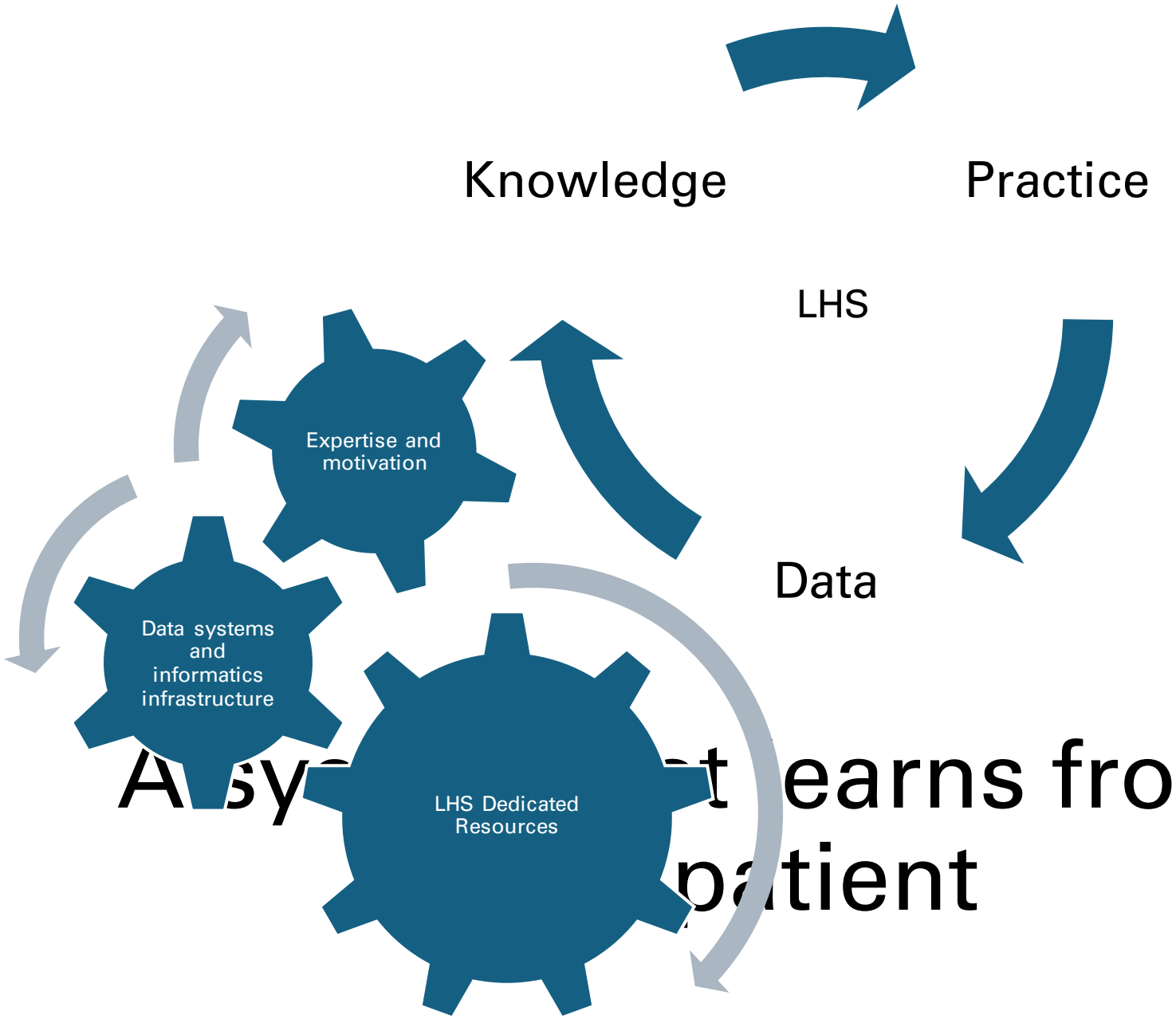


Neil Cockburn

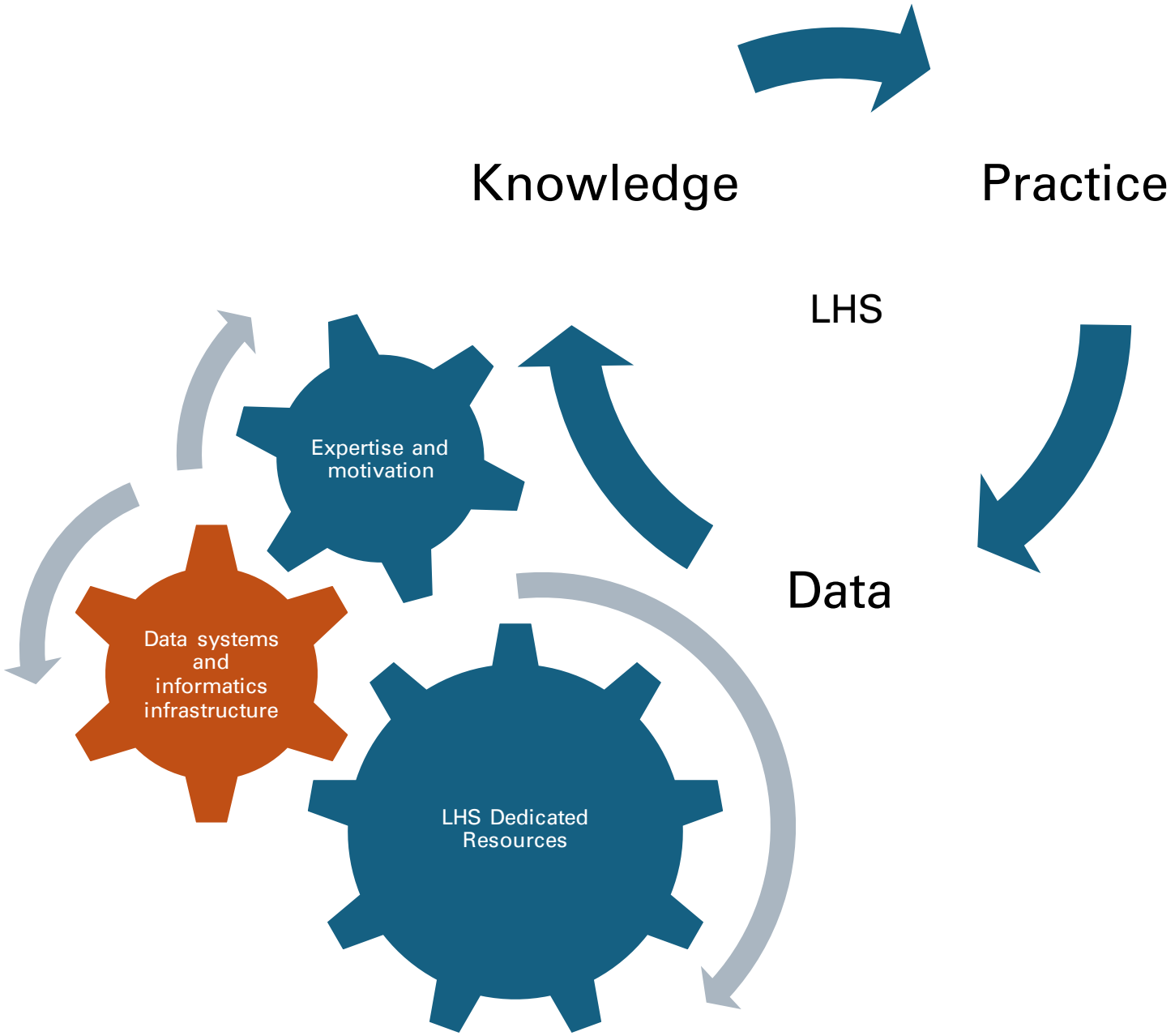
Public Health Registrar, West Midlands

Clinical Research Fellow, University of Bham

n.cockburn@bham.ac.uk



A sy… t earns from every patient


Knowledge
Practice
LHS
Data
Expertise and motivation
Data systems and informatics infrastructure
LHS Dedicated Resources

The Dexter Software Suite

Automated Data Extraction

Study Design Builder - Routine Epidemiology - Pharmaco-epidemiology

Source Agnostic

Applied in many settings for a diverse set of databases and electronic health records

