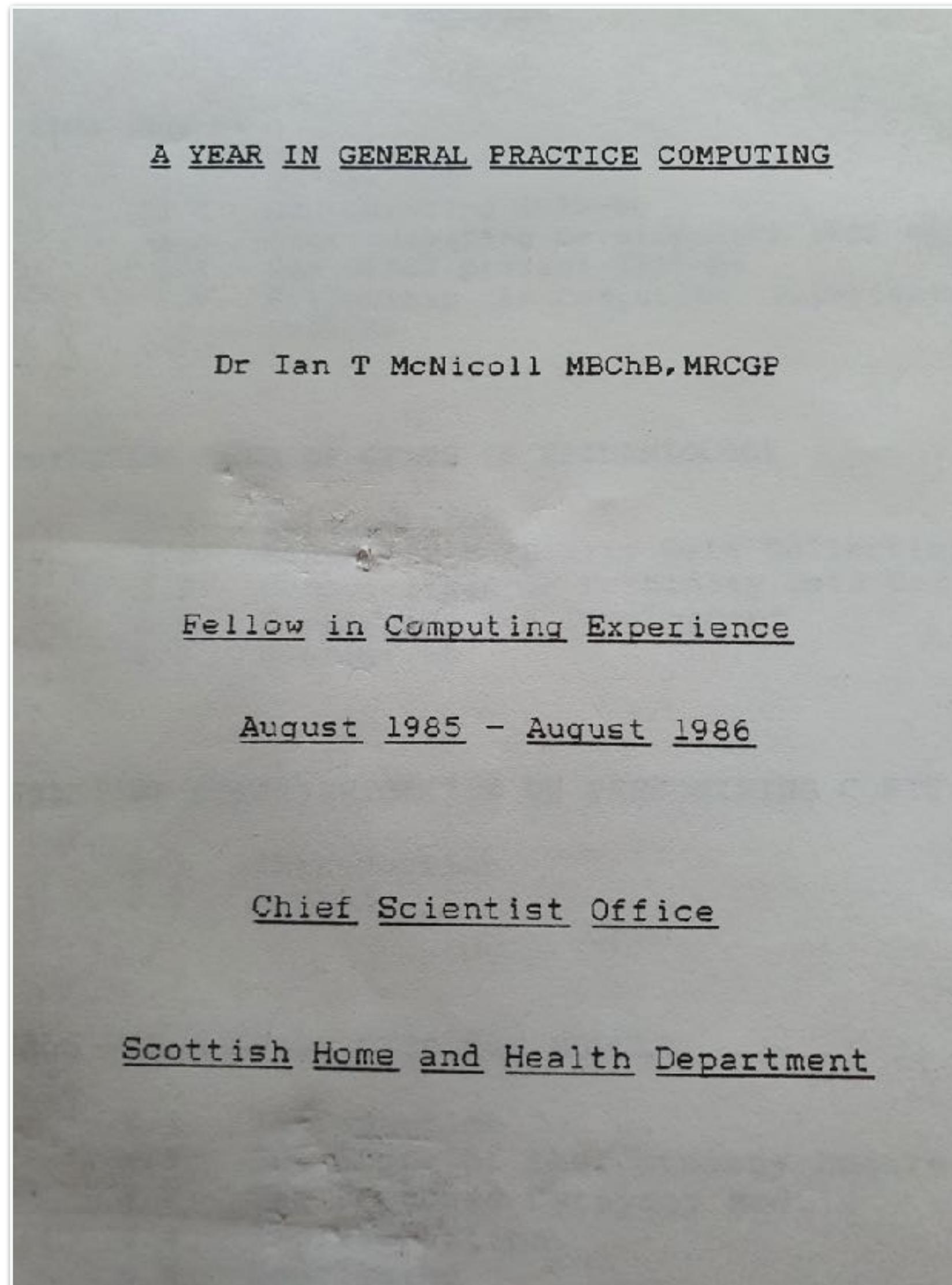
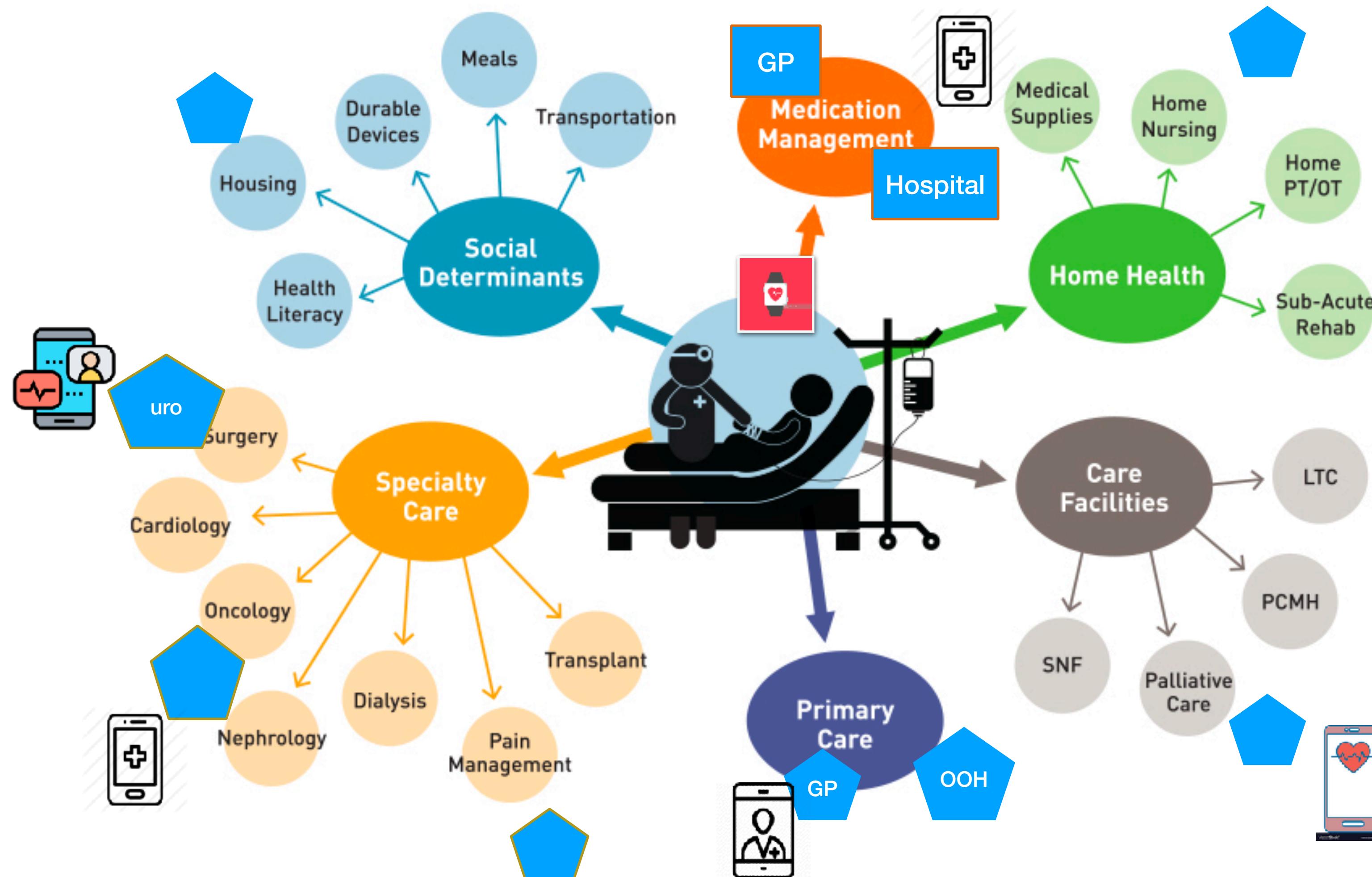


What is openEHR: Towards a coherent patient-centric digital healthcare ecosystem



What do we actually want ? A patient-centred coherent information system?

openEHR



← → ⌛ 🔒 chemphildi.wordpress.com

My Site Reader Write

MDT: Multi-Disciplinary Team or Might Delay Things?



A lot of care pathways involve a multi-disciplinary team at various points, and cancer care pathways are no exception. In fact most key decisions about treatment choices after diagnosis and treatment changes following further investigations are made by the multi-disciplinary team.

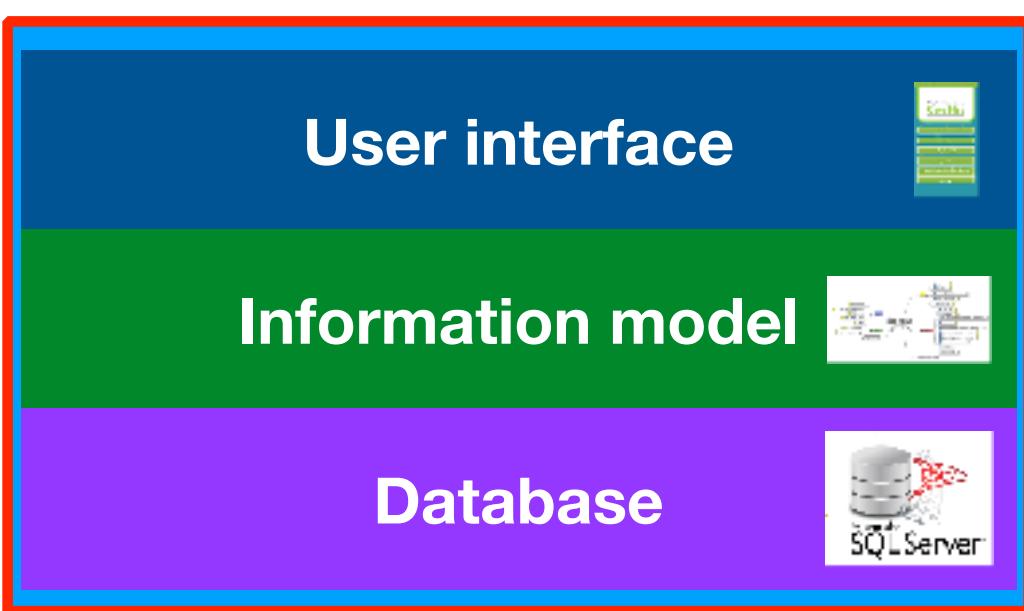
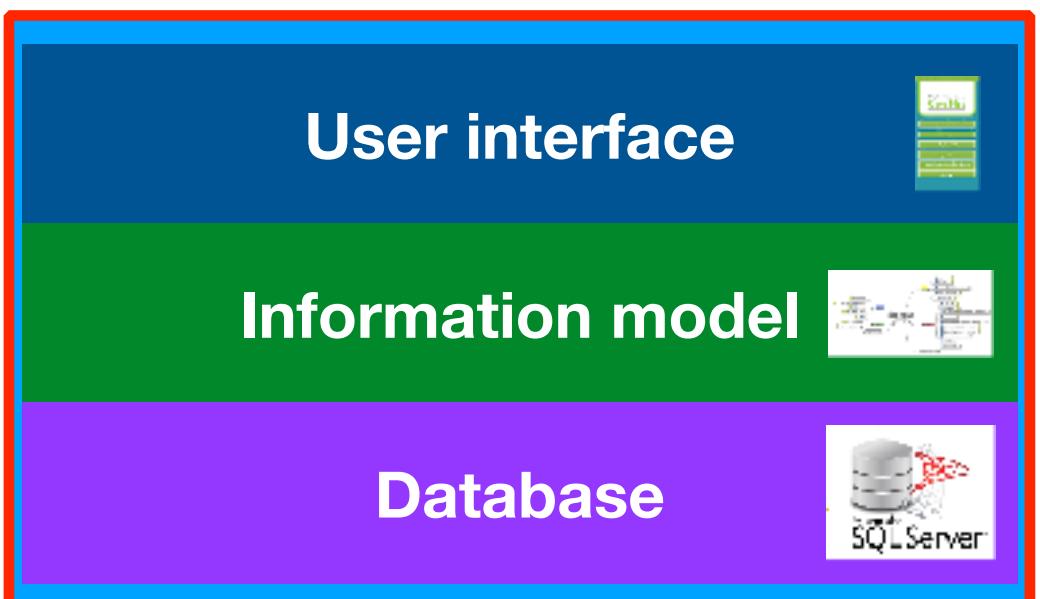
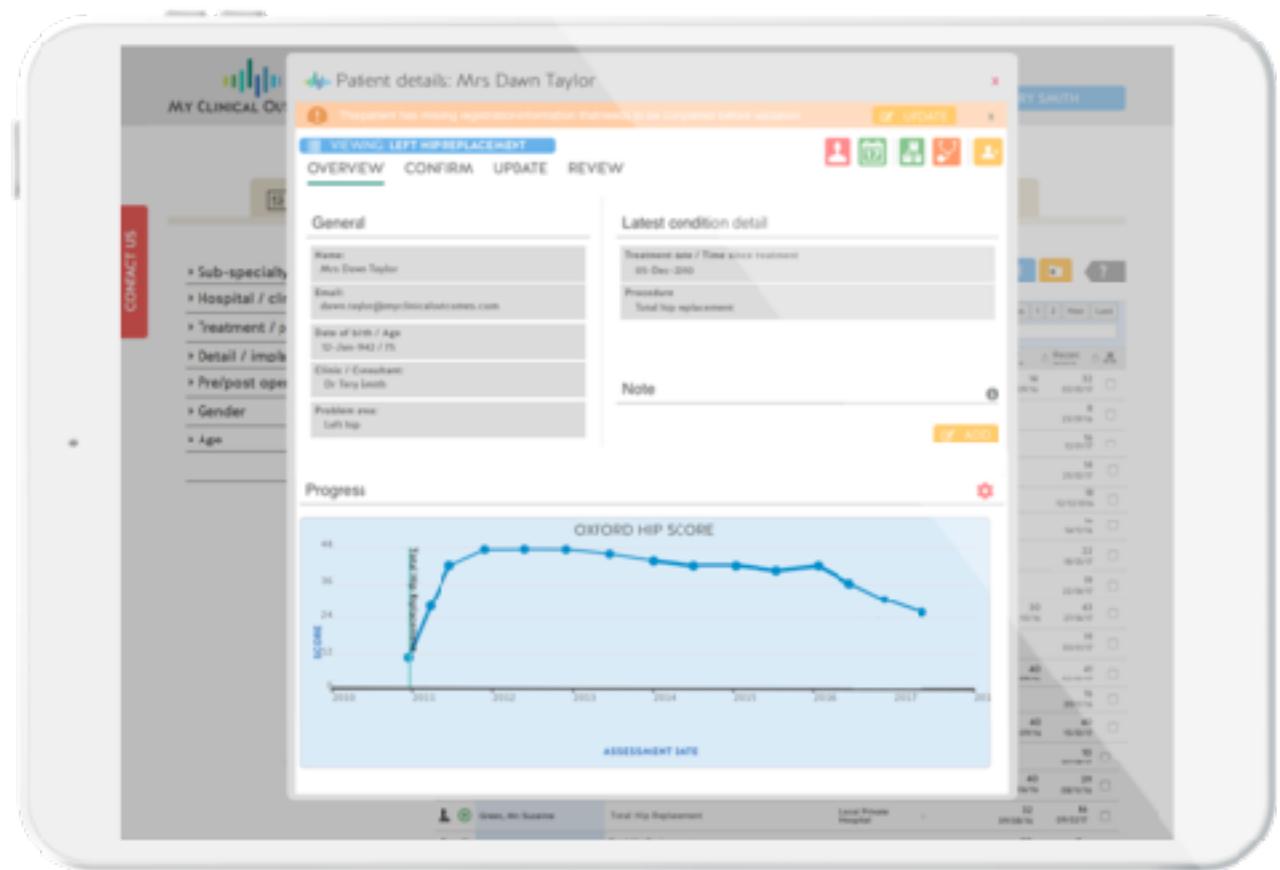
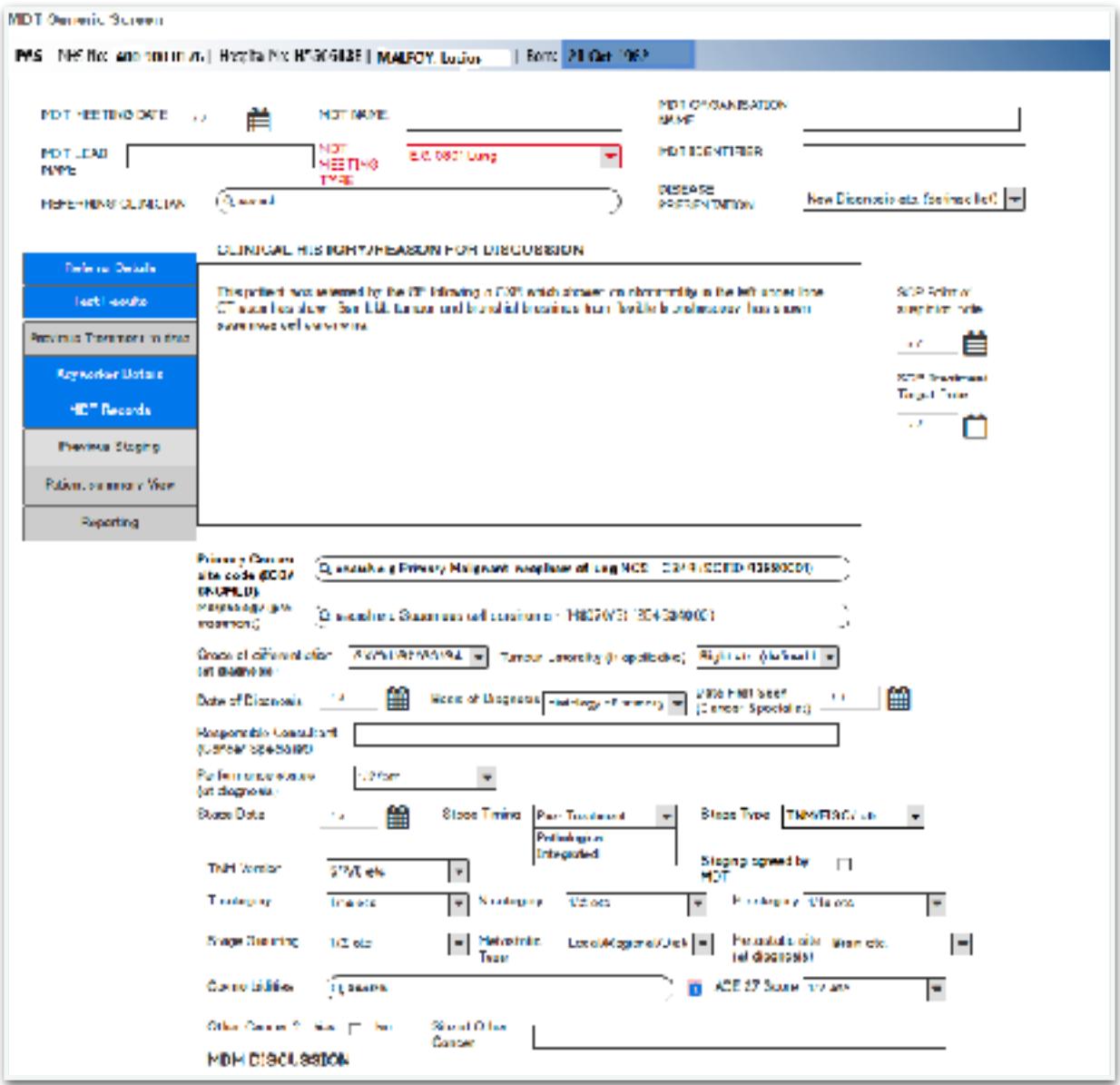
Recent Posts

