

# Convergence in Action

What happens when you put clinicians in the driving seat of building digital solutions?

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A Case Study from the Wales Cardiac Network and Digital Health and Care Wales

digitalhealth

**REWired**  
LONDON 14-15 MARCH 2023

Headline Sponsors:



# John Meredith

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Assistant Chief Architect (Digital Architecture), Digital Health  
and Care Wales

# The problems to look at:

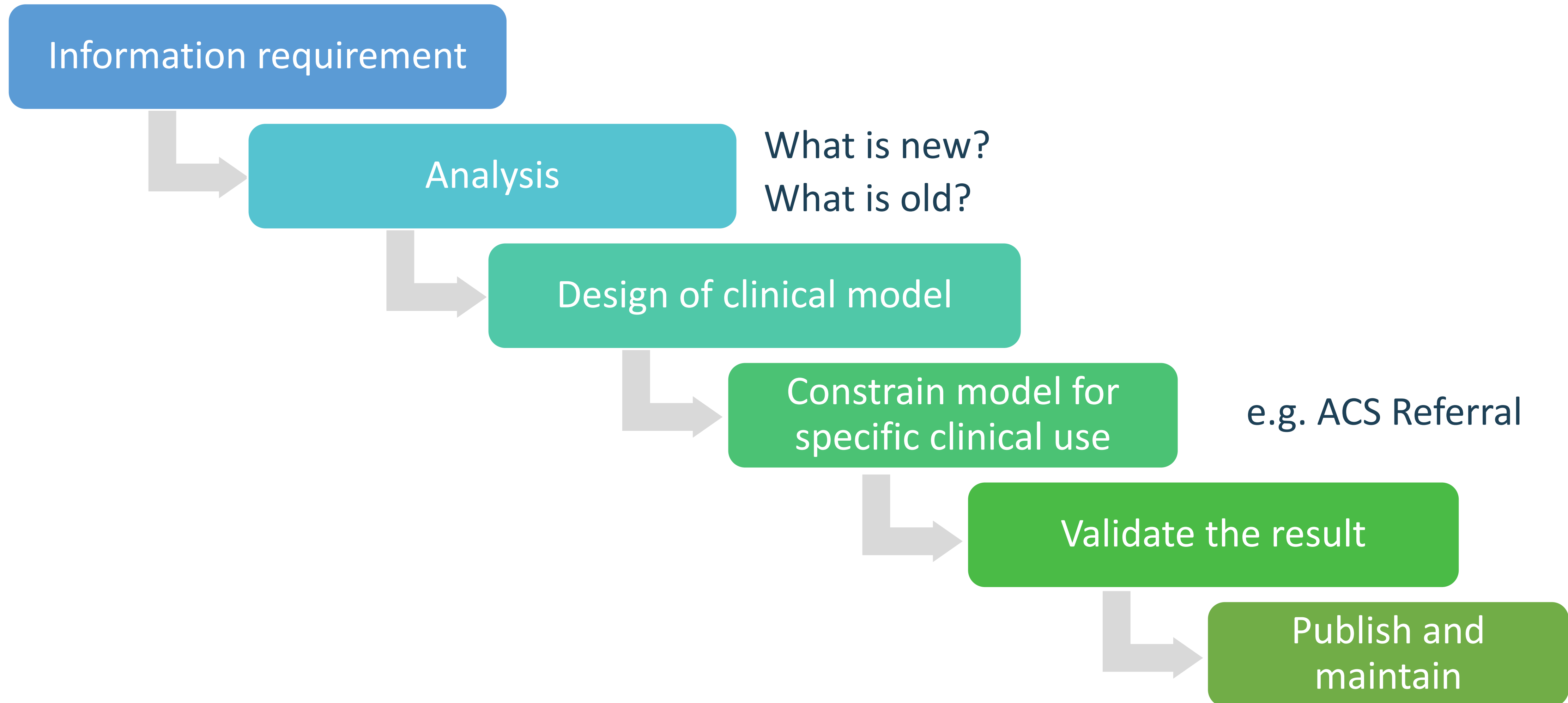
## Wales Cardiac Network

- Inability to agree on the detail of 4 key pathways including Acute Coronary Syndrome.
- No defined process to catalogue data.
- Piecemeal annual headless chicken activities to collect audit data in feral apps...

## Me (an Architect)

- Clinical time is £XPEN\$IV€.
- 6 week rule.
- Physical meetings & workshops.
- Not repeating work done elsewhere.