In Your Environment

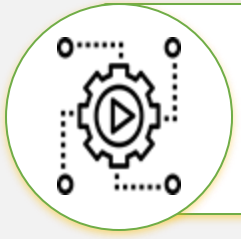
Data never leaves your TRE/data lake/warehouse

Multi-tenancy and Data Governance Processes

Separation of organisation, projects and people

Automated Analytics

Customisable to specific research needs



Scalable, Transparent and Reproducible

Complex studies of over 60 million patient records delivered to short time scales

Phenotype Library and Tools

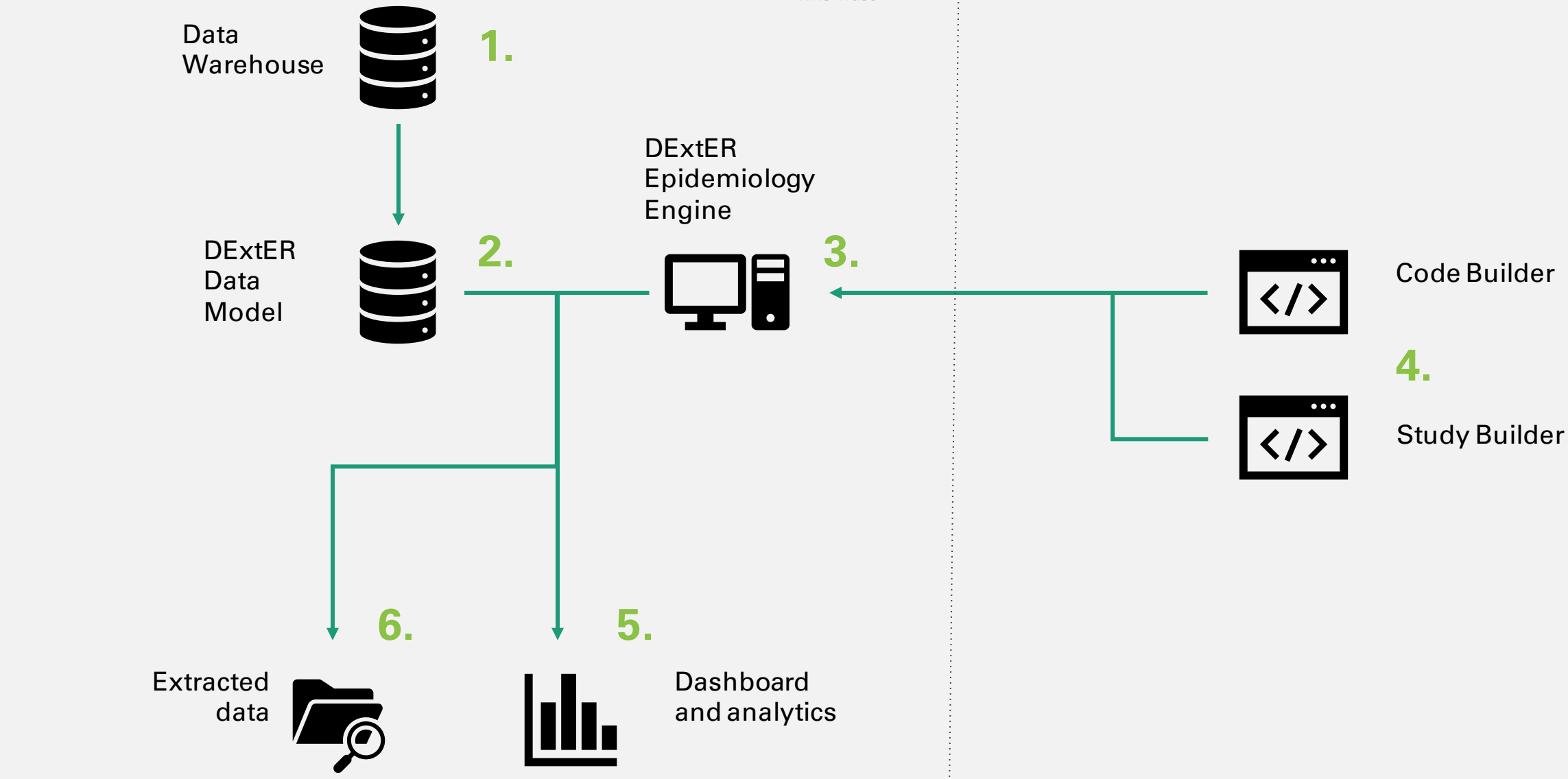
Compatible with any real-world data (RWD) source