- MDT: Multi-Disciplinary Team or Might Delay Things?**
24-August-18
- A prickly tale of hospital notes**
17-August-18
- Chemo Buddies**
4-August-18
- The empowered patient?**
26-July-18
- The aborted PICC Line**
25-July-18
- The extra mile**
20-July-18
- The long road to getting my prescription**
18-July-18
- The New Normal**
15-July-18



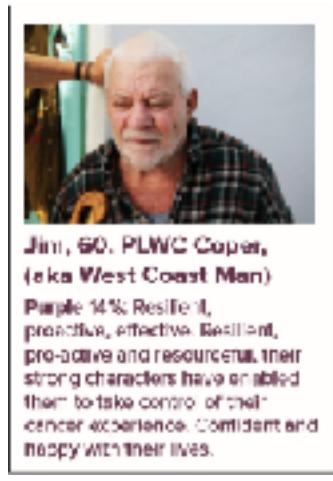
What is an ‘IT system’?

openEHR



Cancer journey

*open*EHR



The screenshot shows a clinical software interface for a patient named Mrs Dawn Taylor. The top navigation bar includes 'MY CLINICAL OUTCOMES' and a search bar for 'RY SMITH'. A message indicates missing registration information. The main view shows 'VIEWING LEFT HIP REPLACEMENT' under 'OVERVIEW'. The 'General' section contains patient details: Name (Mrs Dawn Taylor), Email (dawn.taylor@my-clinical-outcomes.com), Date of birth / Age (10-Jun-1943 / 75), Clinic / Consultant (Dr Terry Smith), and Problem area (Left hip). The 'Latest condition detail' section shows Treatment date / Time since treatment (09-Dec-2010) and Procedure (Total hip replacement). A 'Note' section is present with a 'RECORD' button. Below is a 'Progress' chart titled 'OXFORD HIP SCORE' showing the score from 2010 to 2017. The score starts at approximately 12 in 2010, rises to about 38 in 2011, remains stable until 2013, then gradually declines to around 28 by 2017. The x-axis is labeled 'ASSESSMENT DATE' and the y-axis is labeled 'Score'. The bottom of the screen displays navigation icons and a footer with the patient's name, procedure, and hospital.

Patient details: Mrs Dawn Taylor

This patient has missing registration information that needs to be completed before validation.

VIEWING LEFT HIP REPLACEMENT

OVERVIEW CONFIRM UPDATE REVIEW

General

Name: Mrs Dawn Taylor

Email: dawn.taylor@my-clinical-outcomes.com

Date of birth / Age: 10-Jun-1943 / 75

Clinic / Consultant: Dr Terry Smith

Problem area: Left hip

Latest condition detail

Treatment date / Time since treatment: 09-Dec-2010

Procedure: Total hip replacement

Note

RECORD

OXFORD HIP SCORE

ASSESSMENT DATE

Score

2010 2011 2012 2013 2014 2015 2016 2017

20 22 24 26 28 30 32 34 36 38

Green, Mrs Dawn

Total Hip Replacement

Lower Primary Hospital

02 03 04 05 06 07 08 09 010 011 012 013 014 015 016 017 018 019 020 021 022 023 024 025 026 027 028 029 030 031 032 033 034 035 036 037 038 039 040 041 042 043 044 045 046 047 048 049 050 051 052 053 054 055 056 057 058 059 060 061 062 063 064 065 066 067 068 069 070 071 072 073 074 075 076 077 078 079 080 081 082 083 084 085 086 087 088 089 090 091 092 093 094 095 096 097 098 099 0100

Treatment Summary

Please take this document with you to your GP practice appointment where your diagnosis and cancer care will be reviewed with you.

Please complete this form using BLOCK CAPITALS and black ink.

Patient's name:	John Smith	GP contact details:	Dr Jones
Date of birth:	10.10.10	Record number:	
Address:	3 Park Road	Hospital trust:	
	Doncaster DN4 0EF		

Your patient has had the following diagnosis and treatment for cancer and received a summary and ongoing management plan as outlined below. They have/have not received a copy of this summary. (Delete as applicable)

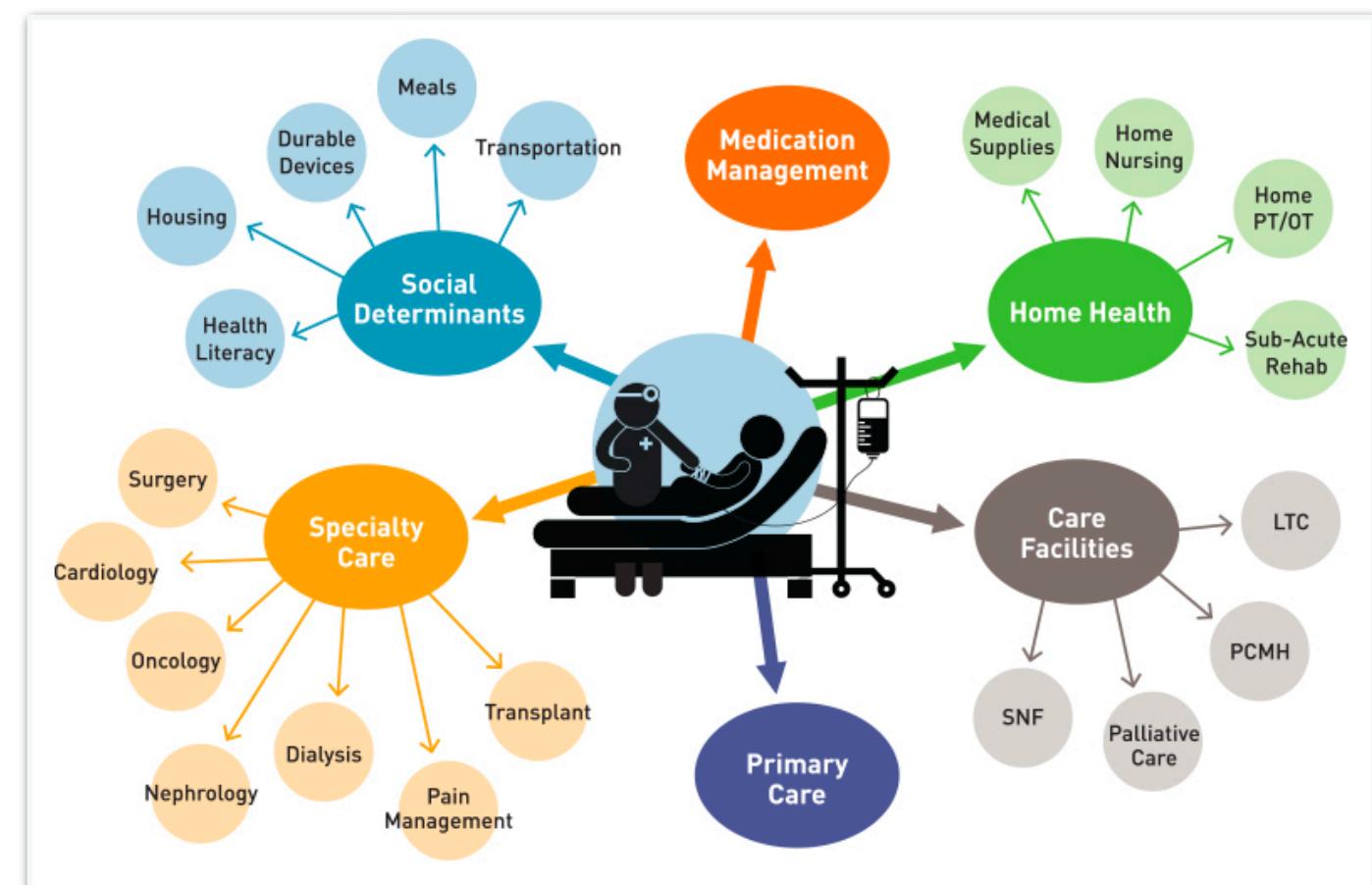
Diagnosis: Colorectal cancer	Date of diagnosis: 10.02.10	Stage/grade: Dukes: T2
Summary of treatment and relevant dates: Surgery – Resection (March 10) and reversal of stoma (Sept 10) Radiotherapy – May-June 2010 Possible treatment toxicities and/or late effects: Diarrhoea following pelvic radiotherapy		Treatment aim: Curative
Possible treatment toxicities and/or late effects: Surgery – Resection (March 10) and reversal of stoma (Sept 10) Radiotherapy – May-June 2010 Possible treatment toxicities and/or late effects: Diarrhoea following pelvic radiotherapy		Advise entry onto primary care palliative/supportive care register: No DS 1500 application completed: No Prescription charge exemption agreed: Yes
Alert symptoms that require referral back to specialist team: Diarrhoea for more than two weeks not relieved by loperamide/codeine Blood or mucus per rectum Further change in bowel function Abdominal pain that persists for longer than four weeks and does not respond to simple analgesia		Contacts for referrals or queries: In hours: 01234 567890 (CNS team) Out of hours: 01234 987654 (oncology ward)
Secondary care ongoing management plan: (tests, appointments etc) Next GP Review – Jan 2011 CEA next due in Jan 2011 then annually until 2015 CT scan (abdomen and chest) next due Sept 2011 Colonoscopy repeat next due Sept 2015		Other service referrals made: (delete or add) Dietician Benefits/Advice Service
Recommended GP actions in addition to GP Cancer Care Review: Please review dose of XXXXXX in two months if symptoms of XXXXX resolved reduce to 4mg daily		
Summary of information given to the patient about their cancer and future prognosis: John Smith and his wife have been informed that the cancer in his colon was non-invasive and that he has received surgery and radiotherapy with curative intent. He is aware however that it may recur in the future and we have briefly discussed the further treatment available should this be required. He is fully aware of the symptoms of recurrence and what to do should any occur.	Additional information including issues relating to lifestyle and support needs: I have advised him to quit smoking and referred to smoking cessation clinic. He is keen to join local colorectal support group and plans to attend next session in November.	

Completing Clinician: Charles Goodenough

Signature:

Date: 30.10.10

You can order Treatment Summary triplicate pack through macmillan.org.uk



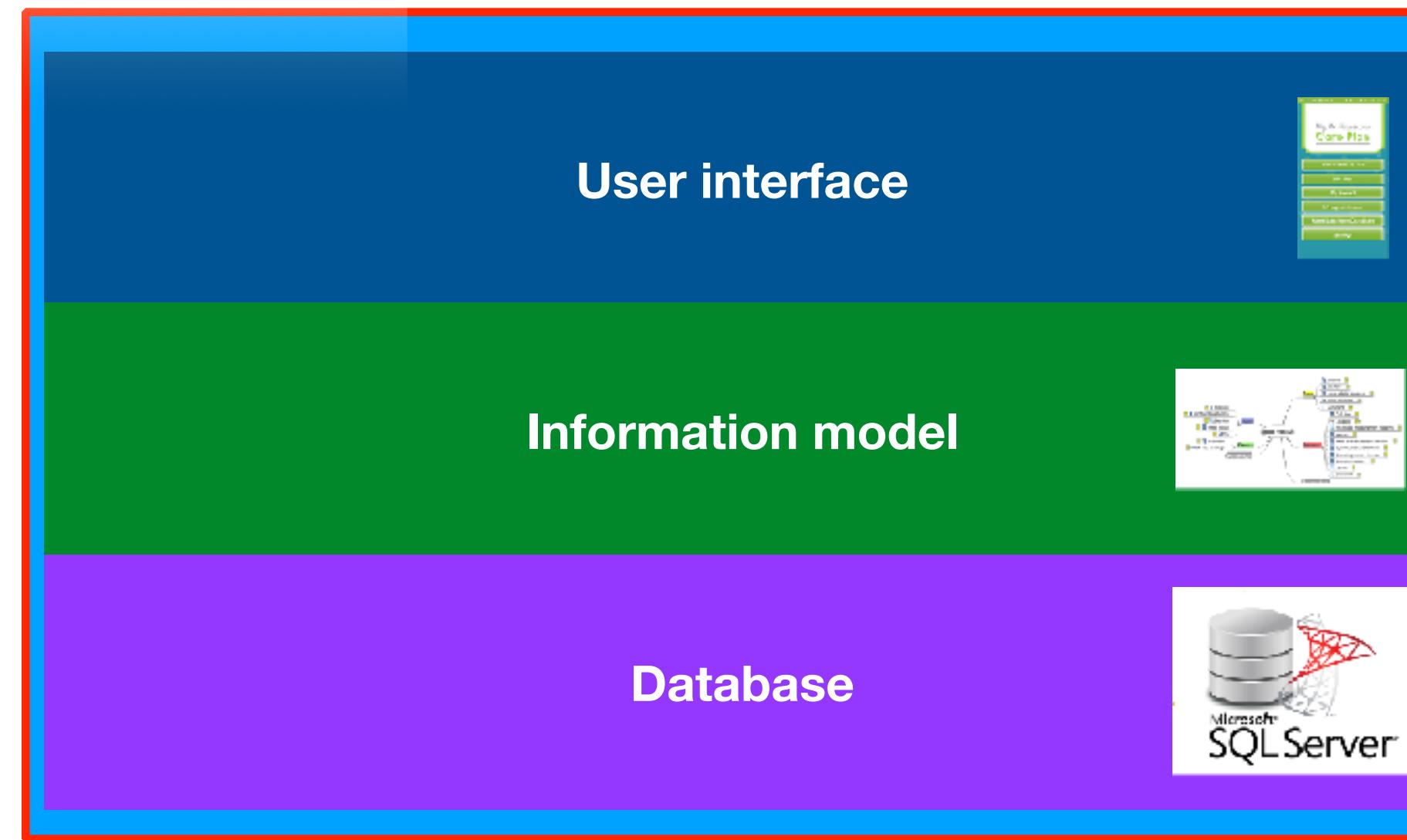
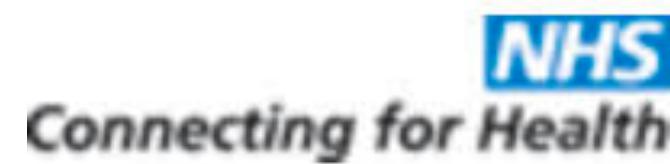
ReSPECT

Recommended Summary Plan for Emergency Care and Treatment

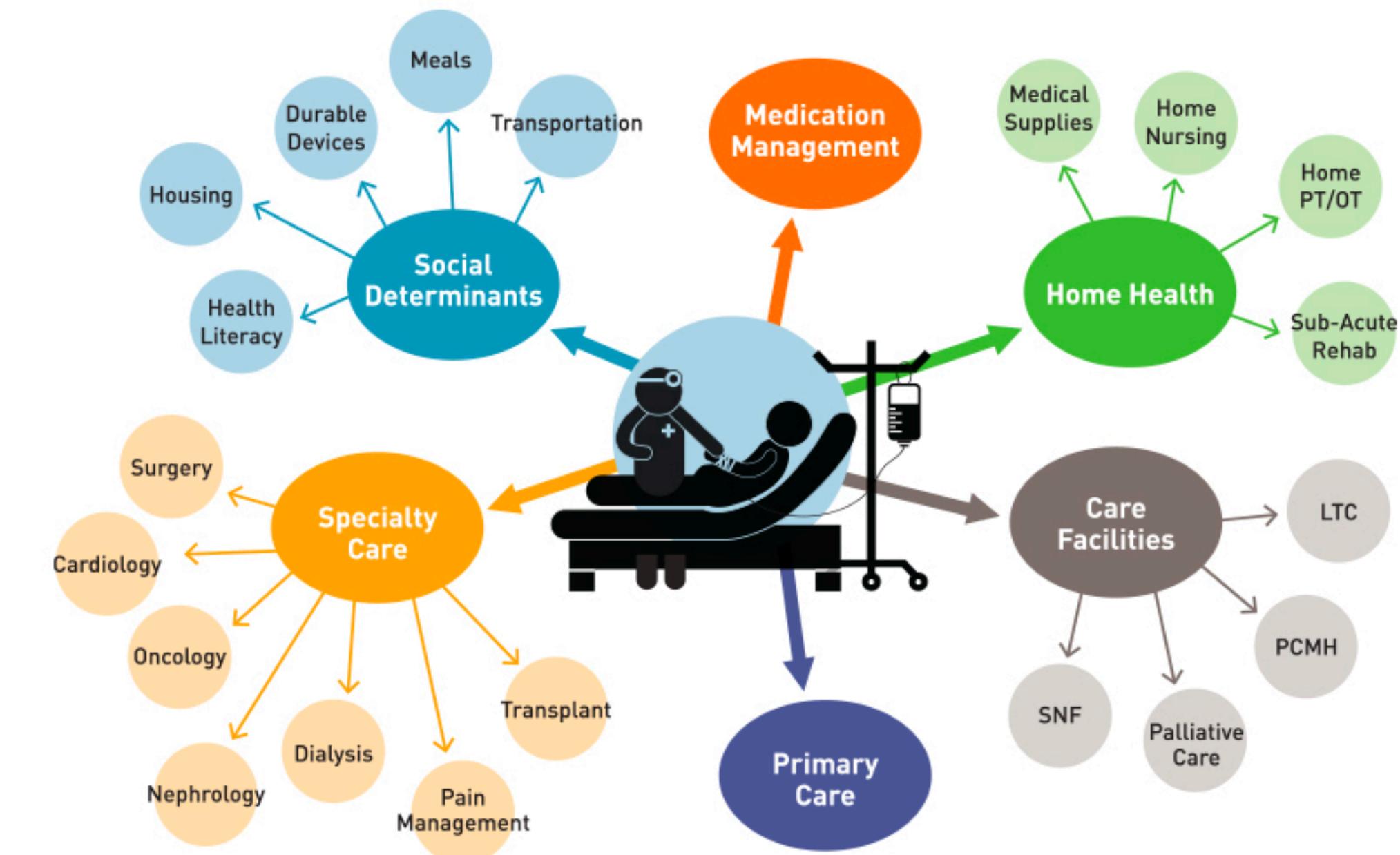
A. One system to rule them all?