# Developing the model



WCN Cardiology

ACS Pathway Referral

Demographics

- Surname
- Forename
- DoB
- Age
- NHS No
- Hosp Number
- Sex (Gender)
- Postcode

Referral details

- Ref Hospital
- Ref Consultant
- Ward
- Ward tel number
- Referrer Name
- Referrer Contact details
- Date
- Referrer GMC Number (locums only)
- Case initially discussed on phone with

Presentation details

History

- Admission diagnosis /Initial diagnosis
- Condition for transfer
- Complications
- Previous interventions
- Brief details of presentation and comorbid conditions (free text)
- Symptom onset
- Abnormal examination findings (free text)

Key timings

- Call for help
- Arrival at local hospital
- Referral time

Risk Assessment

Coronary\_risk\_acp

- Hypertension
- Prev CVD/PVD
- Prev MI
- Prev PCI
- Prev CABG
- Arrest
- Diabetes
- Raised cholesterol
- Troponin

Family history

- No, of 1st degree relatives with history of MI or cardiac arrest
- Family history of premature IHD

Smoking

Weight

GRACE Risk score

Crusade Bleeding score

Results and treatment

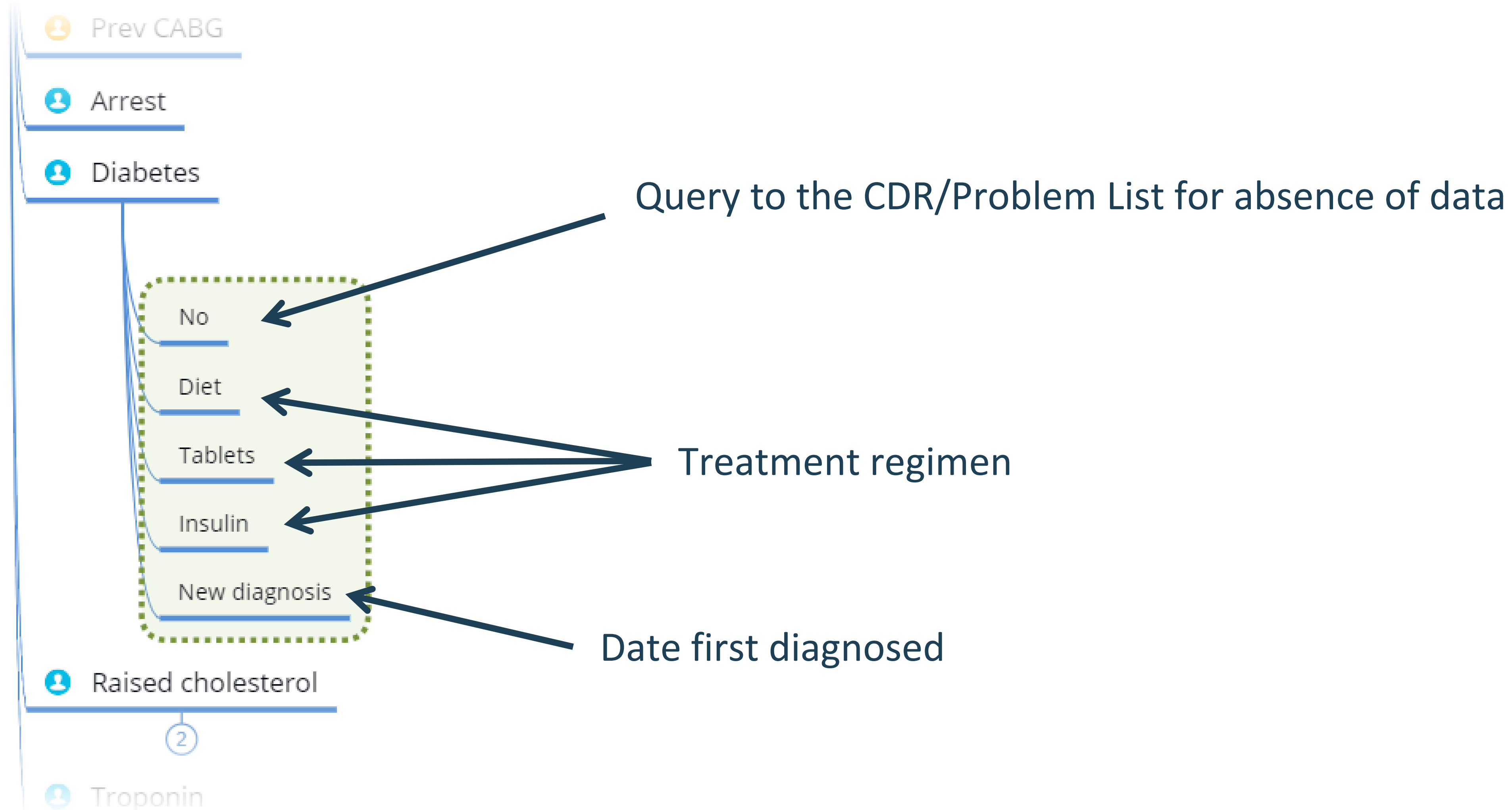
Bloods

- Hb
- Platelets
- WBC
- Trop I/T
- Haematocrit
- Creatinine umol/l
- Creatinine Clearance (ml/min)
- CRP
- Total cholesterol

Other investigations

- Echo description
- ECG description
- OBSERVATION.ecg
- Stress test ECG result
- MRSA status

# Modelling audit data



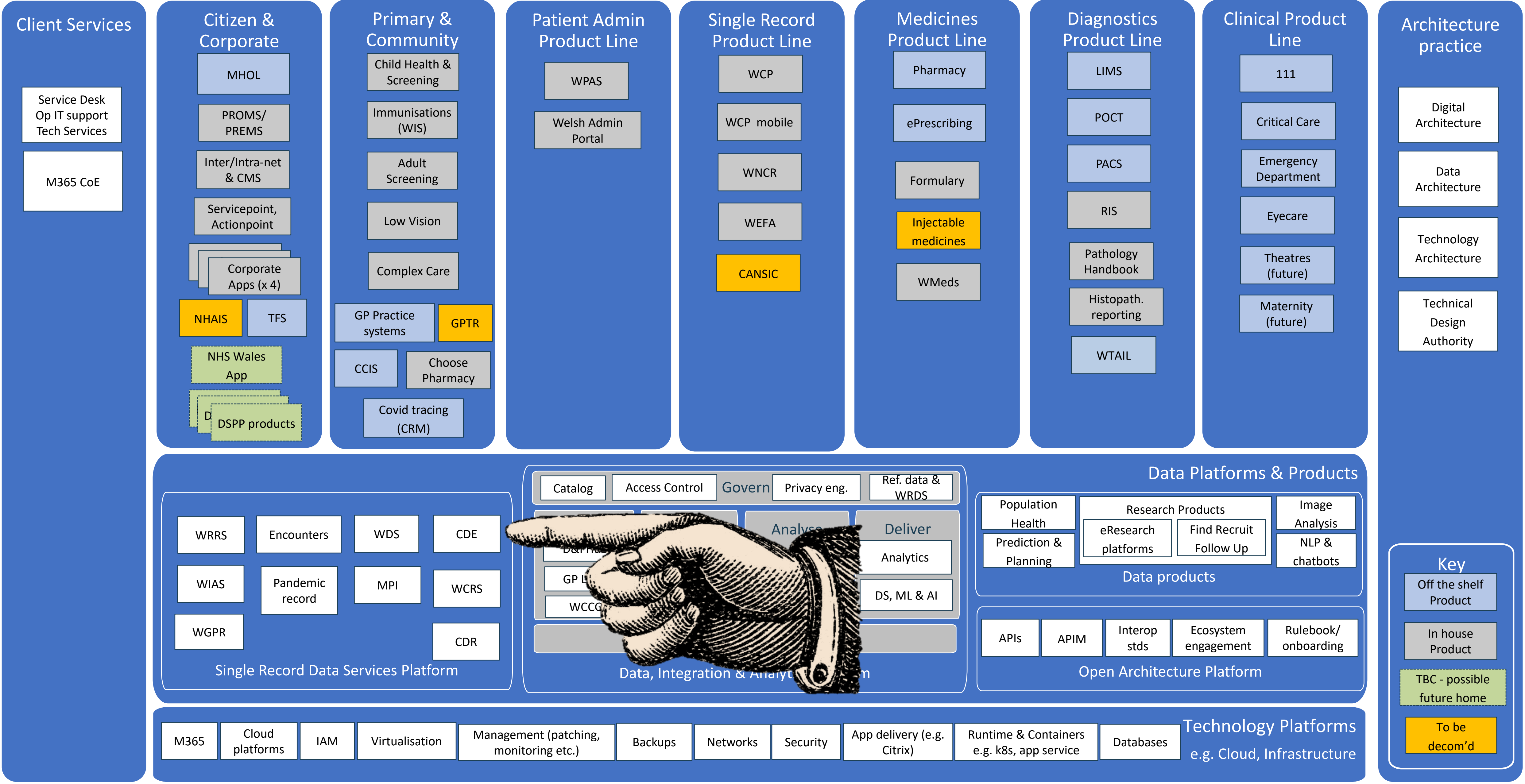


“When I discovered 86% of  
the needed archetypes  
were already available ...”