Lightweight Application

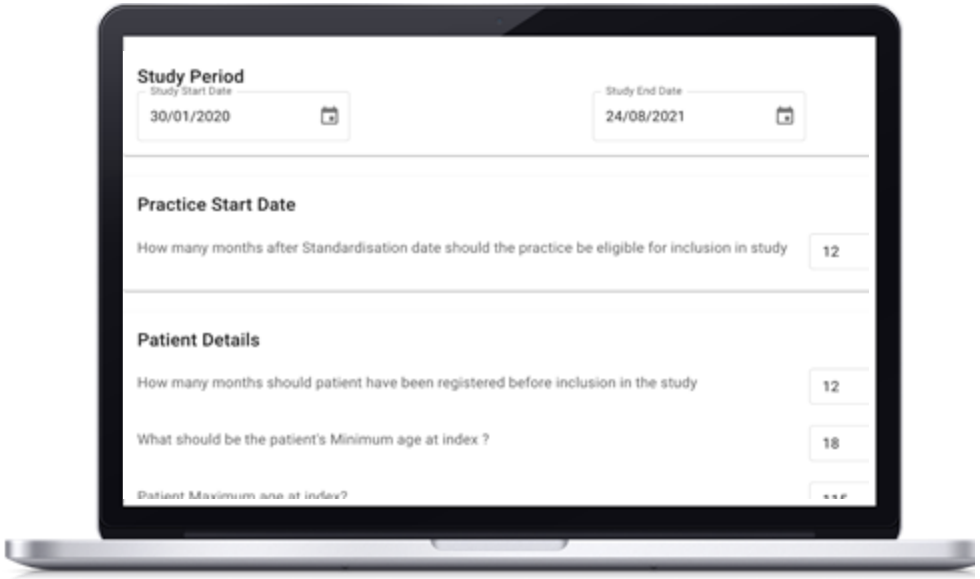
Minimal hardware set up - Cloud compatible

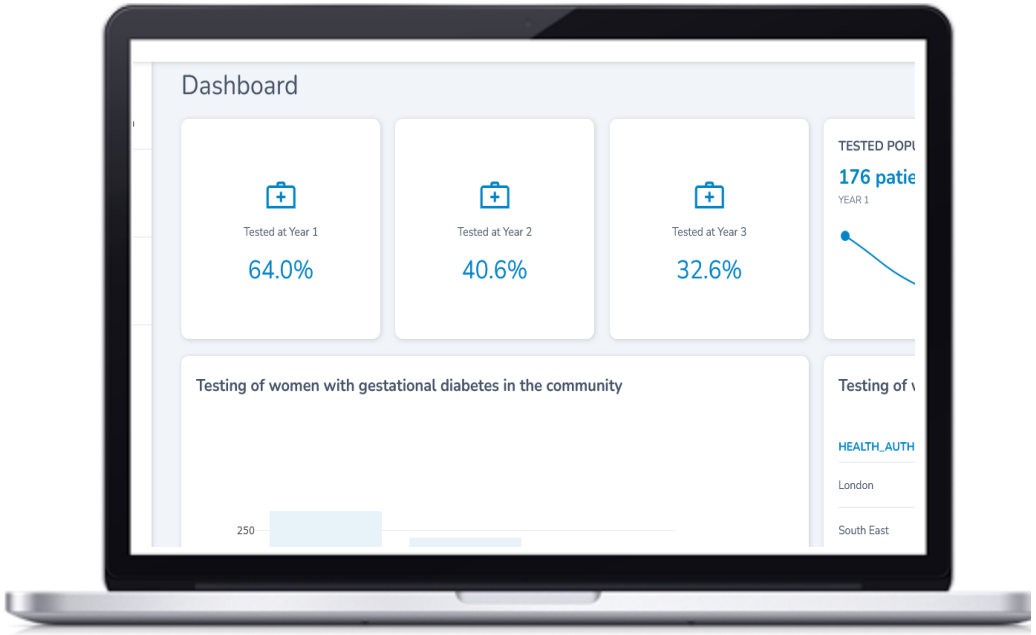
NHS
The Shrewsbury and Telford Hospital
NHS Trust

UNIVERSITY OF BIRMINGHAM



DExtER





5 Use Cases

Improving Current Care

AUDIT

MONITORING

QUALITY IMPROVEMENT

POPULATION HEALTH MANAGEMENT

RESEARCH

Planning new care

How will Dexter help?