openEHR

EMIS Health CEO talks the age of X
and putting patients in the centre

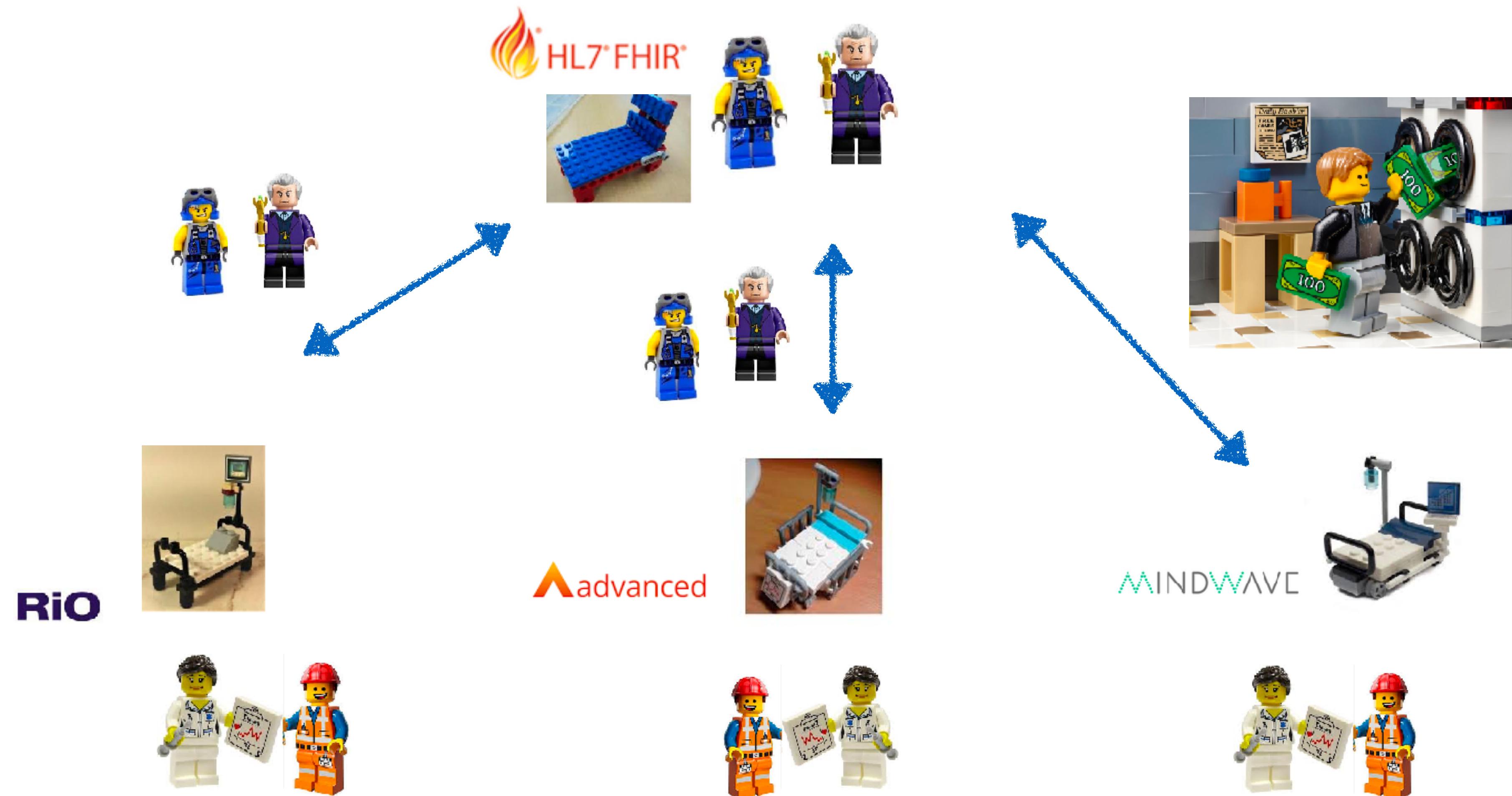


with the patient at the heart



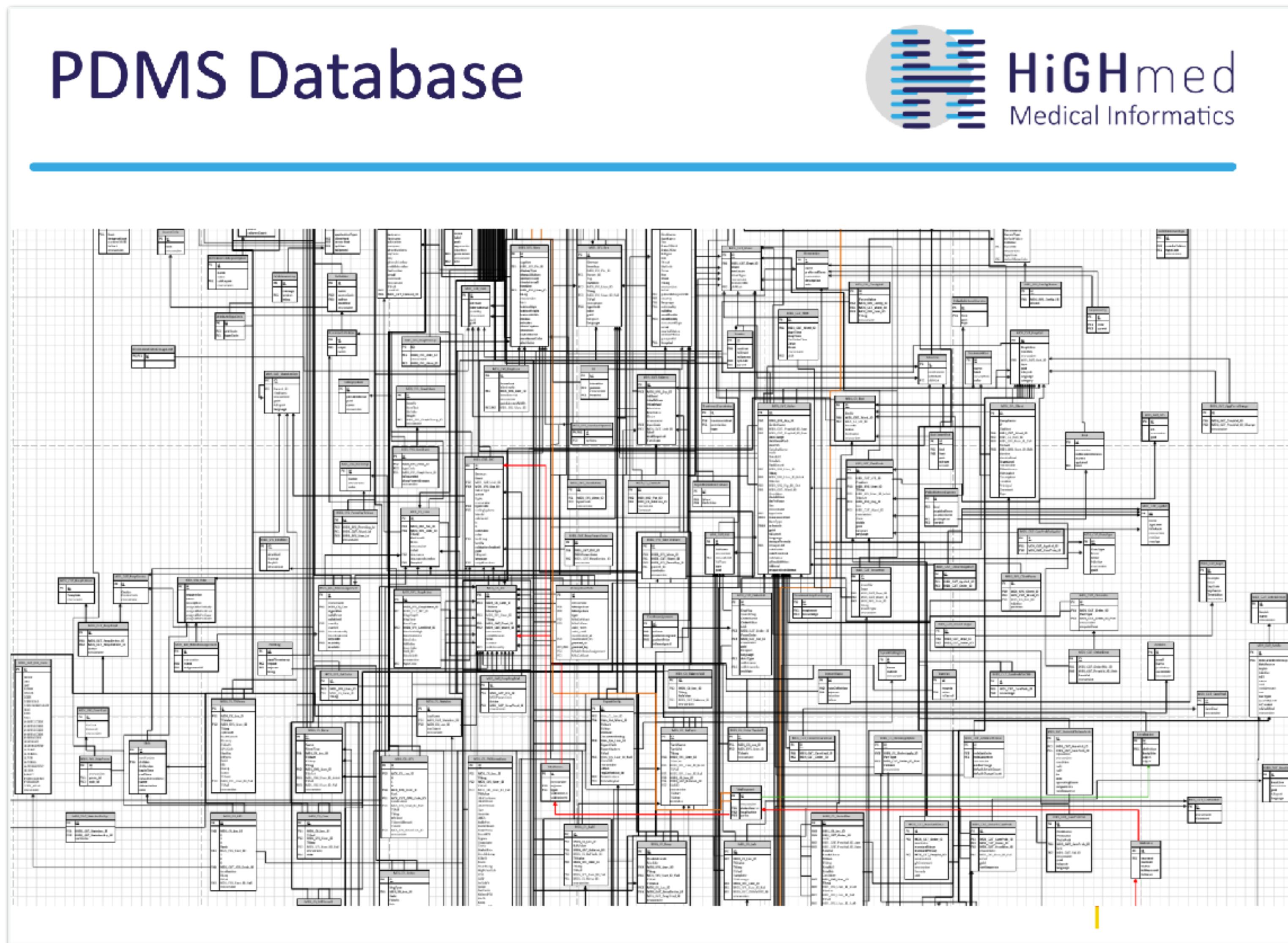
B. Best of Breed - ‘interoperability’

*open*EHR



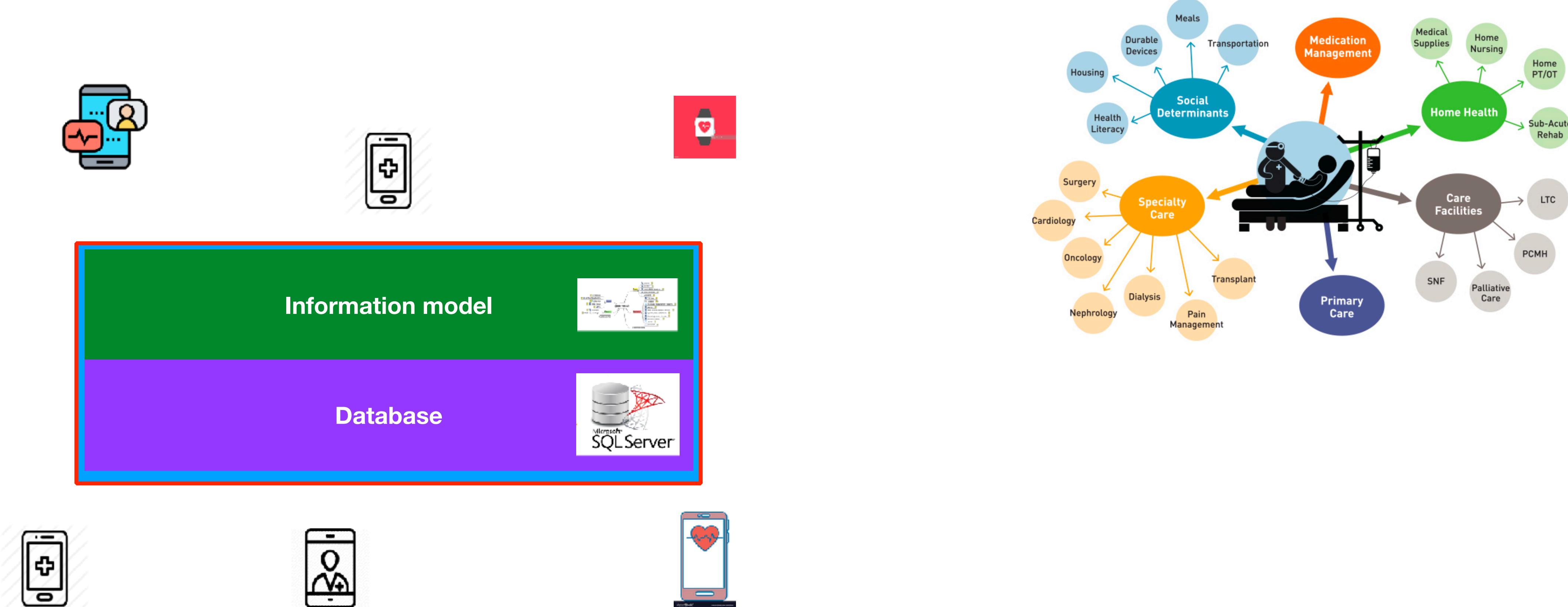
RDBMS - 'so 20th century'?

*open*EHR



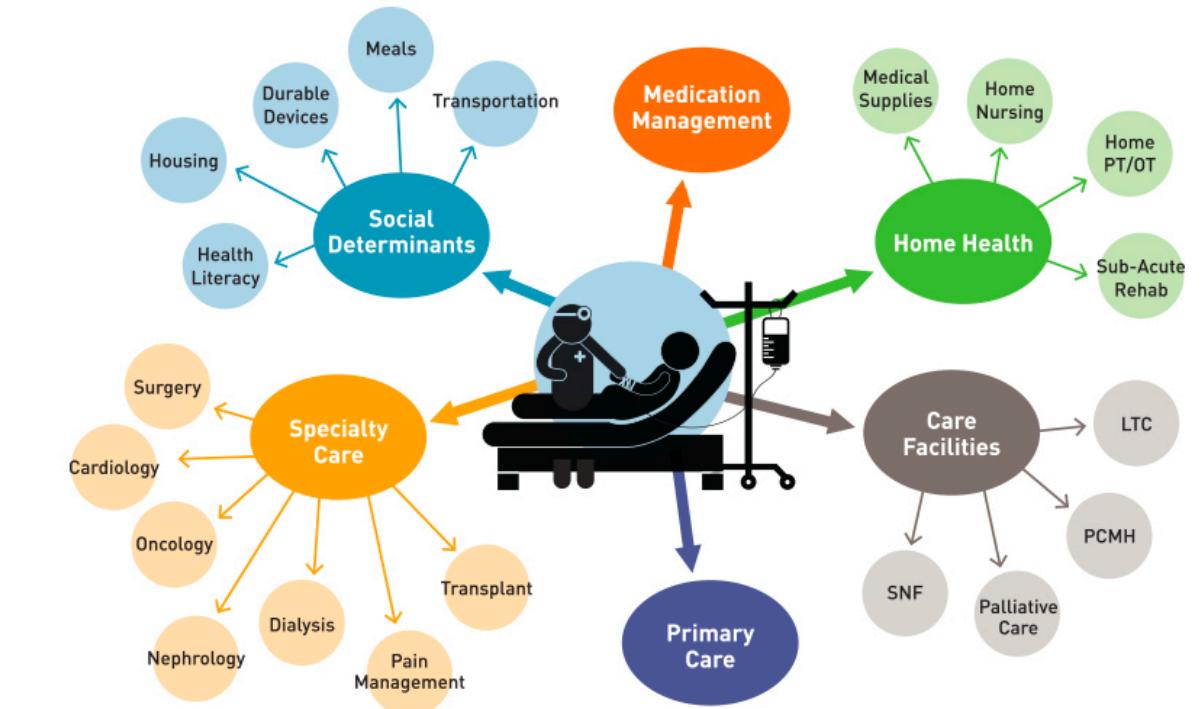
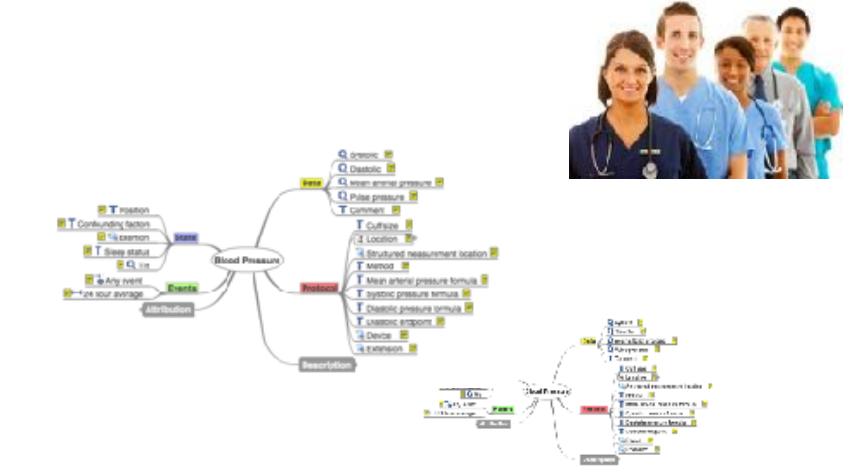
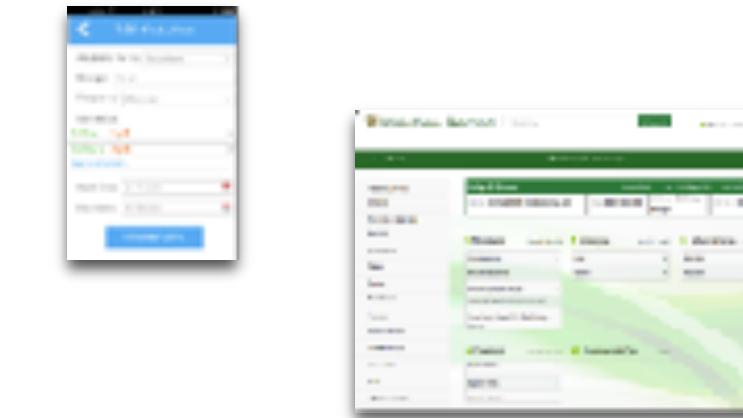
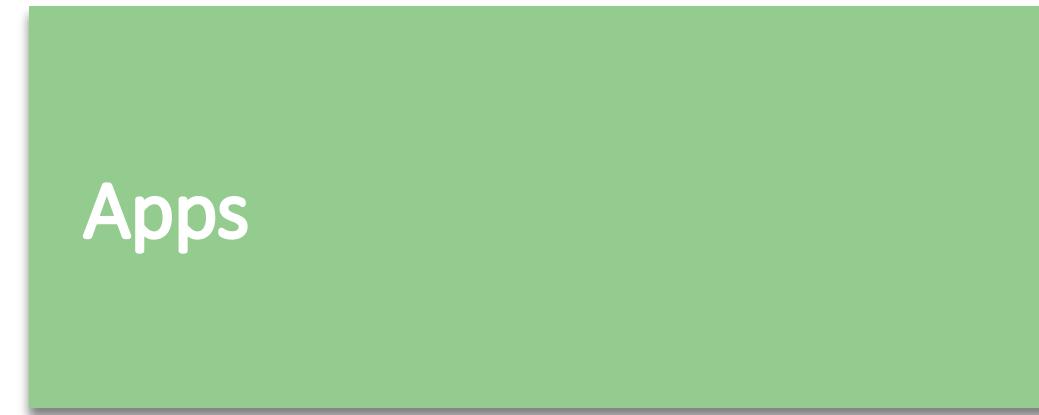
Coherent Platform - single ‘system’/ ‘multiple apps’

openEHR



open Platform - vendor-neutral

openEHR



openEHR



CaboLabs



What is openEHR?