← ME

← WCN Acute Coronary  
Syndrome Model

# DHCW product lines & platforms



## Client Services

- Service Desk
- Op IT support
- Tech Services
- M365 CoE

## Citizen & Corporate

- MHOL
- PROMS/PREMS
- Inter/Intra-net & CMS
- Servicepoint, Actionpoint
- Corporate Apps (x 4)
- NHAIS
- TFS
- NHS Wales App
- DSPP products

## Primary & Community

- Child Health & Screening
- Immunisations (WIS)
- Adult Screening
- Low Vision
- Complex Care
- GP Practice systems
- GPTR
- CCIS
- Choose Pharmacy
- Covid tracing (CRM)

## Patient Admin Product Line

- WPAS
- Welsh Admin Portal

## Single Record Product Line

- WCP
- WCP mobile
- WNCR
- WEFA
- CANSIC

## Medicines Product Line

- Pharmacy
- ePrescribing
- Formulary
- Injectable medicines
- WMeds

## Diagnostics Product Line

- LIMS
- POCT
- PACS
- RIS
- Pathology Handbook
- Histopath. reporting
- WTAIL

## Clinical Product Line

- 111
- Critical Care
- Emergency Department
- Eyecare
- Theatres (future)
- Maternity (future)

## Architecture practice

- Digital Architecture
- Data Architecture
- Technology Architecture
- Technical Design Authority

### Single Record Data Services Platform

WRRS	Encounters	WDS	CDE
WIAS	Pandemic record	MPI	WCRS
WGPR			CDR

### Data, Integration & Analytics Platform

Catalog	Access Control	Govern	Privacy eng.	Ref. data & WRDS
D&I	GP L	WCCG	Analysis	Deliver
			Analytics	DS, ML & AI

### Data Platforms & Products

Population Health	Research Products	Image Analysis
Prediction & Planning	eResearch platforms	Find Recruit Follow Up
		NLP & chatbots

### Open Architecture Platform

APIs	APIM	Interop stds	Ecosystem engagement	Rulebook/onboarding
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### Technology Platforms

e.g. Cloud, Infrastructure

M365	Cloud platforms	IAM	Virtualisation	Management (patching, monitoring etc.)	Backups	Networks	Security	App delivery (e.g. Citrix)	Runtime & Containers e.g. k8s, app service	Databases
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### Key

- Off the shelf Product
- In house Product
- TBC - possible future home
- To be decom'd