Context

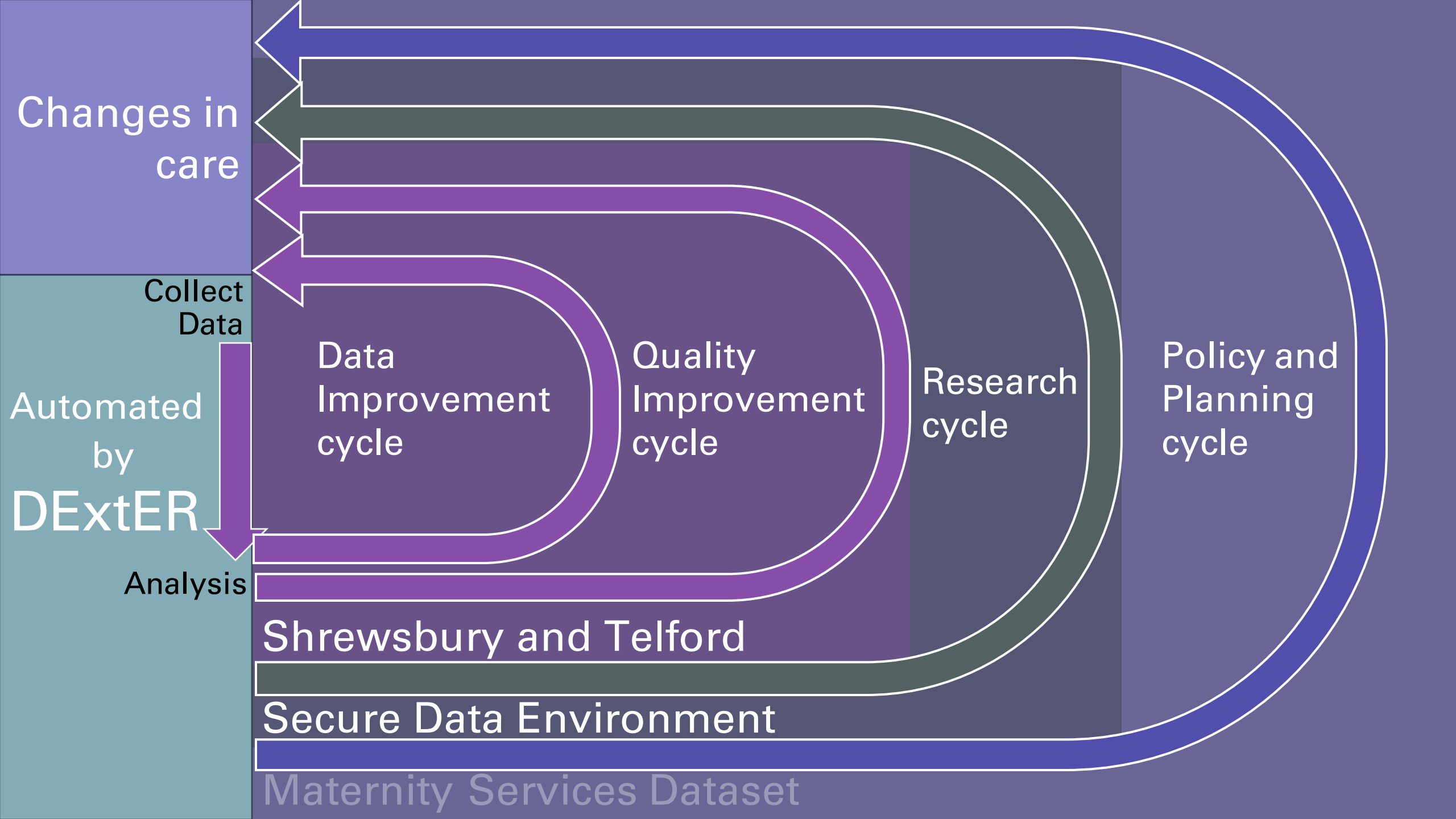
- "More data than you can eat"
- Problems that data can inform

Mechanism

- Data productivity
- Quality of data use

Outcome

- Improve outcomes
- Reduced costs


Changes in care
Collect Data
Automated by DExtER
Analysis
Data Improvement cycle
Quality Improvement cycle
Research cycle
Policy and Planning cycle
Shrewsbury and Telford
Secure Data Environment
Maternity Services Dataset

West Midlands SECURE DATA ENVIRONMENT

Part of the NHS Research Secure Data Environment Network

NHS

Secure Data Environments
Safe and Transparent Access to NHS and Social Care Data

Supporting inclusive research to reduce health inequalities

About the SDE Programme

- National investment to operationalise the DHSC strategy, *Data saves lives: reshaping health and social care with data*
- Alignment to recommendations in Goldacre Review
- Signals **step change** for how **access** to health and social care data for R&D is managed going forward
- Commitment to NHS safe stewardship of data within NHS-governed and managed **secure data environments**
- Puts **public trust and confidence** front and centre of the safe use of, and access to, health and social care data

Supporting inclusive research to reduce health inequalities

Twelve SDEs across England

Supporting inclusive research to reduce health inequalities

National SDE network: Thematic areas of focus

AI/algorithm development (testing, training, and validation)

Clinical trial activities (feasibility, recruitment, efficacy through short- and long-term trial follow up)

Real world studies (safety, effectiveness, cost effectiveness)

Translational research (academic discovery and implementation of discovery into practice)

Epidemiological studies (large cohorts for population health research)

Health systems research (evaluation of systems or processes, including operational and applied research)

Data Silos to Research Ready Data – A Problem to Solve

Our WMSDE mission

Collate and harmonise large-scale, multi-modal healthcare data to derive *executable knowledge* that:

- Delivers improvements in healthcare decisions
- Enables discovery
- Catalyses innovation

With mission delivery assured and enabled by:

- Robust governance structures
- Cybersecurity & Privacy protection by design
- Meaningful patient and public involvement and oversight in data use decision making