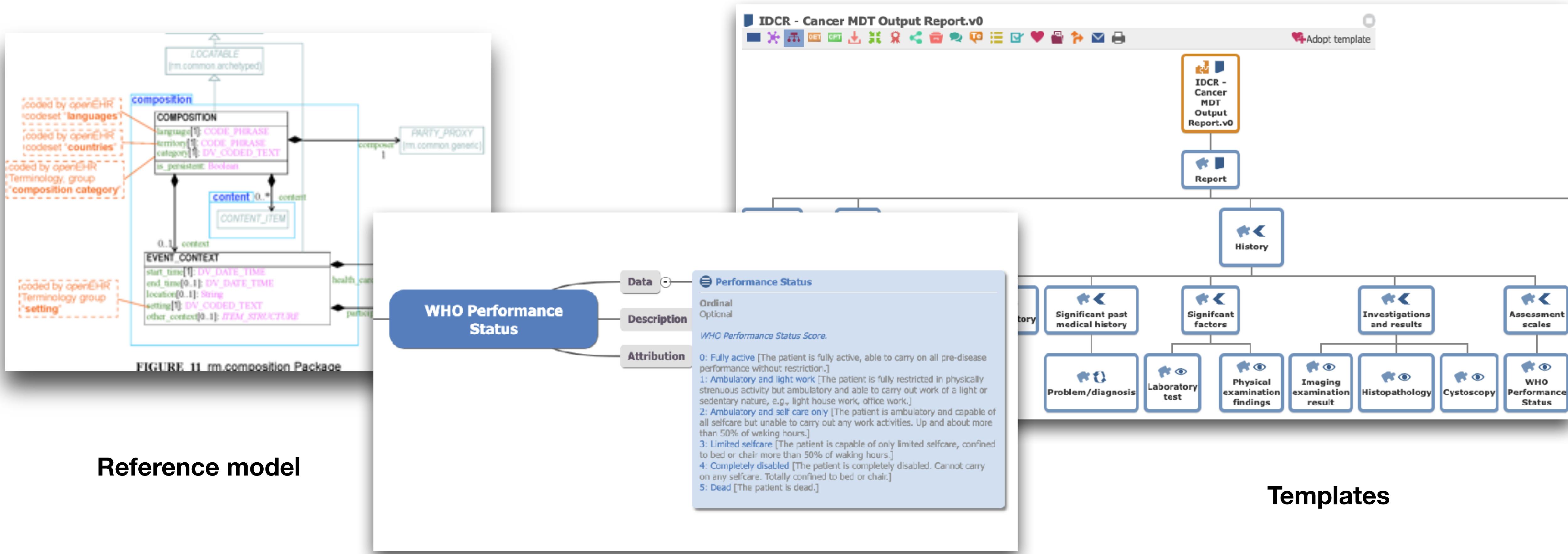
openEHR

- open specification for a health ‘information model’
 - supporting an open platform ecosystem
 - vendor /technology/license neutral
- Non-profit ‘industry / clinical/ health organisation’ collaborative
 - openEHR International
 - openehr.org
 - specifications.openehr.org -specifications
 - ckm.openehr.org - clinical models

The image shows two screenshots of the openEHR platform. The top screenshot is the openEHR website homepage, featuring a navigation bar with links like 'About', 'Governance', 'Programs', 'Community', 'openEHR in USA', 'Products & Tools', and 'Resources'. Below the navigation is a diagram titled 'Multi-level Modelling' showing the flow from 'domain experts' through 'Archetype', 'Template', 'openEHR Platform', 'EHR', and 'Software development environment' to 'app UI codes' and 'src code'. To the right of the diagram is a sidebar for 'accenda' with options for 'Membership', 'Industry | Organisations', 'Professionals | Individuals', and 'Join Us'. The bottom screenshot is the 'Clinical Knowledge Manager' interface, showing a search results page for 'heart'. The search bar indicates 'Search results for heart within the main elements of archetypes, templates and termsets that are active. All projects/incubators.' It shows 26 archetypes, 9 templates, and 0 termsets found. A detailed list of archetypes is provided, including 'HEART score', 'Heart failure symptom questionnaire', 'New York Heart Association functional classification', 'Pulse/Heart beat', and 'Examination of the heart'.

openEHR - vendor-neutral information model for persistence

openEHR



Reference model

Archetypes

Templates

openEHR tooling

openEHR

Archetype Designer Repositories Save Export Import

Covfefe NDS - SBAR_Care_Home.v0.0

NDS - SBAR_Care_Home.v0.0 (openEHR-EHR-COMPOSITION.encounter.v1)

en

Definition Description Analytics

atCode at0054.1

Occurrences 0..*

Type TEXT

Free text

Nasal prongs

Mask

Nebuliser

NIV

Limit to list

Default value

Value

Archetypes

- Physical activity (v0)
- Physical examination findings
- PCEM score (v0)
- Pregnancy status (v0)
- Pregnancy test result (v0)
- Procedure screening question
- Progress note (v1)
- PROMIS (v0)
- Pulmonary function test result
- Pulse deficit (v0)
- Pulse oximetry (v1)
- Pulse/Heart beat (v2)
- qSOFA score (v1)
- Refraction assessment (v0)
- Respiration (v2)
- Richmond agitation sedation
- Rinne and Weber test results
- SAFAS Score (v0)
- SARA ataxia scale (v0)
- SCORAD index (v0)
- Skeletal age (v0)
- Social context screening ques
- SCoPA score (v0)

Projects & Incubators

New and Modified Resources

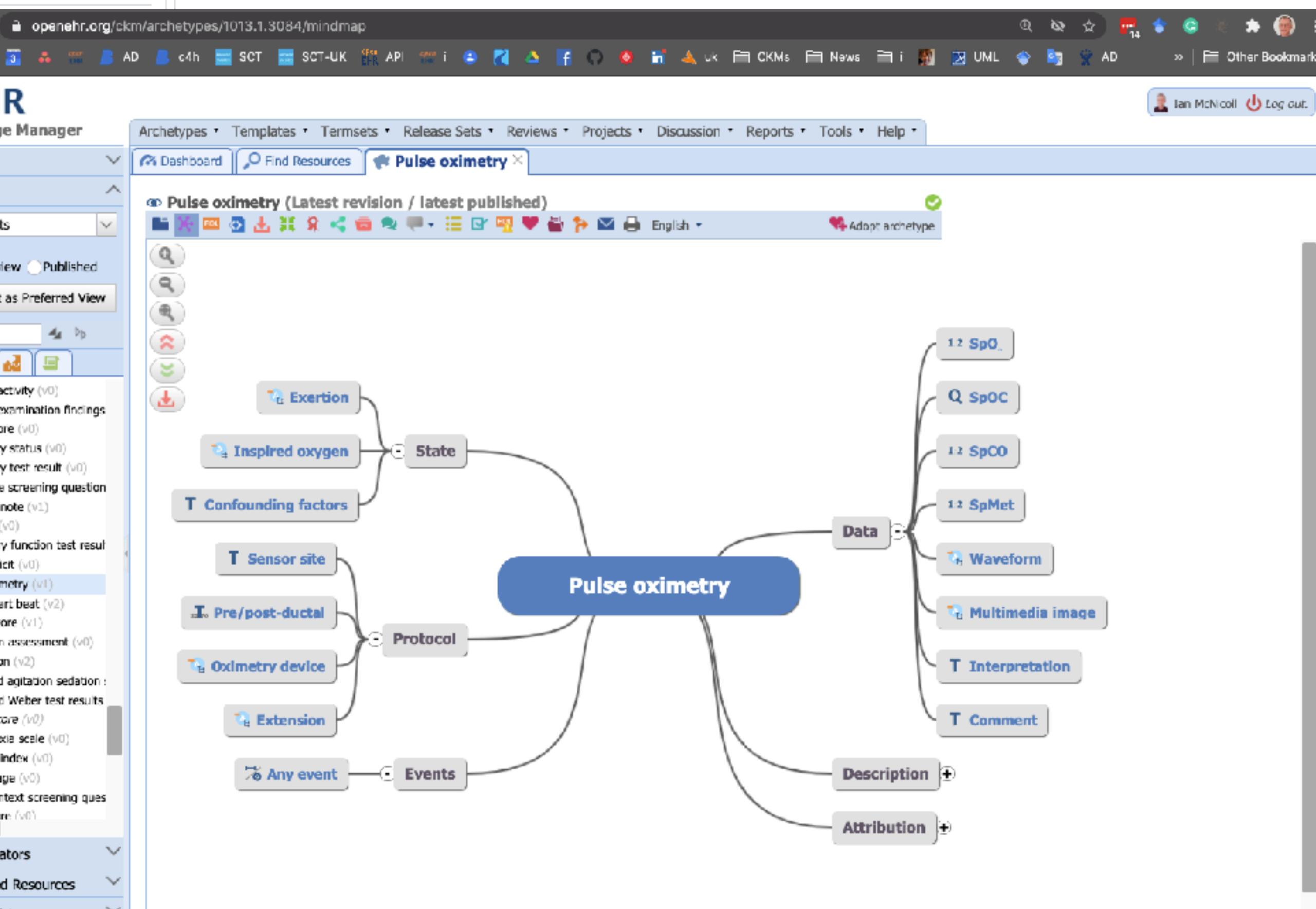
CKMS News UML AD SCT API CKM Other Bookmark

Ian McNicoll Log out

https://tools.openehr.org/

The screenshot shows the 'Archetype Designer' interface. At the top, there are tabs for 'Archetype Designer', 'Repositories', 'Save', 'Export', and 'Import'. Below this is a header bar with a user icon and the text 'freshehr'. The main area displays the 'NDS - SBAR_Care_Home.v0.0' archetype. It includes fields for 'atCode' (set to 'at0054.1'), 'Occurrences' (set to '0..*'), and 'Type' (set to 'TEXT'). A 'Free text' input field contains several medical terms like 'CPR decision', 'Significant comorbidities', 'Tobacco smoking summary', etc. On the right, there's a 'Clinical Knowledge Manager' interface showing a 'Pulse oximetry' mindmap. The mindmap has a central node 'Pulse oximetry' connected to nodes like 'Exertion', 'State', 'Confounding factors', 'Sensor site', 'Protocol', 'Oximetry device', 'Extension', 'Events', 'Data', 'Description', 'Attribution', and various specific measurements like 'SpO2', 'SpOC', 'SpMet', 'Waveform', 'Multimedia image', 'Interpretation', and 'Comment'. A sidebar on the left lists other archetypes such as 'Physical activity', 'Physical examination findings', 'PCEM score', etc.