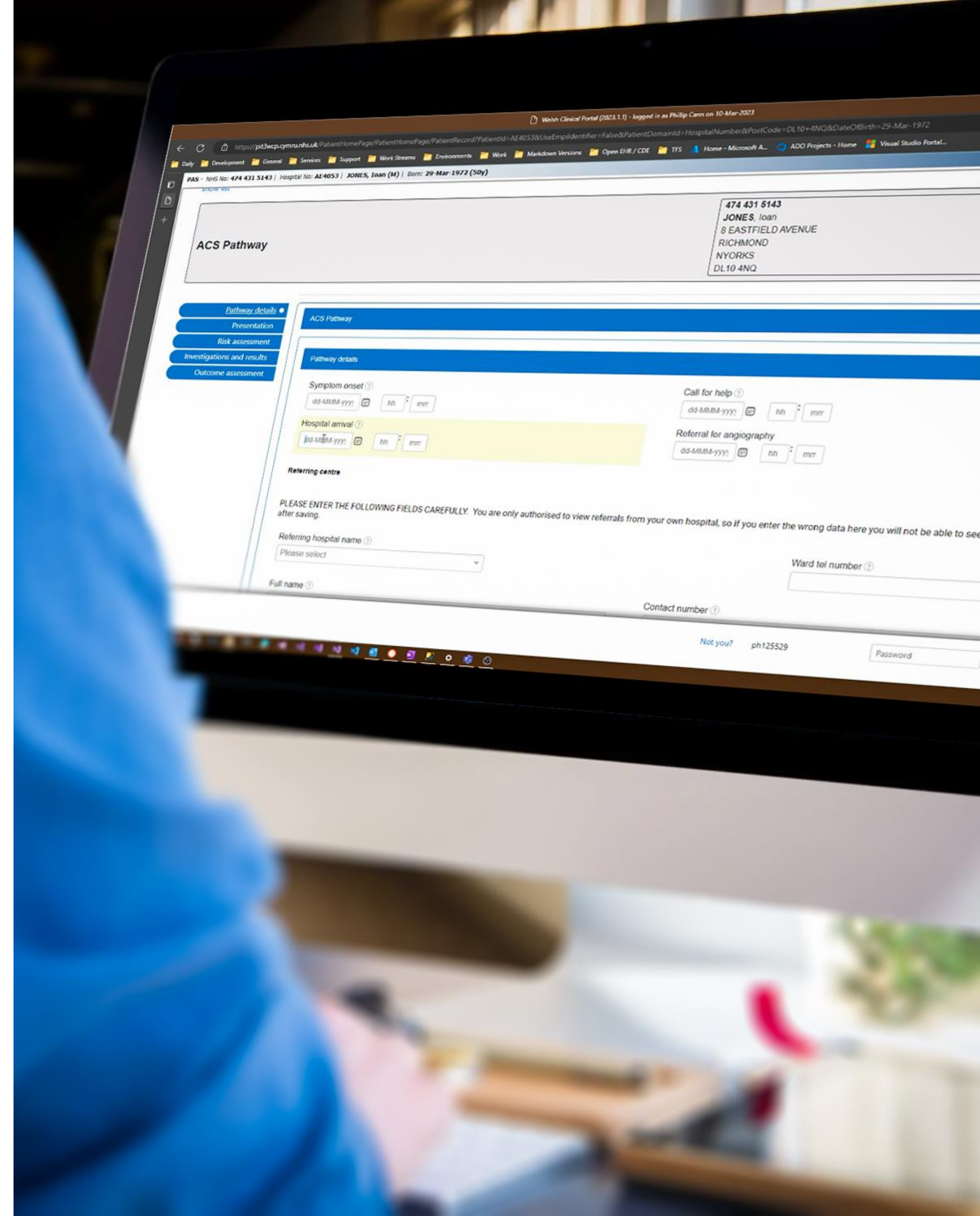


## What is the Clinical Data Engine?

Low-code tools that generate standards  
compliant **data** and **screens** for health and  
care in Wales  
(stored as **openEHR**)

# Building the form

- Funded by DHCW and the National Data Resource programme.
- Baseline structures allowed the rapid development of the app as an exemplar.
- Principle development took 2 weeks.
- Needed the look and feel of native WCP forms.



Results to sign off (3)    DALs (6)    My Watchlist (0)

Highly Sensitive information is **DISPLAYED**.  
 10-Mar-2023 : 8:50 Log Out   
 PIT3 Testing via Main Test WPAS  
 Phillip Cann Other non clinical



Patient Search Patient Lists

NHS Number  Inpatient Wards...  History...

Adverse reactions not recorded     Warnings not recorded

**JONES, Ioan David**

NHS Number: 474 431 5143   
 Hospital Number: AE4053

Date of Birth: 29-Mar-1972 (50y)   
 Sex: Male  
 Address: 8 EASTFIELD AVENUE, RICHMOND, NYORKS, DL10 4NQ

Highly Sensitive information is **DISPLAYED**. [HIDE](#) for this patient. \* 1 active user(s) [Show](#) \* Add to watch list:

Demographics            Other >

**Current search**

Exclusions:  
 Pharmacy Order  
 Uploaded Duplicates

▼ Specialty  
 ▼ Author  
 ▼ Document type  
 ▶ Site  
 ▼ Date  
 Last 7 days [0]  
 Last 4 weeks [0]  
 Last 13 weeks [0]  
 Last 26 weeks [0]