Supporting inclusive research to reduce health inequalities

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Our WMSDE supporting…

Democratising Health Data Research for Better Care

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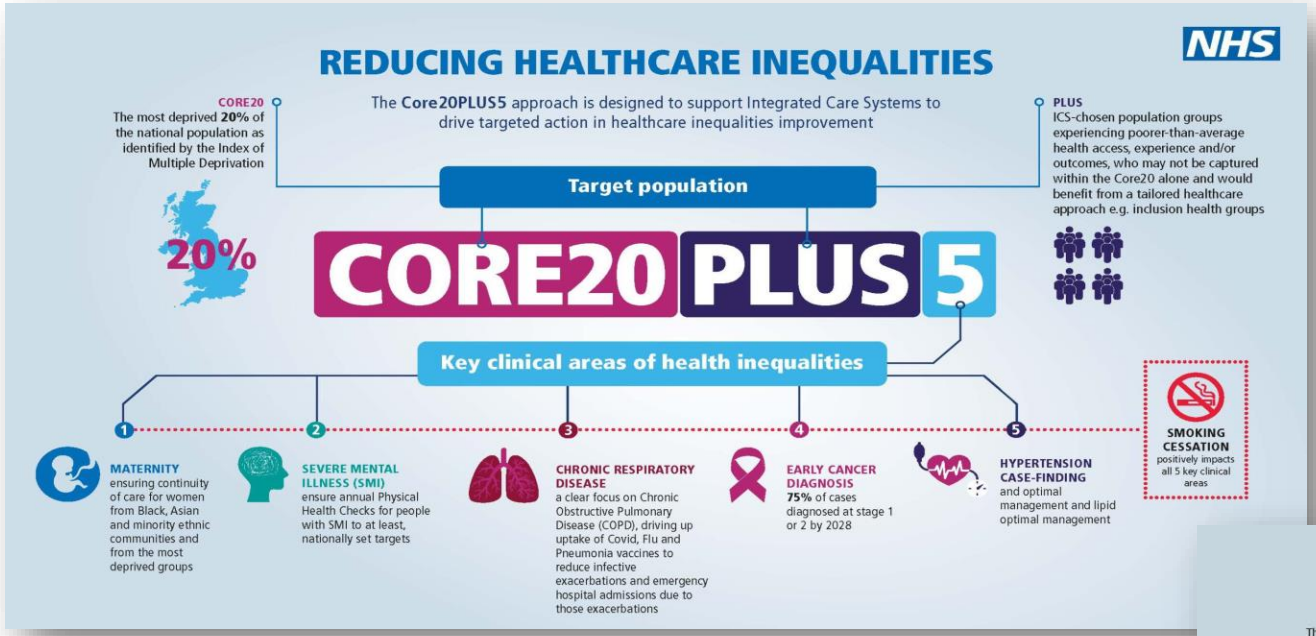
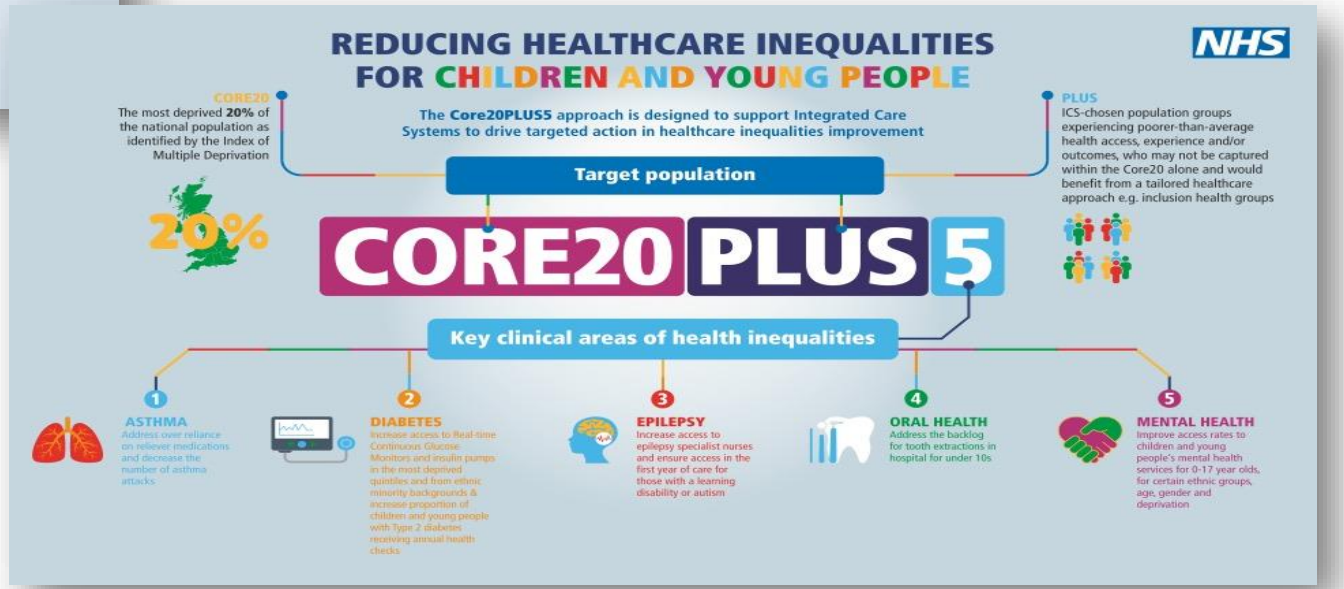
Supporting our ICSs