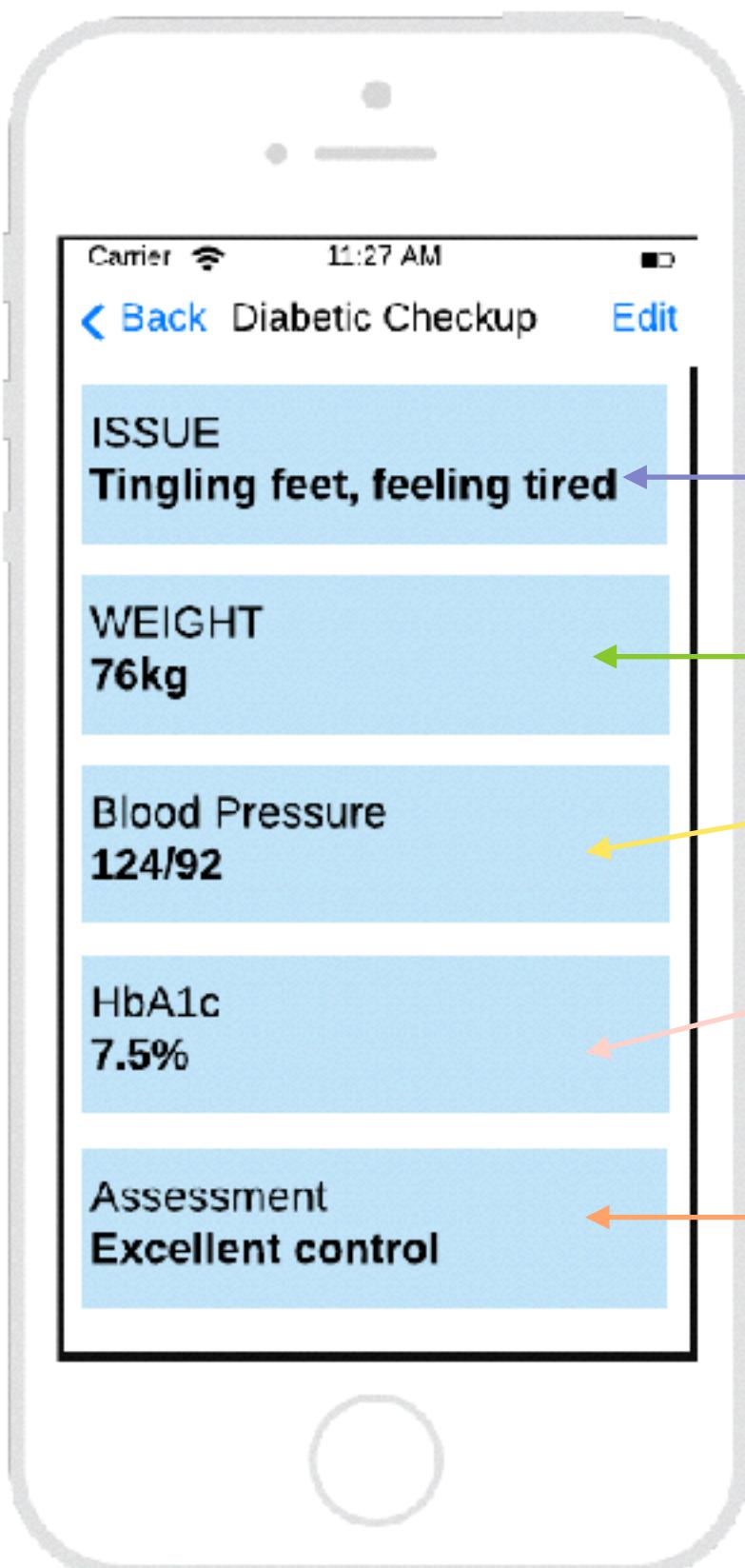
https://openehr.org/ckm



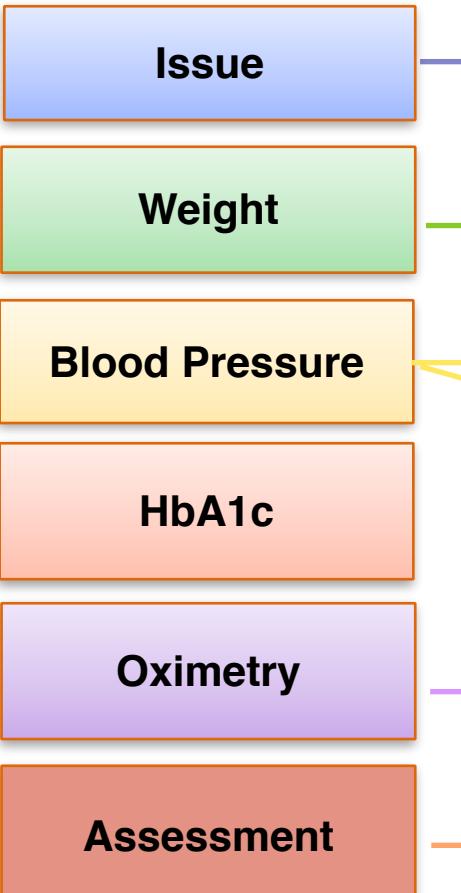
Archetypes and templates

openEHR

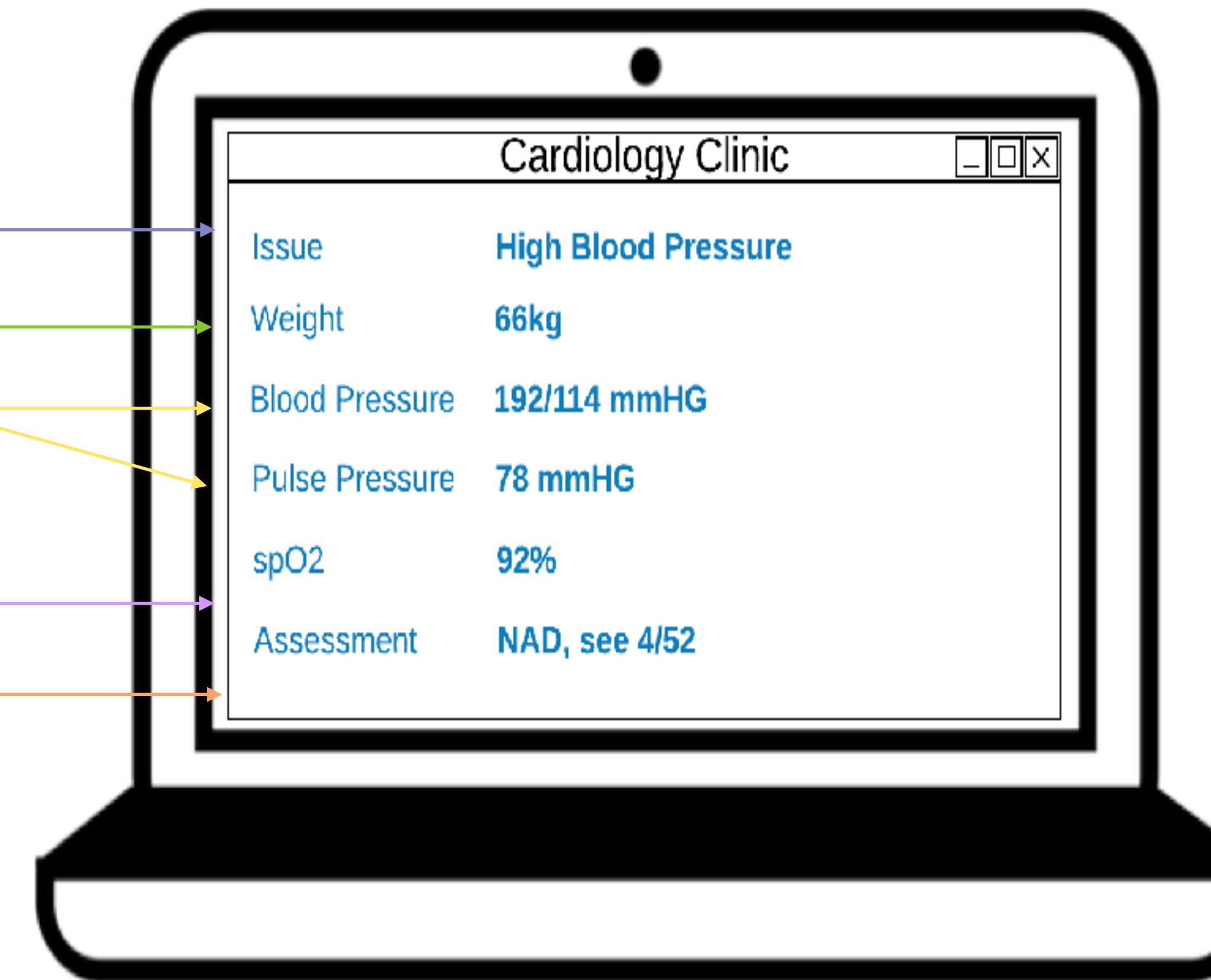
Template underpinning application



Archetypes used in template



Template underpinning application



Discovery process

Care Home data standards?

openEHR

The Development of a Care Home Data Platform in Scotland: Insights from the Care Home Innovation Partnership, Lothian

nightingale hammerson		F1a- ASSESSMENT ON ADMISSION	
RESIDENT'S NAME:	UNIT:		
ASSESSMENT ON ADMISSION TO BE COMPLETED WITHIN 72 HOURS OF ADMISSION			
Personal Cleansing (preferred personal hygiene routine, level of assistance needed)	Eating and Drinking (food preferences, sufficient fluid intake, usual meal pattern, food restrictions)		
Personal Dressing (How often are the clothes changed, what are the individual's personal dressing habits?)	Breathing (include respiration rate)		
Observations & Baseline (Anxious, withdrawn, distressed, Temp etc)	Mobility (assistance needed, limitations, abilities)		
Sleeping Routines (usual sleep rest pattern, preferred time of rest/sleep, sedation)	Elimination Urine and Bowels (incontinence, catheters, size, bowel patterns, laxatives)		

Table 4: Data sources - Assessment tools/measures for each data inventory item

Inventory No.	Area assessed	1	2	3	4	5	6
1	Dependency/ indicator of need	Augmented IoRN	IoRN	Dependency assessment	IoRN	IoRN	Organisation Form
2	Nutrition	MUST	MUST	MUST	MUST	Eating Well in Care homes/ Cook Safe	Organisation Form
3	Weight	Kg/BMI	Kg/BMI	Kg/BMI	Kg/BMI	Kg/BMI	Kg/BMI
4	Incidence and risk of falls	FRASE	Organisation Form	Falls Risk	Falls Risk	Organisation Form	Organisation Form
5	Incidence and risk of pressure sores	Braden	Pressure Ulcer Cross/ PU Checklist/ Waterlow	Waterlow	Waterlow	Waterlow	Skin integrity Care Plan
6	Infections	Count/ type of infection	Count/ type of infection	Count/ type of infection	Count/ type of infection	Count/ type of infection	Count/ type of infection
7	Wounds (new and ongoing)	Internal Chart	STAR Classification	Wounds assessment	Chart on PCS	NHS Wound Assessment Chart	Organisation Form
8	Frailty	CIRC	SPAR Tool	Edmonton Frailty Scale	Clinical Frailty Scale	Not collected	Not collected
9	Bowel Movement(s)	Bristol Stool Chart	Bristol Stool Chart	Chart on PCS	Bristol Stool Chart	Bristol Stool Chart	Organisation Form
10	Fluid Intake	Internal Chart	Organisation Form	Chart on PCS	Chart on PCS	Organisation Form	Organisation Form
11(a)	Mood: Depression	Geriatric Depression scale/ Cornell scale for Depression in dementia	No measure/tool reported*	No measure/tool reported	Cornell scale for depression in dementia	No measure/tool reported	No measure/tool reported
11(b)	Mood: Delirium	4AT	4AT	Not recorded	Not recorded	Care support plan	Not collected
12	Pain	PAINAD Doloplus2 Abbey Pain Scale	Abbey Pain Scale	Abbey Pain Scale	Abbey Pain Scale	Abbey Pain Scale	Abbey Pain Scale
13	Movement	Roper, Logan, Tierney model of ADL Nolan's 6 senses f/work	Care Support Plan	No measure/tool reported	No measure/tool reported	Care Support Plan	In Care Plan
14	Sleep		Care Support Plan	Care Support Plan	Organisation Form	Organisation Form	Organisation Form
15	Observations/ Vital Signs	←----- Various charts -----→					

Cancer pathways / reporting - UK

*open*EHR

Archetype Designer [Repositories](#) [Save](#) [Export](#) [Import](#)

NWIS/DHI - Cancer Care NWIS-Myeloma.v.0.0 ×

NWIS-Myeloma.v.0.0 ([openEHR-EHR-COMPOSITION.encounter.v1](#))

Definition Description Analytics

Myeloma MDT

⊖ Myeloma MDT NAME (from: 'Encounter')

- ⊖ → context
- ⊖ → other_context
- ⊕ Extension
 - ⊖ WCRS Metamodel Δ [0..*] to [0..1] NAME (from: 'XDS Metadata')
- ⊖ → content
- ⊕ MDT Summary
- ⊖ Problems and diagnoses
 - ⊖ → items
 - ⊖ Primary diagnoses
 - ⊖ → items
 - ⊕ Problem/Diagnosis
 - ⊖ → data
 - T Primary cancer site NAME (from: 'Problem/Diagnosis name')
 - T Clinical description Δ [0..1] to [0..0]
 - T Body-site Δ [0..*] to [0..0]
 - Structured body site
 - Date/time-of-onset Δ [0..1] to [0..0]

CKM - Collaborative review / publication

openEHR

ckm.apperta.org/ckm/templates/1051.57.52/orgchart

Apps AD c4h 18 uk CKMs inidus News c4h UML AD openEHR AQL openEHR API Other Bookmarks

Ian McNicoll Log out.

Preferred View

All Resources

Subdomain: All subdomains

Project / incubator: All projects

Active Under review Published

Set as Preferred View

Templates

- GEL Rare diseases withdrawal cl
- GlucometerDeviceReadings
- Housing COVID-19
- ICHOM LPC Summary.v0
- IDCR - Adverse Reaction List.v1
- IDCR - Body Measurements Enc
- IDCR - Cancer MDT Output Repo
- IDCR - Immunisations List.v0
- IDCR - Medication Statement Lis
- IDCR - Problem List.v1
- IDCR - Procedures List.v1
- IDCR - Vital Signs Encounter.v1
- Living will UK
- Macmillan_holistic_assessment.v
- Mental Health Triage-v0
- Mobility
- My asthma plan-v0
- NDS - Essential ACP.v.0.1
- NDS - SBAR_Care_Home.v0.0
- NDS Covid-19 Data Dictionary.v0

Projects & Incubators

New and Modified Resources

Resource Watchlist

Checked-Out Resources

IDCR - Cancer MDT Output Report.v0

Report

```
graph TD; Report --> Holistic[Holistic needs assessment]; Report --> Referral[Referral details]; Report --> History[History]; Report --> Problems[Problems and diagnoses]; Report --> Plan[Plan and requested actions]; Holistic --> MDTReferral[MDT Referral]; Holistic --> OriginalReferral[Original referral]; Referral --> Question[Question for MDT]; Referral --> Story[Story/History]; History --> SignificantPast[Significant past medical history]; History --> SignificantFactors[Significant factors]; History --> Investigations[Investigations and results]; History --> AssessmentScales[Assessment scales]; SignificantPast --> ProblemDiagnosis[Problem/diagnosis]; SignificantPast --> LaboratoryTest[Laboratory test]; SignificantPast --> PhysicalFindings[Physical examination findings]; SignificantFactors --> ImagingResult[Imaging examination result]; SignificantFactors --> Histopathology[Histopathology]; SignificantFactors --> Cystoscopy[Cystoscopy]; Investigations --> WHOStatus[WHO Performance Status]; Investigations --> TNMStaging[Tumour - TNM Cancer staging]
```

Click on archetype to display archetype mindmap, double-click to collapse or expand, right-click for more options.

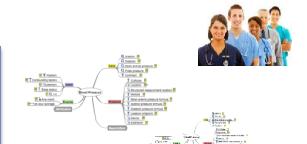
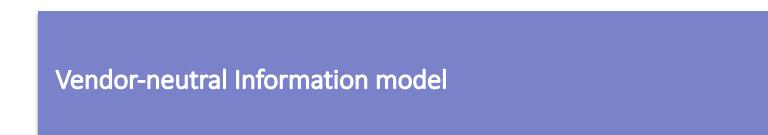
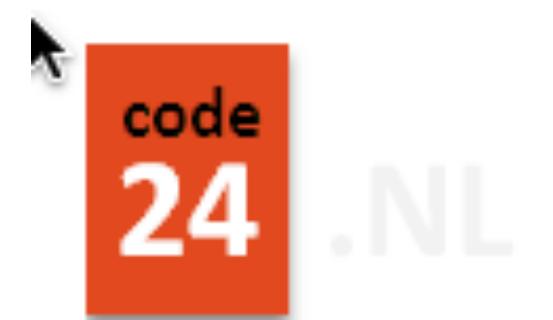
CDR - Clinical data repository

openEHR

- Smart datastore which natively stores, retrieves, queries openEHR data via a standard API



- All data completely available
- AQL - Vendor-neutral querying
- ‘No-code’ deployment of new clinical content definitions



openEHR / ehrscape API

*open*EHR

The screenshot shows the openEHR REST API documentation page. It features a sidebar with navigation links for different API resources:

- Composition (EHR API - Composition Resource v1.0)
- Contribution (EHR API - Contribution Resource (WIP v1.0.1))
- Directory (EHR API - Directory Resource (v1.0))
- EHR (EHR API - EHR Resource (v1.0))
- EHR_STATUS (EHR API - EHR_STATUS Resource (WIP v1.0.1))
- Query (Query API - Query Resource (WIP v1.0.1))
- Stored Query (Definitions API - Stored Query Resource (WIP v1.0.1))
- Template (Definitions API - Template Resource (WIP v1.0))

The screenshot shows the Postman application interface. It displays a collection named "Apperla C4H: openEHR REST APIs" which contains several sub-endpoints under "openEHR REST API". One specific endpoint is highlighted:

```
GET {{ehrbaseBaseUrl}}/template/({{templateId}})/example?format=STRUCTURED&exampleFile
```

The "Body" tab shows a JSON response example for a blood pressure measurement:

```
24  },
25  },
26  },
27  "blood_pressure": [
28  {
29  "_uid": "-",
30  },
31  ],
32  ],
33  ],
34  ],
35  ],
36  ],
37  ],
38  ],
39  ],
40  ],
41  ],
42  ],
43  ],
44  ],
45  ],
46  ],
47  ],
48  ],
49  ],
50  ],
51  ],
52  ],
53  ],
54  ],
55  ],
56  ],
57  ],
58  ],
59  ],
60  ],
61  ],
62  ],
63  ],
64  ]
```

AQL - Archetype Query Language

openEHR

cdr.code4health.org/studio/aql-builder

34

5.11.2020 @ 13:23 + :

< NCD-Generic Patient Encounter.v0

Search...

Patient Encounter

→ context

- Generic

– Vital Signs

– Heart Rate

– Heart rate reading

Q Heart rate

– Blood pressure

– Blood pressure reading

Q Systolic

Q Diastolic

T Position

T Location of measurement

T Method

- Body temperature

– Body temperature reading

Q Temperature

- Oxygen saturation

– SPO2 reading

1:2 SpO₂

– Inspired oxygen

Q Flow rate

✓ On room air

T Method of oxygen delivery

- Anthropometrics

– Height/Length

– Height/length measurement

1 SELECT c/uid/value as compositionId,
2 c/name/value as compositionName,
3 p/Systolic as systolic,
4 p/Diastolic as diastolic,
5 a/Weight as weight,
6 f/Body_mass_index as bmi,
7 r/Analyte_result as glucose_result
8 FROM EHR e
9 CONTAINS COMPOSITION c
10 CONTAINS (OBSERVATION m#Blood_glucose or OBSERVATION p#Blood_pressure or OBSERVATION a#Body_weight or OBSERVATION f#Body_mass_index or CLUSTER r#Laboratory_analyte_result)
11 WHERE e/ehr_id/value = {{ehrId}}
12 OFFSET 0 LIMIT 10

Num. of results: 10

Export Expand table Compact Detailed Raw

#	compositionId	compositionName	systolic	magnitude	units	precision	d
1	7b20dc2b-6494-467d-8986-469367f7c75b::4cce5a07-be4d-4318-a94f-3b8401853a20::1	Passport observations	169	mm[Hg]	0	69	
2	3484653f-c211-464b-bace-83ff626d0b6b::4cce5a07-be4d-4318-a94f-3b8401853a20::1	Passport observations	169	mm[Hg]	0	69	
3	aaa1da4b-ea92-4933-ac25-66f84bcd717c::4cce5a07-be4d-4318-a94f-3b8401853a20::1	Passport observations					
4	ae04cf64-4d76-4742-9c44-3ff2b8a2e9fd::4cce5a07-be4d-4318-a94f-3b8401853a20::1	NCD - first visit	110	mm[Hg]		76	
5	ae04cf64-4d76-4742-9c44-3ff2b8a2e9fd::4cce5a07-be4d-4318-a94f-3b8401853a20::1	NCD - first visit	99	mm[Hg]		80	
6	ae04cf64-4d76-4742-9c44-3ff2b8a2e9fd::4cce5a07-be4d-4318-a94f-3b8401853a20::1	NCD - first visit	123	mm[Hg]		55	
7	ae04cf64-4d76-4742-9c44-3ff2b8a2e9fd::4cce5a07-be4d-4318-a94f-3b8401853a20::1	NCD - first visit	155	mm[Hg]		66	
8	7ff115e4-dcd1-4315-a3bb-70b5e8a59134::4cce5a07-be4d-4318-a94f-3b8401853a20::1	JMOHW - Passport observations.v0	120	mm[Hg]	0	88	
9	687d40df-57d1-4d29-ab41-88396f810de0::4cce5a07-be4d-4318-a94f-3b8401853a20::1	Passport observations	124	mm[Hg]	0	88	
10	159c3aab-8bb6-45dd-a452-cbf3e4ac1fe8::4cce5a07-be4d-4318-a94f-3b8401853a20::1	Passport observations	124	mm[Hg]	0	90	

openEHR REST API /query

openEHR

Filter languages...