Sort By  
 Document Date  
 Event Date

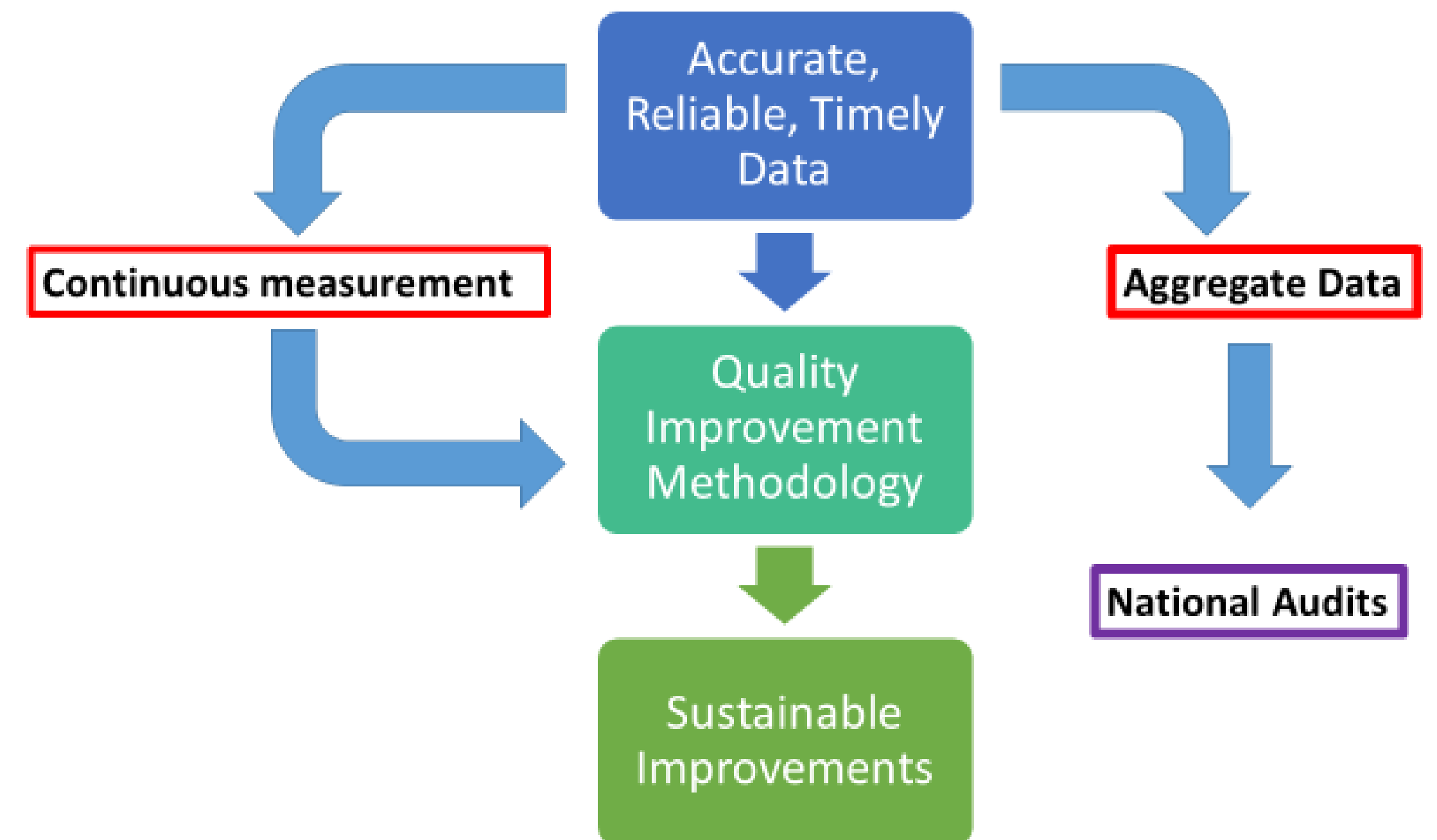
Showing 0 of 0 documents  Show Thumbnails

**No items to display.**

Main content area (currently empty)

# Why is this important to the Cardiac Network?

- ✓ Quality improvement.
- ✓ Measuring outcomes.
- ✓ Easing the communication issues affecting different organisations and digital silos of data.
- ✓ Audit.