NHS





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NHS

Catalysing Research collaborations

NIHR | Applied Research Collaboration West

NIHR | Birmingham Biomedical Research Centre

NIHR | Birmingham Clinical Research Facility

NIHR | Trauma Management MedTech Co-operative

Convening *Health Technology Development* collaborations

European Union
European Regional Development Fund

MD-TEC

Department for Science, Innovation, & Technology

West Midlands Health Tech Innovation Accelerator

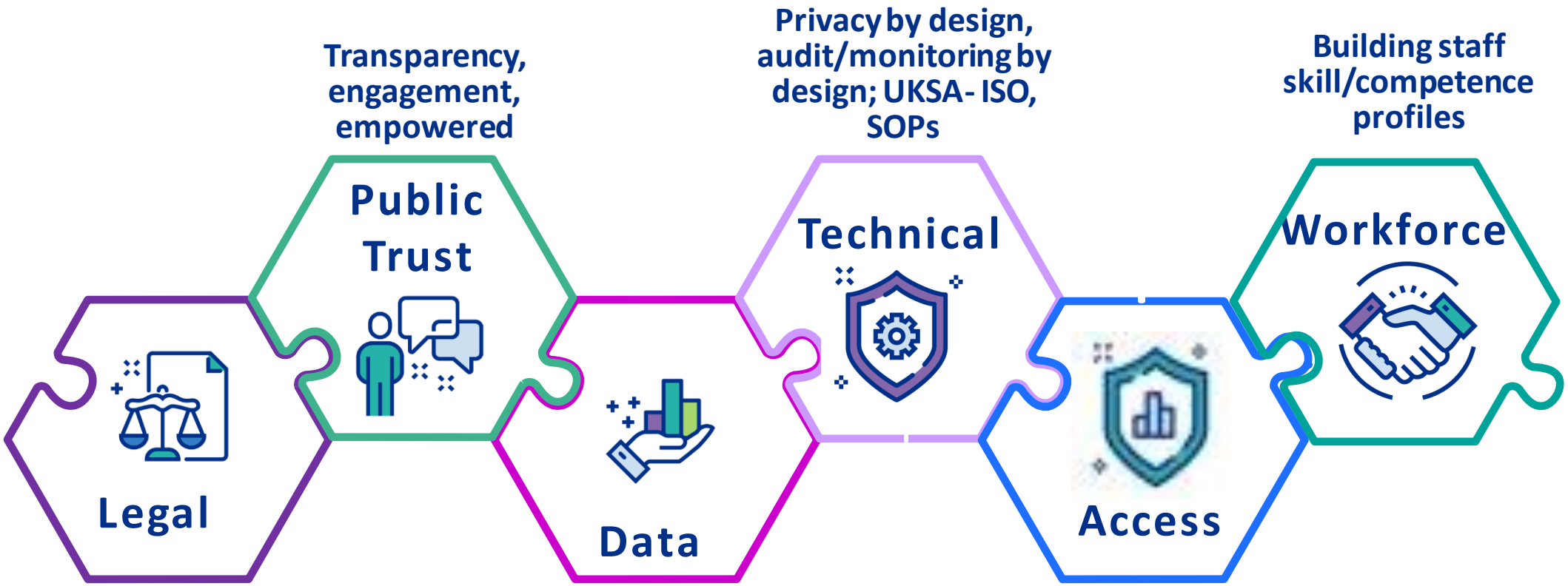
UKRI Innovate UK

West Midlands Combined Authority

Birmingham Health Partners
Collaboration. Innovation. Application.

Centre for Regulatory Science

Our journey so far in summary ……



Connect with us……..

West Midlands Secure Data Environment

email: wmsde@uhb.nhs.uk

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Chief Scientific Advisor – DEXTER Software

Enabling Junior Clinicians

The burden of mental ill health associated with childhood maltreatment in the UK, using The Health Improvement Network database: a population-based retrospective cohort study

Joht S Chandan, Tom Thomas, Krishna M Gokhale, Siddhartha Bandyopadhyay, Julie Taylor*, Krishnarajah Nirantharakumar**

Summary

Background

ORIGINAL RESEARCH

HEALTH

Increased Cardiometabolic and Mortality Risk Following Childhood Maltreatment in the United Kingdom

Joht Singh Chandan, MBBS; Kelvin Okoth, MBBS; Krishna Margadhamane Gokhale, MSc; Siddhartha Bandyopadhyay, PhD*; Julie Taylor, PhD*; Krishnarajah Nirantharakumar, MD*

COVID-19: a public health approach to manage domestic violence is needed

Joht Singh Chandan • Julie Taylor • Caroline Bradbury-Jones • Krishnarajah Nirantharakumar • Eddie Kane • Siddhartha Bandyopadhyay

Open Access • Published: May 08, 2020 • DOI: https://doi.org/10.1016/S2468-2667(20)30112-2

ociated with

Lancet Psychiat

RESEARCH

Association between the reproductive health of young women and cardiovascular disease in later life: umbrella review

Kelvin Okoth,[1] Joht Singh Chandan,[1] Tom Marshall,[1] Shakila Thangaratinam,[1,2] G Neil Thomas,[1] Krishnarajah Nirantharakumar,[1,3,4] Nicola J Adderley[1]

BMJ: first publishe

Digital public health: a hopeful strategy to tackle th in domestic violence

Deepthika Jeyaraman • Joht Singh Chandan

Female survivors of intimate partner violence and risk of depression, anxiety and serious mental illness

Joht Singh Chandan, Tom Thomas, Caroline Bradbury-Jones, Rebecca Russell, Siddhartha Bandyopadhyay*, Krishnarajah Nirantharakumar* and Julie Taylor*

“PI Like me” Scheme for ECR

Nicola Adderley

Francesca Crowe

Anthony Fenton

Pushpa Singh

Dawit Zemedikun

Malcolm Price

Jonathan Hazlehurst

Shamil Haroon

Punith Kempegowda

Dana Sumilo

Kumaran Subaschandren

Sajjad Haider

Enabling Senior Leaders / Clinicians

Dr Nigel Trudgill, Consultant Gastroenterologist

Publications

IBD INFLAMMATORY BOWEL DISEASES

The Risk of Later Diagnosis of Inflammatory Bowel Disease in Patients With Dermatological Disorders Associated With Inflammatory Bowel Disease

Dominic King, MBChB, Joht Singh Chandan, PhD, Tom Thomas, MBBD, Krishnarajah Nirantharakumar, MD, Raoul C Reulen, PhD, Nicola J Adderley, PhD, Nigel Trudgill, MD

AP&T Alimentary Pharmacology and Therapeutics

ORIGINAL ARTICLE | Open Access

Changing patterns in the epidemiology and outc inflammatory bowel disease in the United Kingd

Dominic King, Raoul C. Reulen, Tom Thomas, Joht Singh Chandan, Rasiah Thayakar Anuradhaa Subramanian, Krishna Gokhale, Neeraj Bhala, Krishnarajah Niranthara Nicola J. Adderley, Nigel Trudgill ... See fewer authors

BMJ Open

Risk of a subsequent diagnosis of inflammatory bowel disease in subjects with ophthalmic disorders associated with inflammatory bowel disease: a retrospective cohort analysis of UK primary care data

Dominic King [1,2] Joht Singh Chandan [2] Tom Thomas,[3] Alastair K Denniston,[4] Tasanee Braithwaite,[2,5] Krishnarajah Niranthrankumar,[2] Raoul Reulen,[2] Nicola Adderley [2] Nigel J Trudgill[1]

Colorectal Disease

ORIGINAL ARTICLE | Full Access

The risk of subsequent surgery following bowel resection for Crohn's disease in a national cohort of 19 207 patients

Dominic King, Benjamin Coupland, Amandeep Dosanjh, Andrew Cole, Stephen Ward, Raoul C. Reulen

AJG The American Journal of GASTROENTEROLOGY

Achalasia Is Associated With Atopy in Patients Younger Than 40 Years of Age

King, Dominic MBChB[1,2]; Thomas, Tom MBBS[3]; Chandan, Joht Singh PhD[2]; Bhala, Nij DPhil[2]; Adderley, Nicola J. PhD[2]; Nirantharakumar, Krishnarajah MD[2]; Trudgill, Nigel MD[1]

AP&T Alimentary Pharmacology and Therapeutics

ORIGINAL ARTICLE | Full Access

The association between inflammatory bowel disease a mental ill health: a retrospective cohort study using dat UK primary care