- C - libcurl
- C# - RestSharp
- cURL
- Go - Native
- HTTP
- Java - OkHttp
- Java - Unirest
- JavaScript - Fetch
- JavaScript - jQuery
- JavaScript - XHR
- NodeJs - Axios
- NodeJs - Native
- NodeJs - Request
- NodeJs - Unirest

Generated code for NodeJs - Axios [Contribute on GitHub](#)

```
1 var axios = require('axios');
2 var data = '{\n  "q": "SELECT c/uid/value as compositionId,\nc/name/value\n  as compositionName,np/data[at0001]/events[at0006]/data[at0003]/items\n  [at0004]/value as systolic,\n          p/data[at0001]/events[at0006]/data\n  [at0003]/items[at0005]/value as diastolic,\n          a/data[at0002]/events\n  [at0003]/data[at0001]/items[at0004]/value as weight,\n          f/data\n  [at0001]/events[at0002]/data[at0003]/items[at0004]/value as bmi,\n          r/items[at0001]/value as glucose_result\nFROM EHR e\nCONTAINS COMPOSITION\n  c\nCONTAINS (OBSERVATION m[openEHR-EHR-OBSERVATION.laboratory_test_result.\nv1] or OBSERVATION p[openEHR-EHR-OBSERVATION.blood_pressure.v2] or\nOBSERVATION a[openEHR-EHR-OBSERVATION.body_weight.v2] or OBSERVATION f\n[openEHR-EHR-OBSERVATION.body_mass_index.v2] or CLUSTER r\n[openEHR-EHR-CLUSTER.laboratory_test_analyte.v1])\nWHERE e/ehr_id/value =\nb4a4577f-7496-4053-ae60-45e22cf9952\nOFFSET 0 LIMIT 10"\n}';

3
4 var config = {
5   method: 'post',
6   url: 'https://cdr.code4health.org/rest/openehr/v1/query/aql',
7   headers: {
8     'Accept': 'application/json',
9     'Content-Type': 'application/json',
10    'Authorization': 'Basic\nNGNjZTVhMDctYmU0ZC00MzE4LWE5NGYtM2I4NDAxODUzYTIw0iQyYSQxMCQ2MTlraQ==',
11    'Cookie': '_2269c=http://10.0.0.203:8080'
12  },
13  data : data
14 }
```

NHS Scotland: National Digital Platform

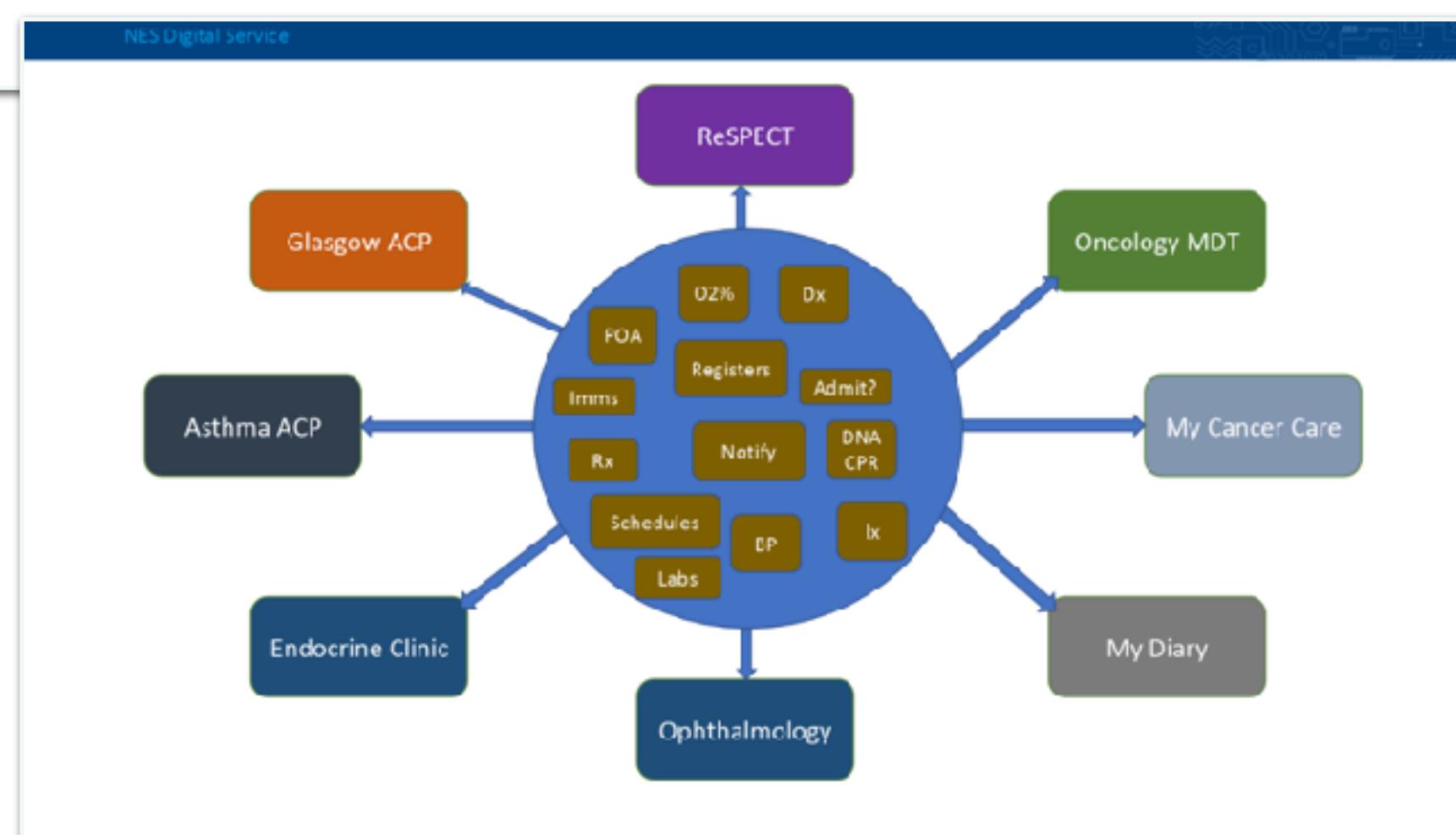
openEHR

194. It is no longer acceptable in this age that our health service is still using multiple incompatible systems and various platforms. In all our work we have heard

It is no longer acceptable in this age that our health service is still using multiple incompatible systems...

167. We agree the best way forward for data sharing is through a single platform, or spine, for data that other systems connect into and we note witnesses and the Scottish Government are in agreement. Can the Scottish Government advise whether it has had discussions with other countries regarding the use of a single platform?

...the best way forward for data sharing is through a single platform...



 **Paul Miller** @docpaulmiller 2d
Running thought: There is no need to try to maintain the GP record as the 'source of truth' when we have [@ndsscotland](#) platform. We only ever did that before because there was nothing else better. ACPs, DNACPR, Immunisations etc, are not just for GPs. Put them on the platform!

  You

Open digital platform

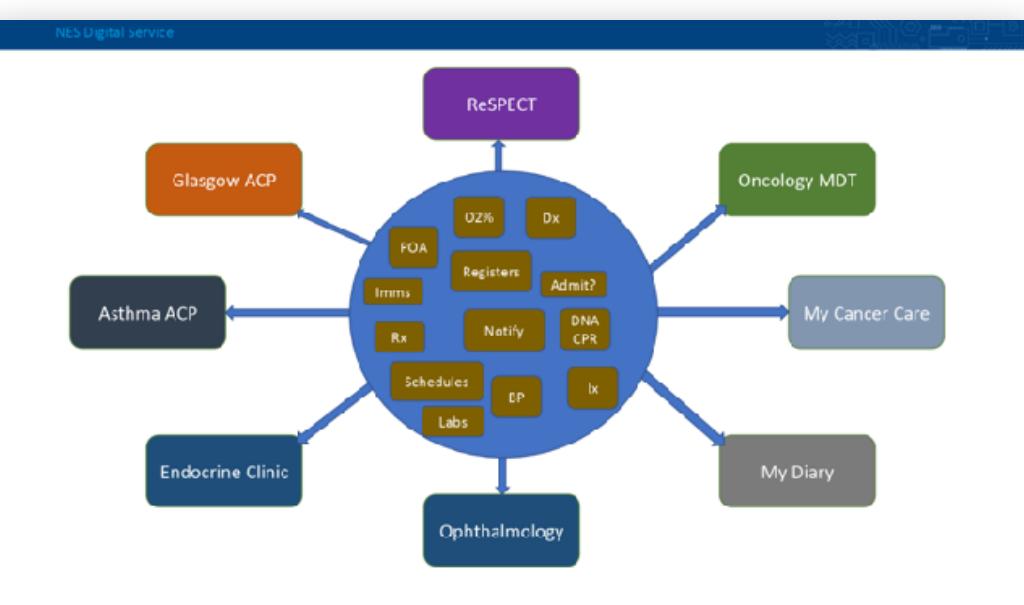
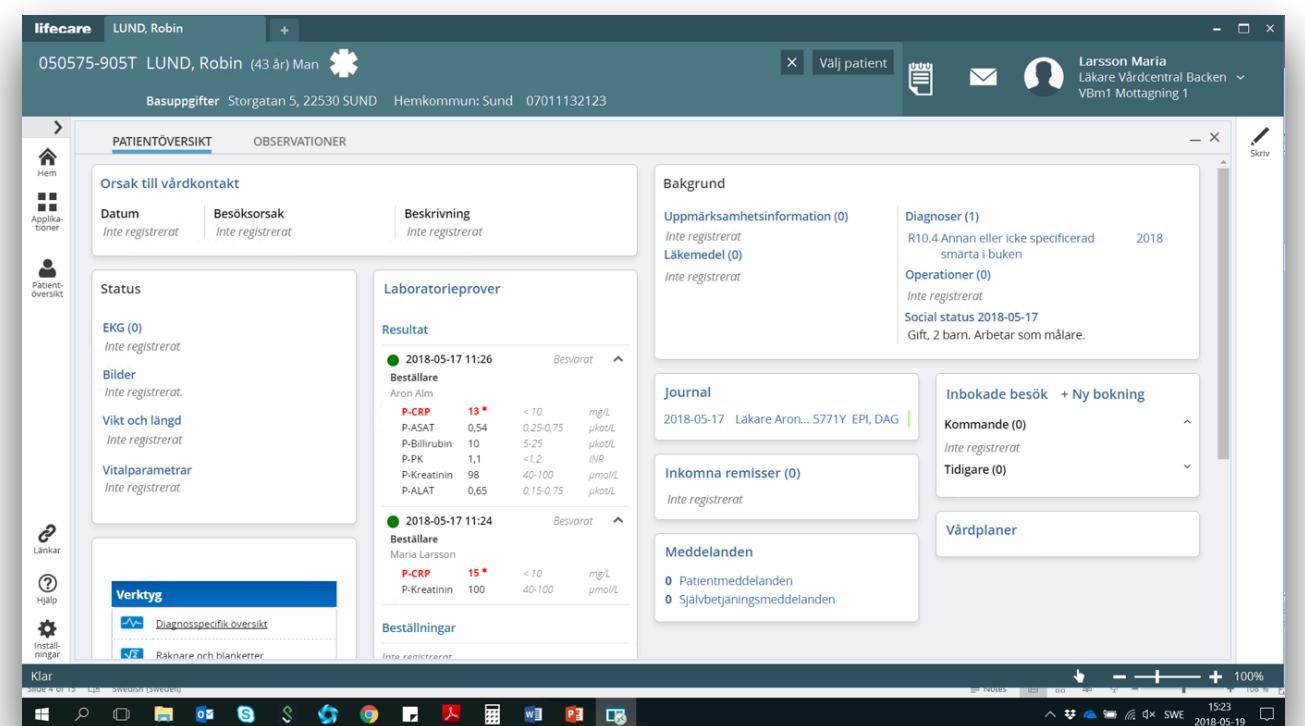
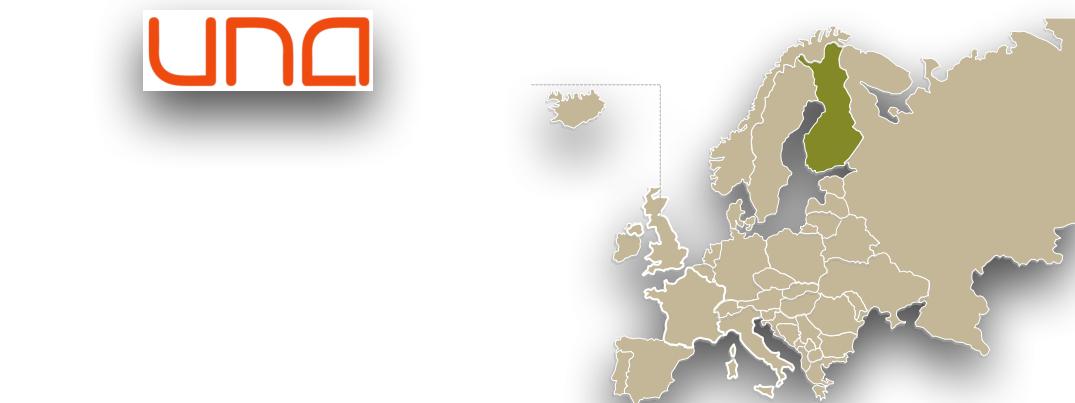
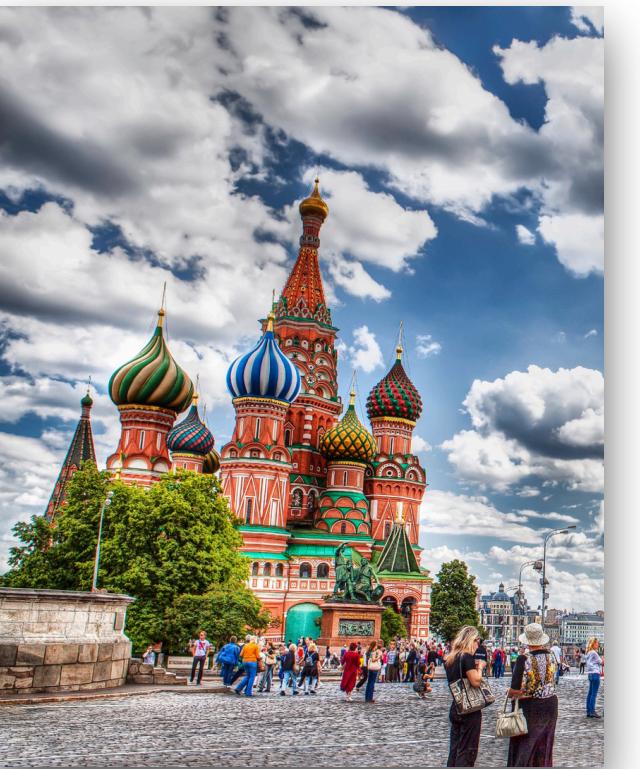
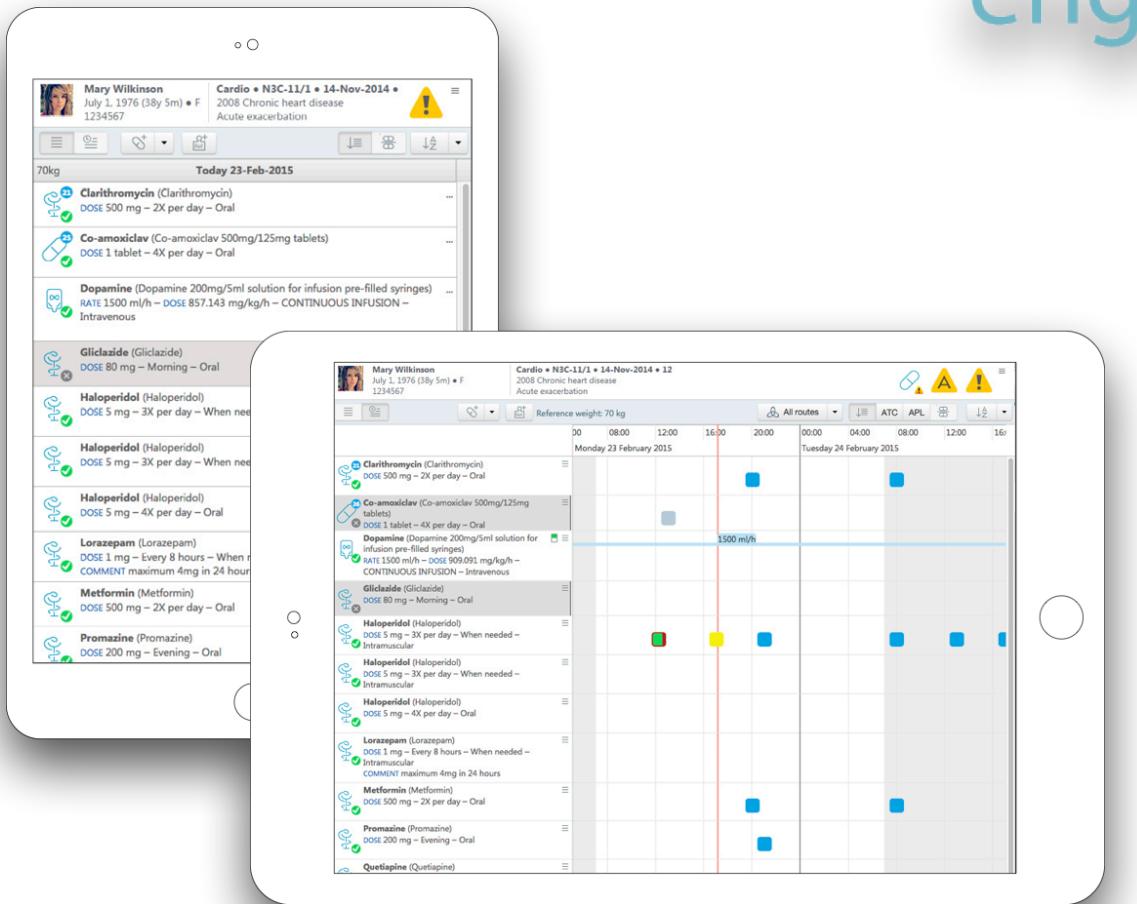
1 - 2 years

- Enhance the NHS Wales EMPI along open principles to facilitate a more developed Patient/Citizen identification strategy.
- Enhance the NHS Wales Integration and Interaction Engine to provide a truly open platform for NHS Wales.
- Focus the work of the National Data Resource (NDR) programme on the creation of a National Clinical Data Repository in line with open principles whilst progressing the programme as a whole.
- Make migrating the WCP to an open architecture the highest priority for the product in the next 12 months. This will need to address any impacts on the current work programme.

openEHR applications - at scale

openEHR

Genomics
england



The image contains three screenshots of openEHR applications. The top right screenshot shows a map of Europe with a green highlighted area, likely representing a specific country or region. The middle right screenshot shows a medical application interface with a patient's name (TRILLE, Lille), age (7 år), and gender (Man). It displays sections for medication use, allergies, and a prescription form. The bottom right screenshot shows another medical application interface with a similar layout, displaying patient information and treatment details.

Covid-19

openEHR

Register ny:

Screening COVID-19

Anamnese

Er noen av følgende symptomer tilstede hos pasienten?