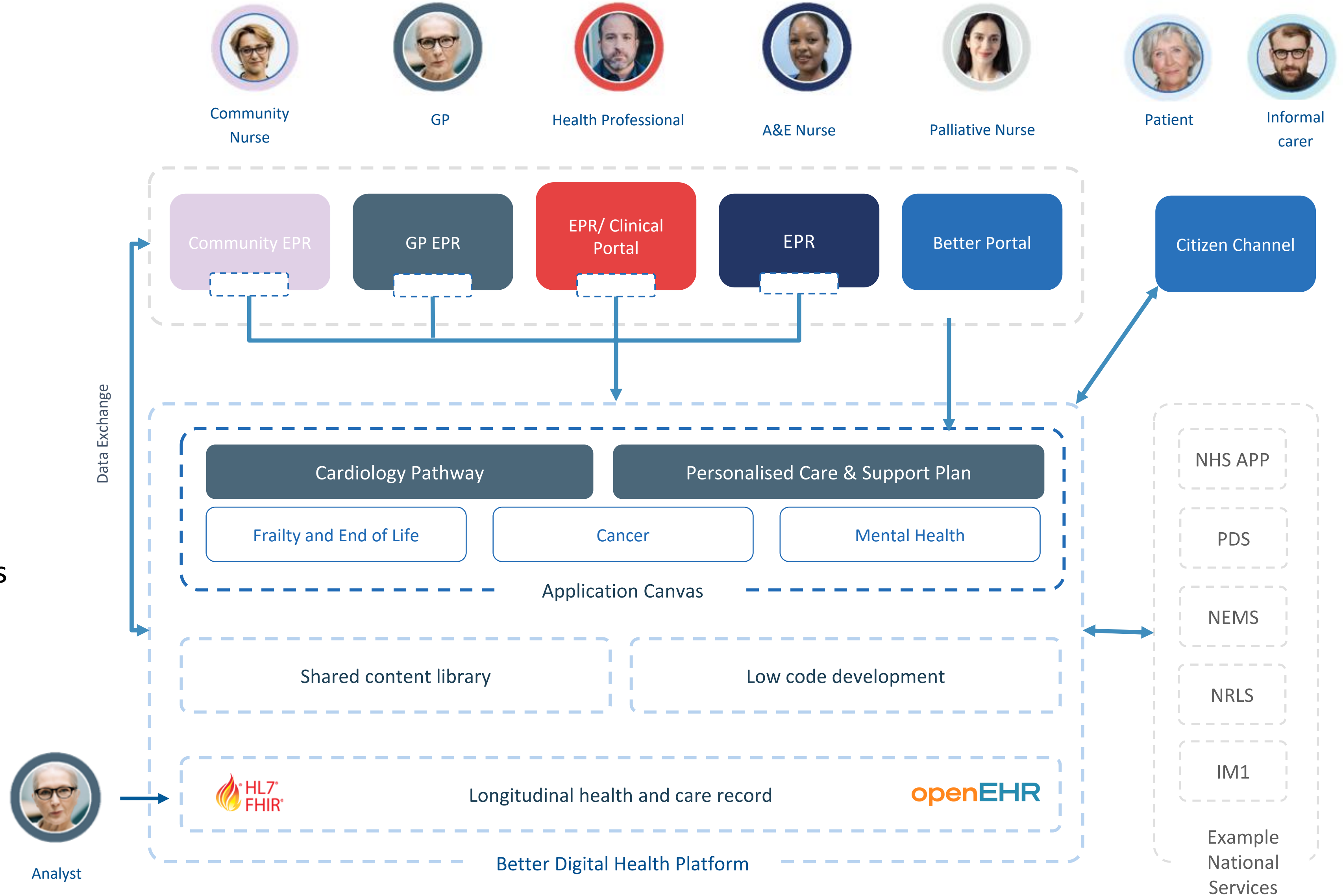
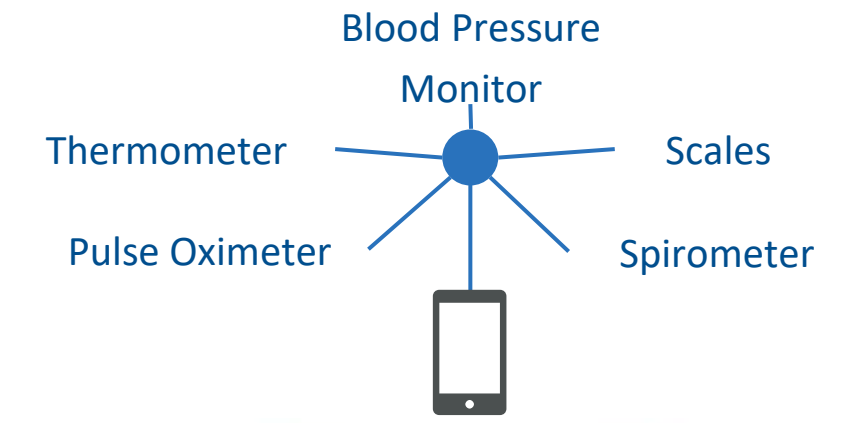


# Alastair Allen

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Chief Technology Officer

# Architecture



- Single-sign on from existing systems
- Patient and carer engagement
- Cloud-based, secure and governed
- Centralised deployment to all users
- Rapid co-production of new pathways
- Interoperable data
- Instant read/write access to data



All

All Installed New Latest versions

Upload widget

Search Widget



FOR APPLICATION

Widgets

Plugins

Functions

DOCUMENTS

Forms

Summaries

Views

ASSETS

Templates

APIs

Global variables

MD

### DATA, Mock Sample (Mr)

Preferred name: Dr. Heinz  
 01-Jan-1970 - 52y 12m  
 MRN 123-456

### Patient ID

General • Data visualisation

Show key patient identifiers in a clear and consistent way throughout the application. Customize the order of identifiers, use the color-coded gender symbol, set the date format and start building patient banners. Available in three sizes.