Nosheen Umar, Dominic King, Joht Singh Chandan, Neeraj Bhala, Krish Nirantharakumar, Nicola Adderley, Dawit T. Zemedikun, Phil Harvey, Nigel Trudgill

AP&T Alimentary Pharmacology and Therapeutics

ORIGINAL ARTICLE | Full Access

The risk of later surgery at the anastomotic site follo hemicolectomy for Crohn's disease in a national coh 12 230 patients

Dominic King, Benjamin Coupland, Amandeep Dosanjh, Andrew Cole, Nicola J. Adderley, Raoul C. Reulen, Prashant Patel, Nigel J. Trudgill

AP&T Alimentary Pharmacology and Therapeutics

INVITED EDITORIAL | Open Access

Editorial: increasing IBD prevalence and its complications in the context of the COVID-19 pandemic. Authors' reply

Dominic Stephen King, Nigel John Trudgill, Nicola J. Adderley

Grants

NIHR | National Institute for Health and Care Research

Identifying procedure adjusted quality indicators for upper gastrointestinal endoscopy from systematic review and multivariate analysis of cohorts with post endoscopy upper gastrointestinal cancer in the national endoscopy database

NIHR | National Institute for Health and Care Research

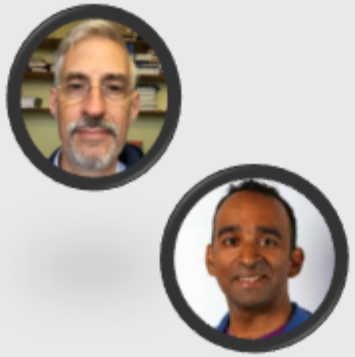
Improving the diagnosis of oesophageal and gastric cancers by system-wide identification and analysis of missed diagnoses of oesophageal and gastric cancers during endoscopy