Høste *

Tilstede Ukjent Fraværende

Kortpustet *

Tilstede Ukjent Fraværende

Feber *

Tilstede Ukjent Fraværende

Resultat COVID-19

Covid-19 smitte er:

Positiv prøve - bekreftet

Negativ prøve - fremdeles mistanke

Negativ prøve - avkretet

Pasienten forblir mistenkt smittet av COVID-19

Register ny:

Isolasjon/karantene COVID-19

Isolasjon/karantene av mulig smittet

Isolasjon/karantene av smittet

Start for isolasjon/karantene
24. mar 2020 kl 13:31

Dato for når prosedyren er avsluttet

openEHR Discussion Forums

Project Covfefe

openEHR COVID-19 Project

How medical pros decide whether to test someone for COVID-19 | HeraldNet.com

A citizen-facing equivalent has been produced by NHS-111 in the UK, using the Public Health England Risk assessment advice

openEHR Clinical Models

BEAU85459309 POSTIVE

B. Breathing

SPO2 (on arrival) 88% Respiration rate 22 bpm

Right lung finding Normal Left lung finding Wheeze

Oxygen-delivery Mask O2 flow rate 15 l/min SPO2 (post O2) 97%

Increased work of breathing Yes No

C. Circulation

Heart rate 22 bpm Blood pressure 120/80 Cap refill > 3 secs

Abdomen Left Current IV fluids None

COVID-19-screening-interface

Covid-19 Screening Interface using Covid-19 OpenEHR Clinical Models

Developed in the Open

Summary

This repository contains software which enables an organisation to rapidly deploy a Covid-19 screening programme. Data collected will be stored in the local openEHR database and reports to the WHO standard made available.

Being Open Source, the application can be implemented within an organisation using existing systems therefore reducing privacy and information governance challenges associated with cloud systems.

Being modular, the application can be connected to an existing openEHR repository or operated with a stand-alone repository.

PatientSky

FIGHT COVID-19

Kampen mot COVID-19: Register symptomer og hjelp andre

openEHR CDR in the hospital

Clinical Support

Research

Patient Service

Data exchange

Archetype: 120

Template: 80

CLEVER: openEHR CDR

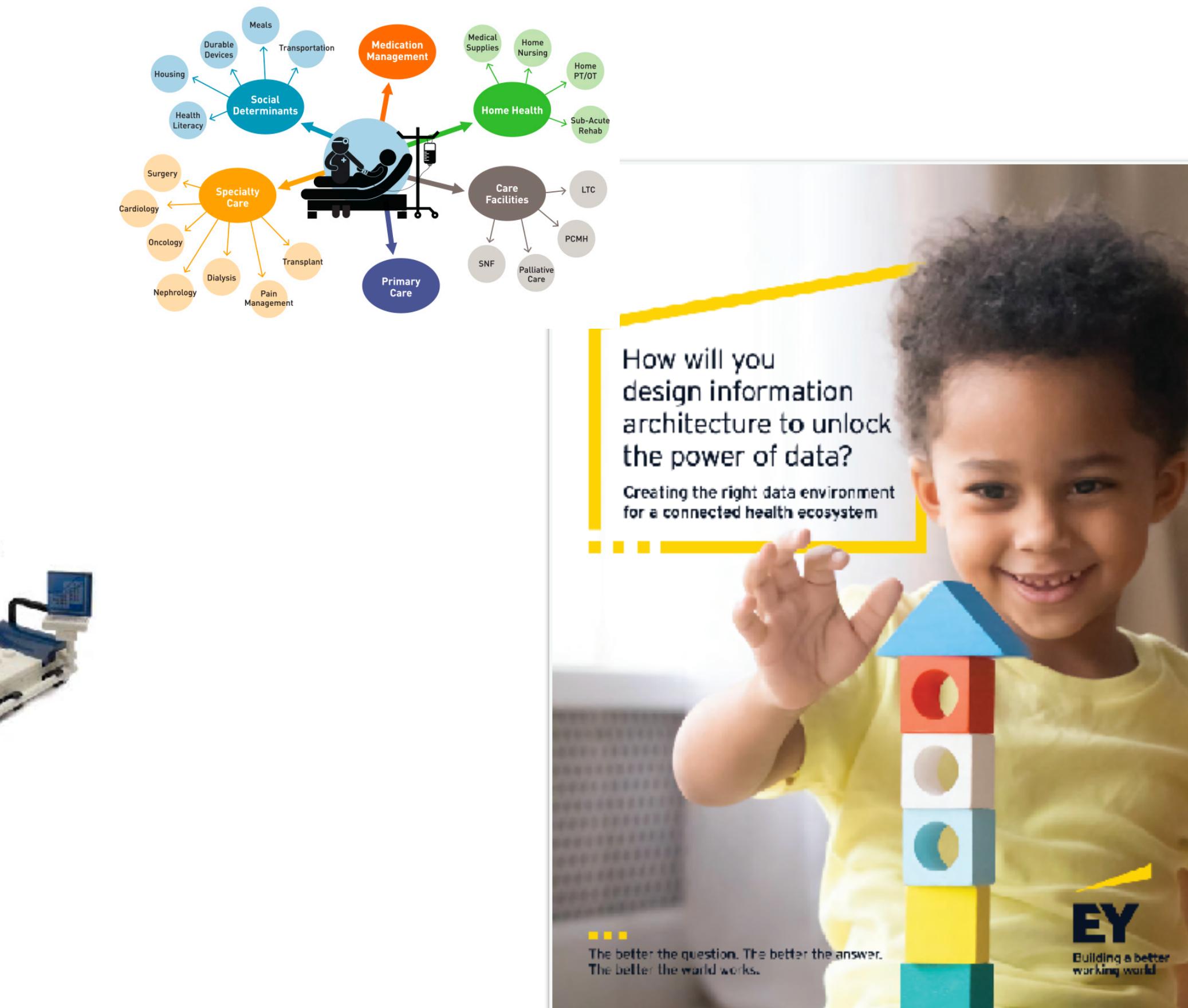
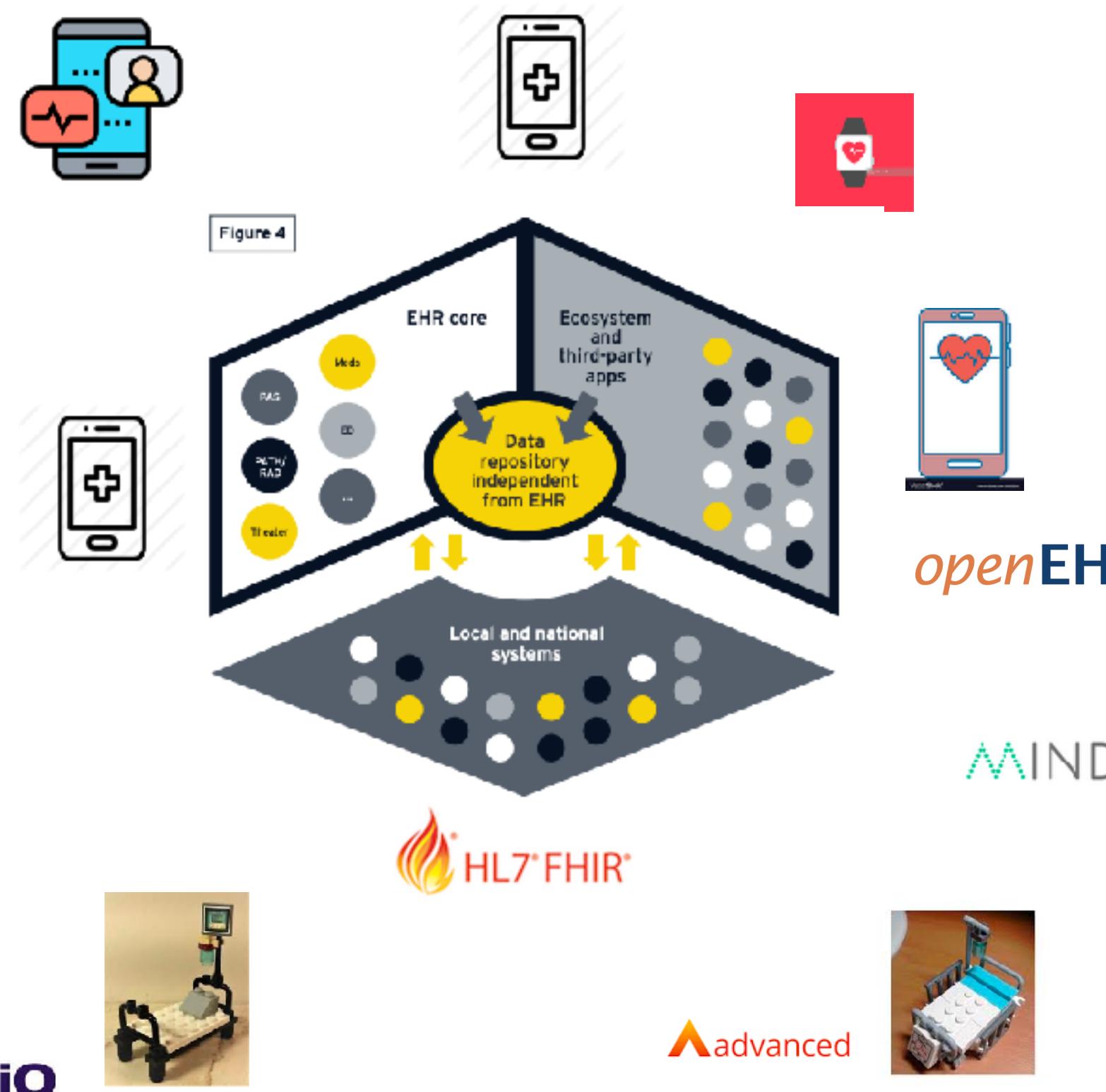
1,500,000 patient cases so far

HIS CIS LIS PACS EMR RIS ...

<https://www.youtube.com/watch?v=oAzjHdiioDY&feature=youtu.be>

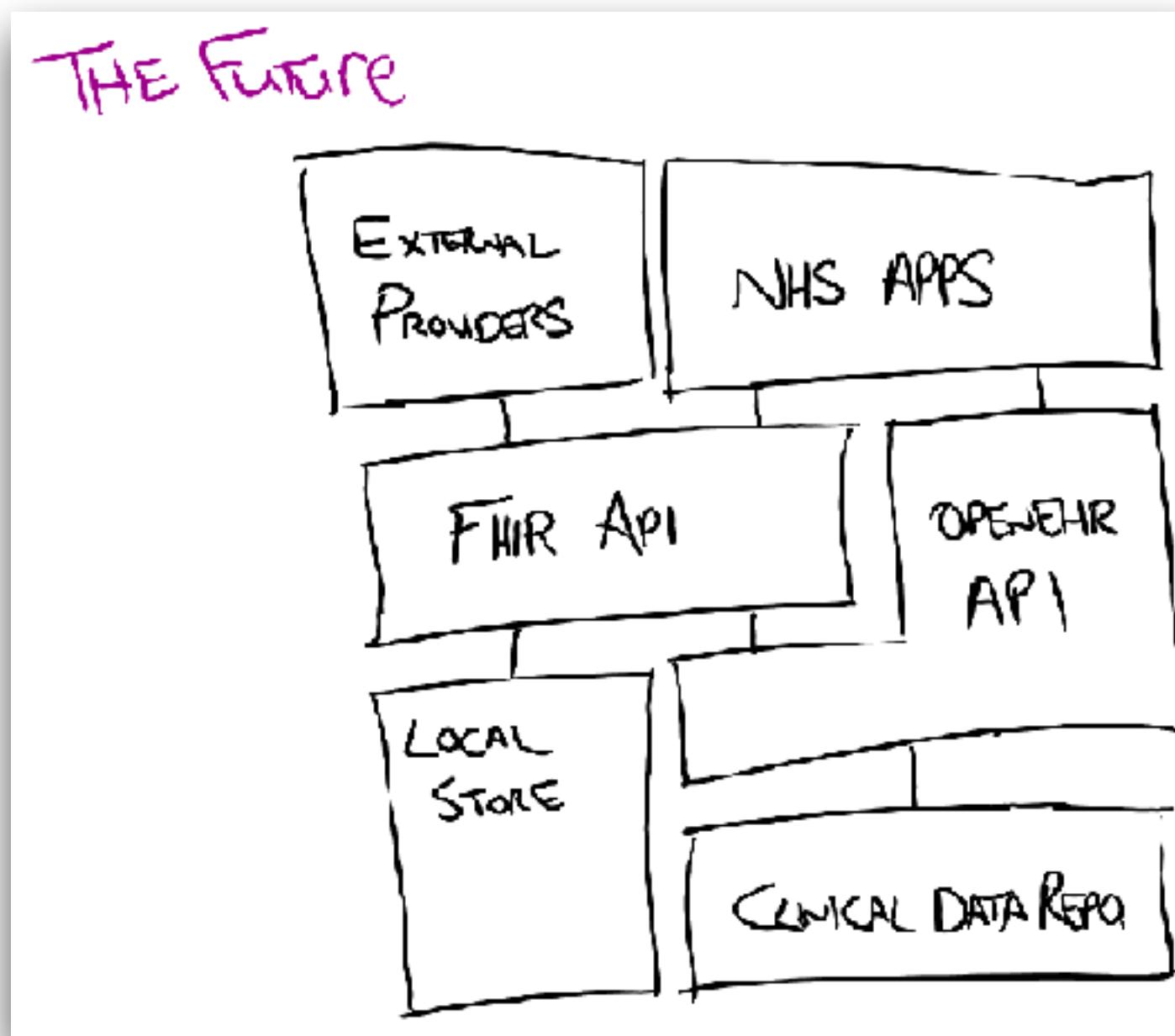
EY - connected Health ecosystem

*open*EHR



Why not ‘just’ use FHIR?

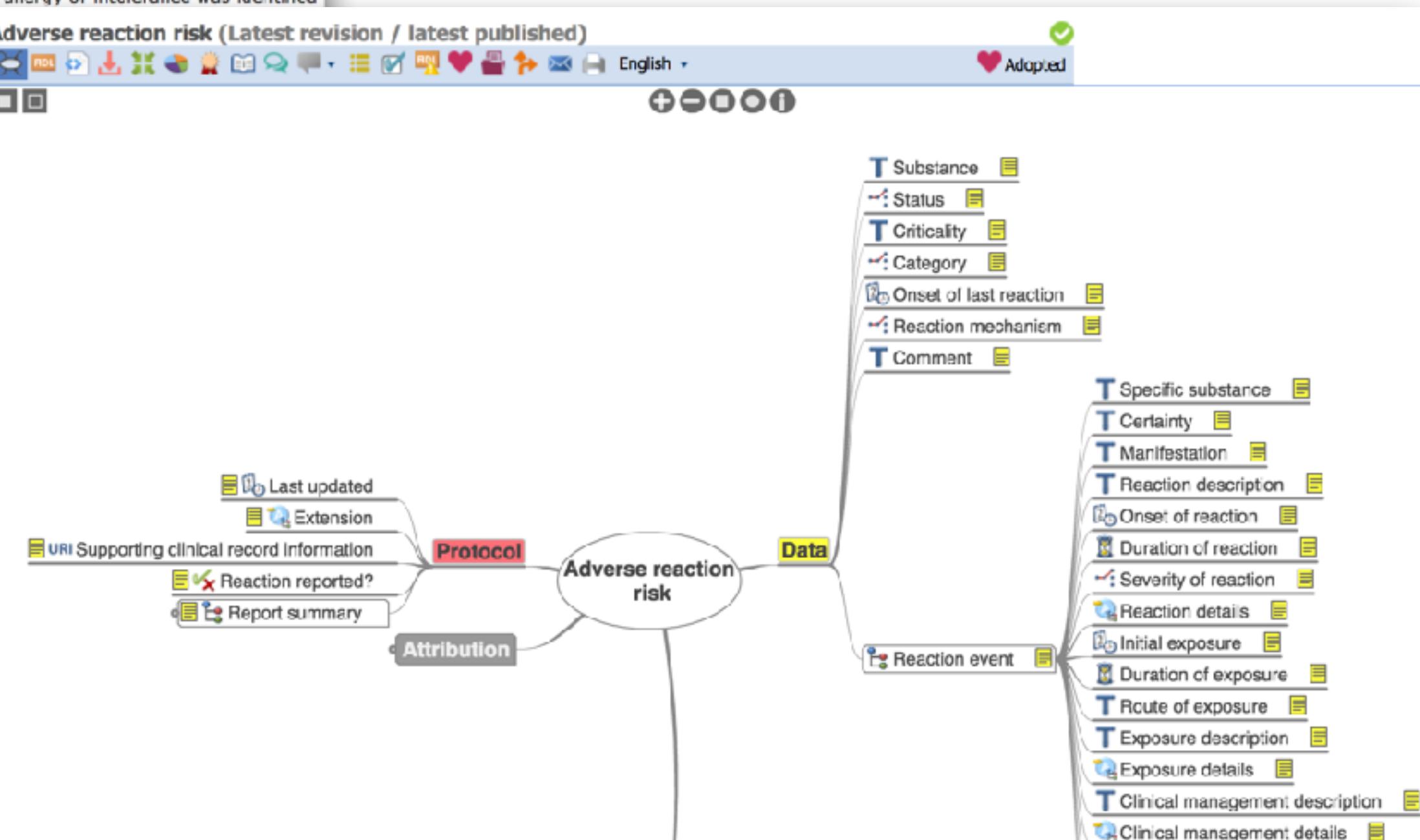
*open*EHR



INTEROPen

FHIR® and openEHR

Name	Flags	Card.	Type	Description & Constraints
AllergyIntolerance	I		DomainResource	Allergy or Intolerance (generally: Risk of a + <i>AllergyIntolerance.clinicalStatus SHALL</i> + <i>AllergyIntolerance.clinicalStatus SHALL</i> / Elements defined in Ancestors: <i>id</i> , <i>meta</i> , <i>in</i> External ids for this item
identifier	Σ	0..*	Identifier	active inactive resolved
clinicalStatus	?! Σ I	0..1	code	<i>AllergyIntoleranceClinicalStatus</i> (Required)
verificationStatus	?! Σ I	1..1	code	unconfirmed confirmed refuted entered
type	Σ	0..1	code	Allergy intolerance - Underlying mechanism
category	Σ	0..*	code	<i>AllergyIntoleranceType</i> (Required)
criticality	Σ	0..1	code	food medication environment biologic
code	Σ	0..1	CodeableConcept	<i>AllergyIntoleranceCategory</i> (Required)
patient	Σ	1..1	Reference(Patient)	low high unable-to-assess
onset[x]		0..1		<i>AllergyIntoleranceSubstance/Product</i> , <i>Condition</i> Who the sensitivity is for
onsetDateTime			dateTime	When allergy or intolerance was identified
onsetAge			Age	
onsetPeriod			Period	
onsetRange			Range	
onsetString			string	
assertedDate		0..1	dateTime	
recorder		0..1	Reference(Practitioner Patient)	
asserter	Σ	0..1	Reference(Patient RelatedPerson Practitioner)	
lastOccurrence		0..1	dateTime	
note		0..*	Annotation	
reaction		0..*	BackboneElement	
substance		0..1	CodeableConcept	
manifestation		1..*	CodeableConcept	



openEHR vs + FHIR

openEHR

FHIR has had a significant positive global impact in helping existing systems exchange high-value clinical information, in a modern developer-friendly way along with other helpful innovations such as vendor-neutral terminology service interfaces.