Show more ...

Install



New version

Slider

0 1 2 3 4 5



### Slider for visual or numeric sc ...

General • Input

View and, by dragging, select a value from the range along the bar — and see the change immediately. You can also choose to show or hide the title or the scale steps. Ideal for VAS data entry. You can also choose to show or hide.

Show more ...

Install



2 ↘

High

52 years ago

2 ↘

High

52 years ago

### Score and scale value

Assessment • Widget

Display stratified results of assessments, scores and scales in a color-coded way. Define how the levels will be called, use an arrow for showing trend and a flag to indicate an incomplete score. Available in three sizes.

Show more ...

Installed



### Task prioritisation

Organisation • List

Introduce statuses and prioritise tasks based on their urgency. Set a date and time when the task is due and when its status should change. When needed, you can also set the interval when the task should be repeated.

Show more

Install



Steroids list	
<b>Metyprednisone</b> TOTAL DAILY AMOUNT: 30 mg SINGLE DOSE: 30 mg - By mouth (p.o.) START: 1-Feb-2022	<b>Prednisone</b> TOTAL DAILY AMOUNT: 30 mg SINGLE DOSE: 30 mg - 7 x per day - By mouth (p.o.) START: 7-Feb-2022 - STOP: 16-Feb-2022 DURATION: 7d
<b>PREVIOUS</b> <b>Metyprednisone</b> TOTAL DAILY AMOUNT: 30 mg SINGLE DOSE: 30 mg - By mouth (p.o.) START: 5-Dec-2022 - STOP: 5-Dec-2022 DURATION: 0d	<b>Prednisone</b> TOTAL DAILY AMOUNT: 30 mg SINGLE DOSE: 30 mg - 10 x per week START: 7-Jan-2022 - STOP: 14-Jan-2022 DURATION: 7d

### Prescription history list

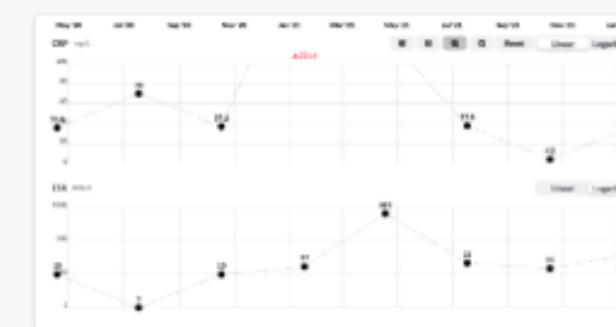
Medication • List

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021												
2022												

### Table for showing data overtime

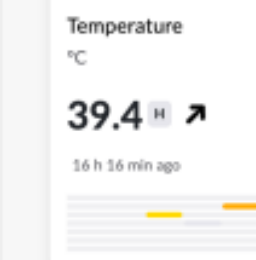
General • Table

New



### Apex stacked Line Chart

General • Charts



### Better vital widget

Assessment • Widget

- Install
- Edit widget presets
- Edit widget information
- Download to
- Upload new version
- Delete



**Templates**

Add template

**CPOT**

CPOT\*

→ context\*

- Critical care pain observation tool (CPOT)\*
- Ventilator compliance
- Vocalization
- Facial expression\*
- Body movements\*
- Muscle tension\*
- Total score\*
- Comment
- Intubated?\*
- Confounding factors

**Critical Care Pain Observation Tool (CPOT)**

**Critical Care Pain Observation Tool (CPOT)**

Rates critically ill patients' pain based on clinical observation.

Is patient intubated?

Yes No

Ventilator compliance

(0) Tolerating ventilator or

(1) Coughing but tolerating

(2) Fighting ventilator

**Design**

**LABEL**

Is patient intubated?

**DEFAULT VALUE**

Add default value

**FIELD**

Required

Readonly

Hidden

Presentation: yes/no question

Show field provenance

**LAYOUT**

Label position |← ↑ ×

**SIZE**

Element 8  Inherit

API connectors Compare Dependency inspector Errors Dependencies Custom script

**Anchor**

**Is patient intubated?**

When: Any case field value changes or form loads

If: Is patient intubated? is true

Then: Ventilator compliance show

Else: Add condition

Then: Ventilator compliance clear, Ventilator compliance hide



**Better data,  
better care.**