Team / 5+ Doctoral researchers

Independent Senior Clinical Researchers in Health Data Science

Ophthalmology

Gastroenterology



Nephrology

Geriatrics

Rheumatology

Diabetes

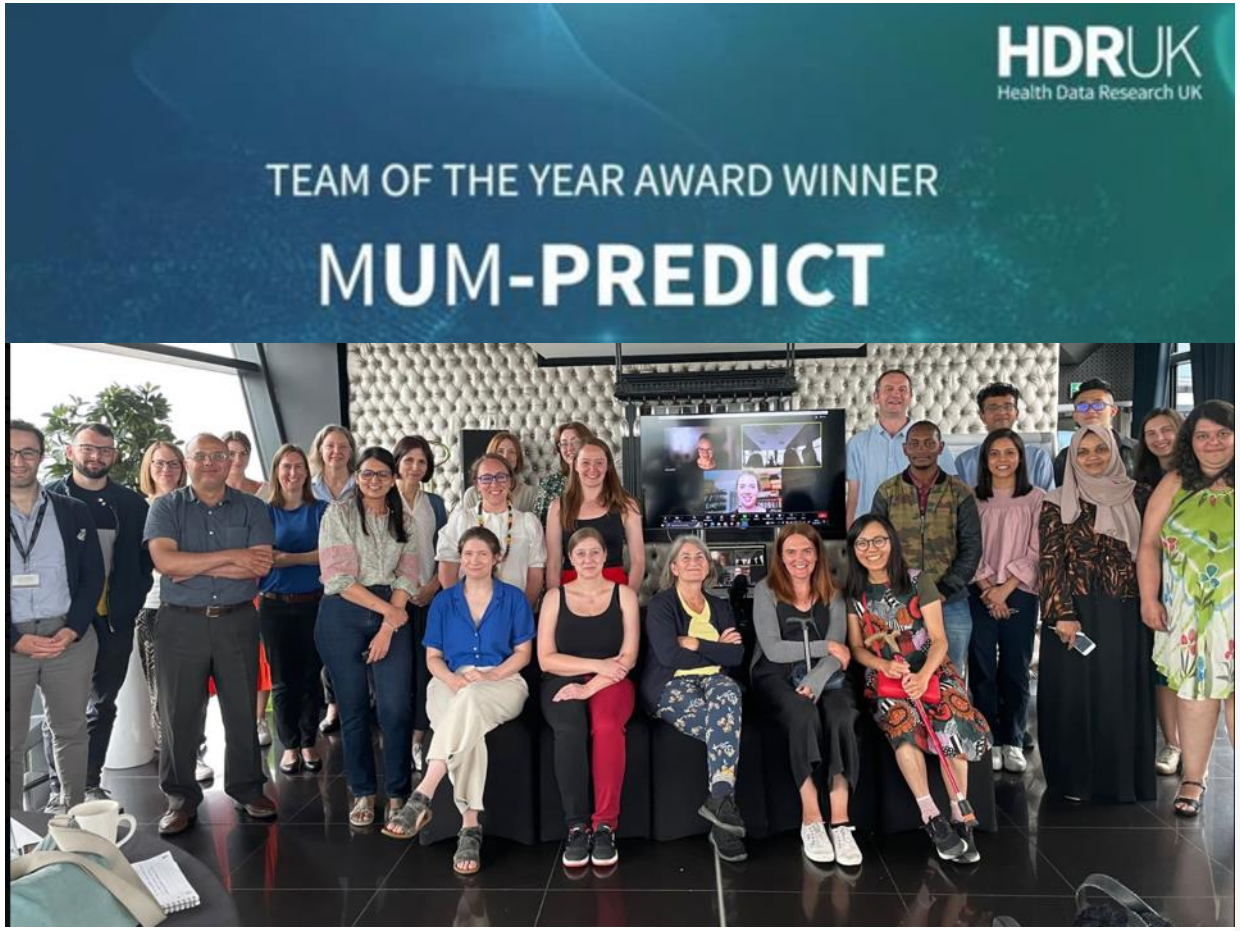
Surgery

Paediatrics

Obstetrics

Endocrinology

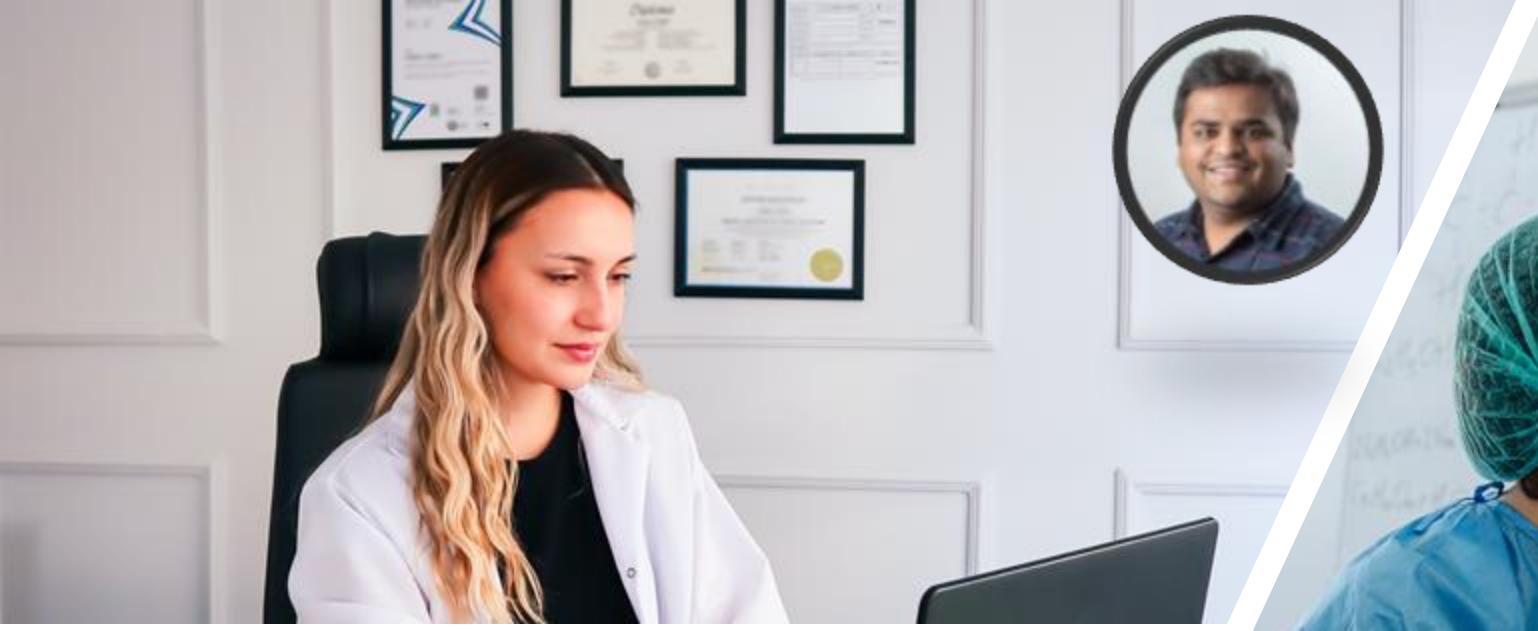
Regional and National Consortiums for Improving Maternity Care

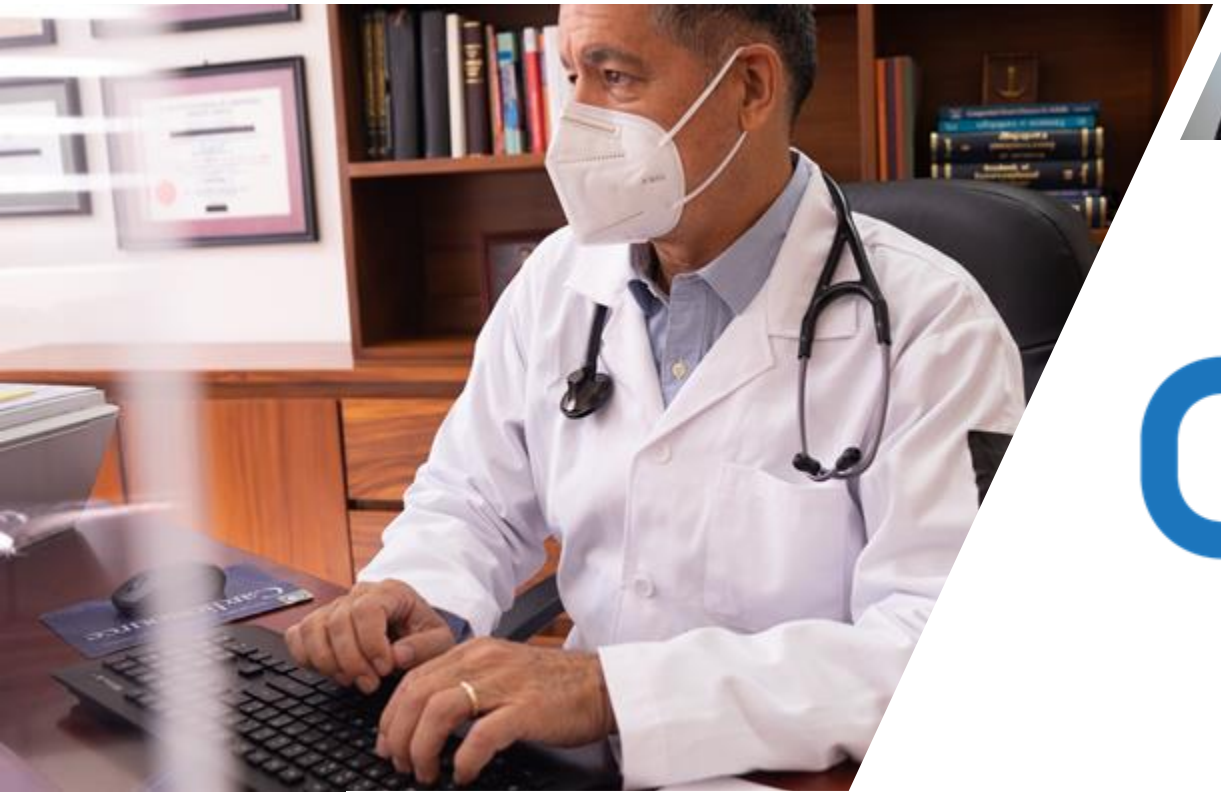


MuM-Predict Annual Meeting 2023

An all nations, multidisciplinary collaboration

PPIE @ MuM-Predict Annual Meeting 2023





dexter

Thank You!
DEXTER