The openEHR development community is actively adopting FHIR standards, over openEHR-based datastores and tooling, in line with other more traditionally engineered systems, using FHIR ‘as intended’, to support information exchange between applications..

In contrast, openEHR supports a world where applications increasingly coalesce around communal, vendor-neutral structured data repositories (CDRs).

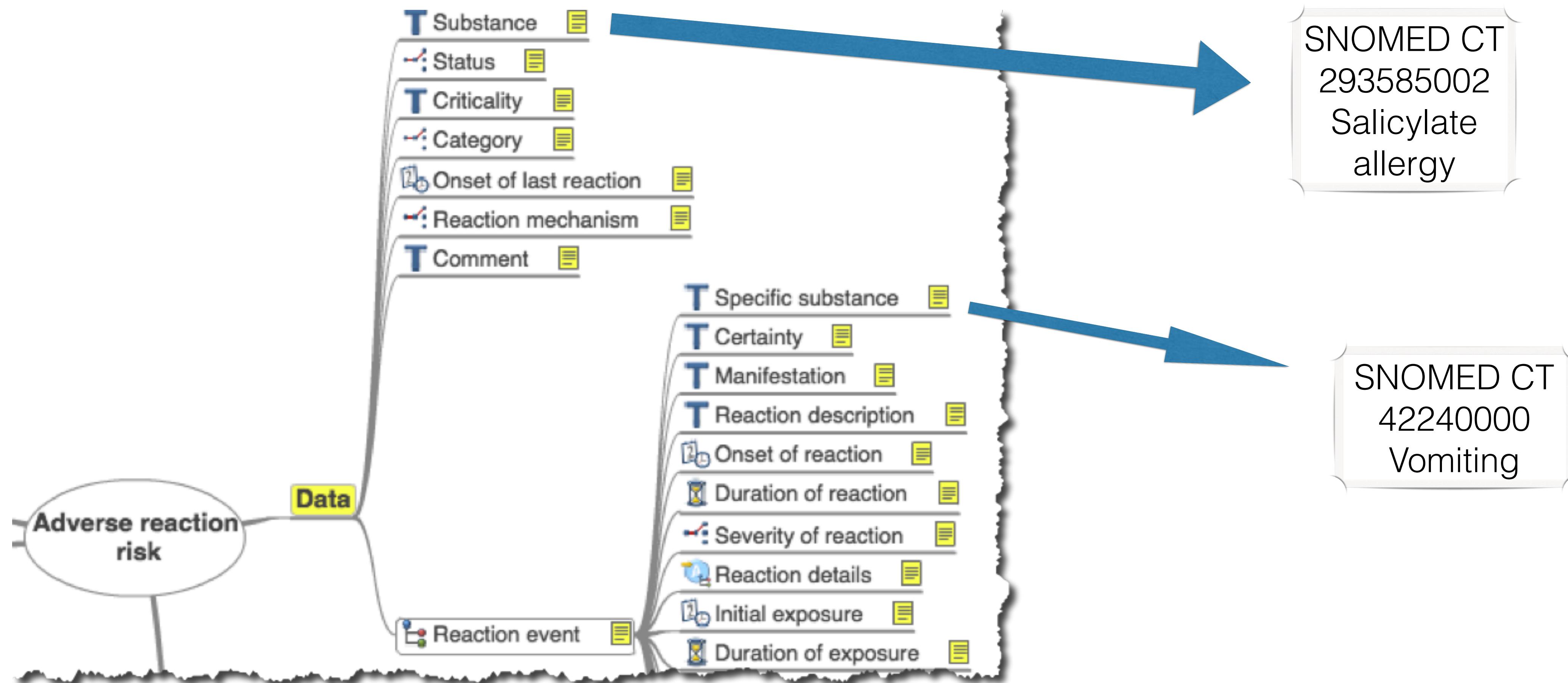
The ‘controller’ of the CDR (not the vendor) can upload new openEHR clinical model definitions without further engineering or recourse to the vendor and patient records can then immediately be created and fully-queried using those new definitions - a ‘no-code’ vendor-neutral data management environment.



**Alastair Allen, CTO Kainos:
The case for using FHIR
and openEHR**

<https://www.youtube.com/watch?v=biEXVRzjWmw>

Why not ‘just’ use SNOMED CT?



openEHR - rewiring healthIT:

- From ‘my system’ to a person-centric information system
 - separate the data from applications
 - **single source-of-truth** where that makes sense
 - but federate if needs be
 - **open platforms** / vendor & tech-neutral information standards
 - **Standardisation by negotiation** not by science, clinically-driven
 - The near future is openEHR + SNOMED CT + FHIR



openEHR and Secondary uses

Ian McNicoll

AQL: Archetype Query Language

openEHR

The screenshot shows the openEHR AQL interface. On the left, there's a sidebar with various icons and a search bar. The main area displays a query history entry for "DHI - Urology_PROMs-v0" from "23.09.2020 @ 15:57". The query code is:

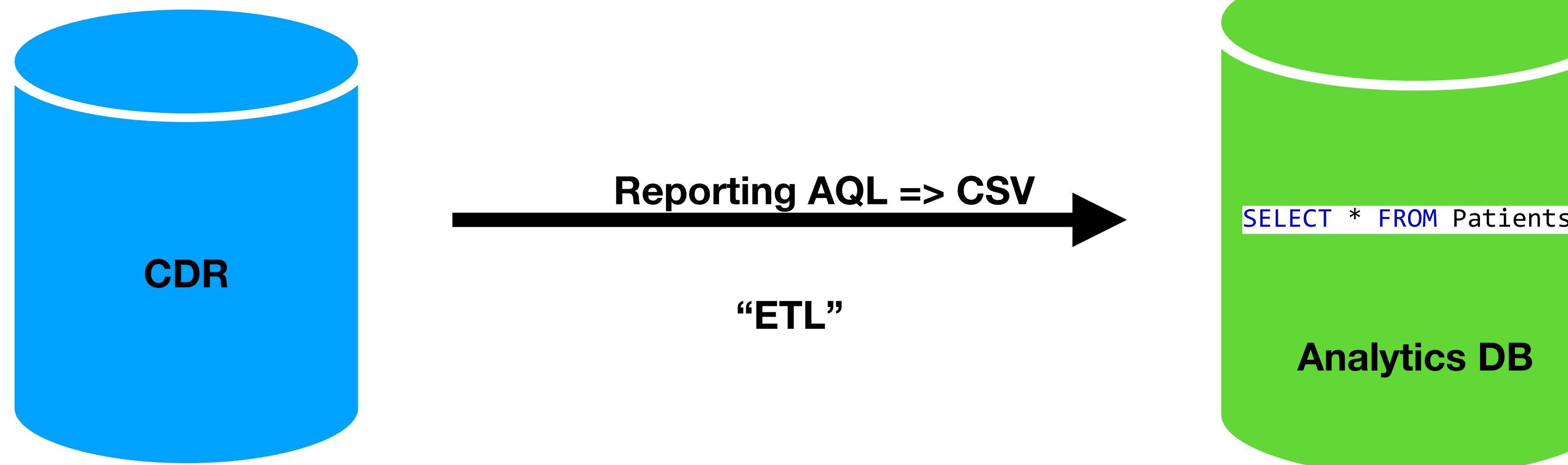
```
1 SELECT c
2 FROM EHR e
3 CONTAINS COMPOSITION c#Prostate_cancer_PROMS_report
4 WHERE c/name/value='Prostate cancer PROMS report'
5 OFFSET 0 LIMIT 10
```

The results table shows 10 rows of data. The columns are:

#	archetype_id	template_id	formalism	system_id	archetype_id	tim
1	openEHR-EHR-COMPOSITION.report.v1	DHI - Urology_PROMs-v0	application/json	FormRenderer	openEHR-EHR-OBSERVATION.howru.v1	202
2	openEHR-EHR-COMPOSITION.report.v1	DHI - Urology_PROMs-v0	application/json	FormRenderer	openEHR-EHR-OBSERVATION.howru.v1	202
3	openEHR-EHR-COMPOSITION.report.v1	DHI - Urology_PROMs-v0	application/json	FormRenderer	openEHR-EHR-OBSERVATION.howru.v1	202
4	openEHR-EHR-COMPOSITION.report.v1	DHI - Urology_PROMs-v0			openEHR-EHR-OBSERVATION.howru.v1	202
5	openEHR-EHR-COMPOSITION.report.v1	DHI - Urology PROMs-v0	application/json	FormRenderer	openEHR-EHR-OBSERVATION.howru.v1	202

openEHR Reporting

*open*EHR



Discovery process

Care Home data standards?

openEHR

nightingale hammerson	F1a- ASSESSMENT ON ADMISSION
RESIDENT'S NAME:	UNIT:
ASSESSMENT ON ADMISSION TO BE COMPLETED WITHIN 72 HOURS OF ADMISSION	
Personal Cleansing (preferred personal hygiene routine, level of assistance needed)	Eating and Drinking (food preferences, sufficient fluid intake, usual meal pattern, food restrictions)
Personal Dressing (How often are the clothes changed, what are the individual's personal dressing habits?)	Breathing (include respiration rate)
Observations & Baseline (Anxious, withdrawn, distressed, Temp etc)	Mobility (assistance needed, limitations, abilities)
Sleeping Routines (usual sleep rest pattern, preferred time of rest/sleep, sedation)	Elimination Urine and Bowels (incontinence, catheters, size, bowel patterns, laxatives)

The Development of a Care Home Data Platform in Scotland: Insights from the Care Home Innovation Partnership, Lothian

✉ Lucy Johnston, ✉ David AG Henderson, ✉ Jo Hockley, ✉ Susan D Shenkin

doi: <https://doi.org/10.1101/2020.08.17.20176503>

Inventory No.	Area assessed	1	2	3	4	5	6
1	Dependency/ indicator of need	Augmented IoRN	IoRN	Dependency assessment	IoRN	IoRN	Organisation Form
2	Nutrition	MUST	MUST	MUST	MUST	Eating Well in Care homes/ Cook Safe	Organisation Form
3	Weight	Kg/BMI	Kg/BMI	Kg/BMI	Kg/BMI	Kg/BMI	Kg/BMI
4	Incidence and risk of falls	FRASE	Organisation Form	Falls Risk	Falls Risk	Organisation Form	Organisation Form
5	Incidence and risk of pressure sores	Braden	Pressure Ulcer Cross/ PU Checklist/ Waterlow	Waterlow	Waterlow	Waterlow	Skin integrity Care Plan
6	Infections	Count/ type of infection	Count/ type of infection	Count/ type of infection	Count/ type of infection	Count/ type of infection	Count/ type of infection
7	Wounds (new and ongoing)	Internal Chart	STAR Classification	Wounds assessment	Chart on PCS	NHS Wound Assessment Chart	Organisation Form
8	Frailty	CIRC	SPAR Tool	Edmonton Frailty Scale	Clinical Frailty Scale	Not collected	Not collected
9	Bowel Movement(s)	Bristol Stool Chart	Bristol Stool Chart	Chart on PCS	Bristol Stool Chart	Bristol Stool Chart	Organisation Form
10	Fluid Intake	Internal Chart	Organisation Form	Chart on PCS	Chart on PCS	Organisation Form	Organisation Form
11(a)	Mood: Depression	Geriatric Depression scale/ Cornell scale for Depression in dementia	No measure/tool reported*	No measure/tool reported	Cornell scale for depression in dementia	No measure/tool reported	No measure/tool reported
11(b)	Mood: Delirium	4AT	4AT	Not recorded	Not recorded	Care support plan	Not collected
12	Pain	PAINAD Doloplus2 Abbey Pain Scale	Abbey Pain Scale	Abbey Pain Scale	Abbey Pain Scale	Abbey Pain Scale	Abbey Pain Scale
13	Movement	Roper, Logan, Tierney model of ADL Nolan's 6 senses f/work	Care Support Plan	No measure/tool reported	No measure/tool reported	Care Support Plan	In Care Plan
14	Sleep		Care Support Plan	Care Support Plan	Organisation Form	Organisation Form	Organisation Form
15	Observations/ Vital Signs	←-----	Various charts	-----→			

The current UK openEHR CDR installations/projects that I am aware of are ..

BetterCare:

- Plymouth hospital
- Somerset FT including the merger with community and Mental health
- Wye Valley FT
- Dartford and Gravesham FT
- South London and Maudsley mental health Trust
- Oxford Mental Health Trust
- South Tees hospital FT
- Salford FT
- 15 hospitals within the Cancer Alliance (implementing) - Cancer MDT pathways
- North Thames and West midlands NHS genomics medicine centres - full Cancer and Rare disease genomics phenotypics
- NWIS - proof of concept - Cardiology, Cancer, community medication record
- Digital Health and Care Institute Scotland - sandbox open platform environment
- N. Ireland Genomics platform

most of these are based around the Better EPMA product but several of the trusts involved have already started building their own apps on the CDR or integrating 3rd party apps.

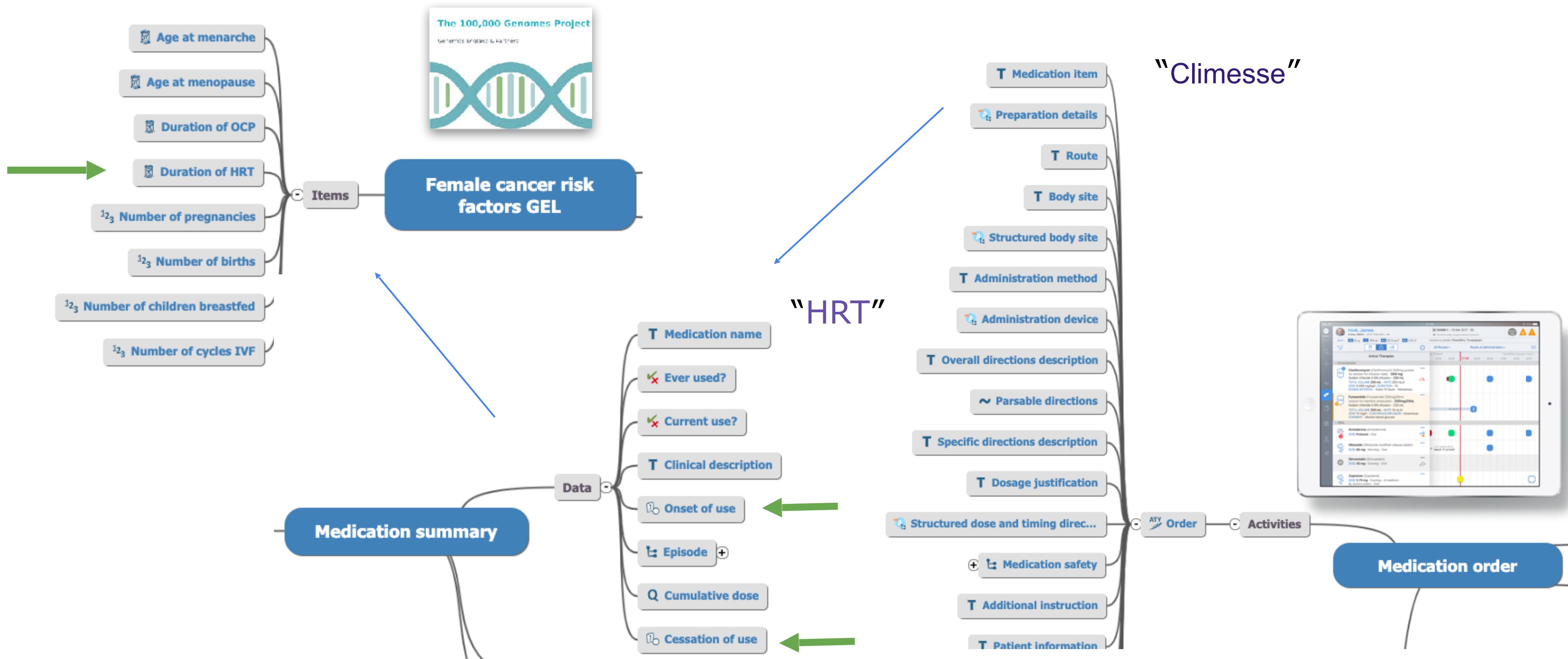
EhrBase (open-source):

- NHS Scotland National Digital platform - ReSPECT form, Vaccination records? ophthalmology pathways?, Cancer Treatment summaries
- opusVL /Apperta Care home Covid assessment app
- opusVL /Apperta Ward eObs app
- Staircase13 / Apperta 'Chart my health' mental health PHR app <https://vimeo.com/463452989>
- Staircase 13 / Apperta - open Outcomes Ortho PROMS app

The UK openEHR community are also looking forward to playing a part in the upcoming INTEROpen hackathon on care planning, based on some prototypes for the East Accord LHRCE around End of Life care frailty and long covid management.

100K Genomics: “Duration of HRT”

*open*EHR



openEHR International : openehr.org

*open*EHR

