

Interoperability: managing healthcare diversity

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Why is interoperability so hard?

- The 'usual suspects'
 - Clinical ego, technophobia, vendor lock-in
- Innovation, research
 - The consultant's MS-Access database
- Information granularity
 - 'Family history of breast cancer'
 - GP, Breast Cancer unit, Research Genetics Unit
- Organisational constraints
 - Financial, Legal, Project timescales

interoperability

“It must be kept in mind that interoperability implementation also depends on social, cultural and human factors within each organisation, region and country, each system and each time period.”

SemanticHealth EU report

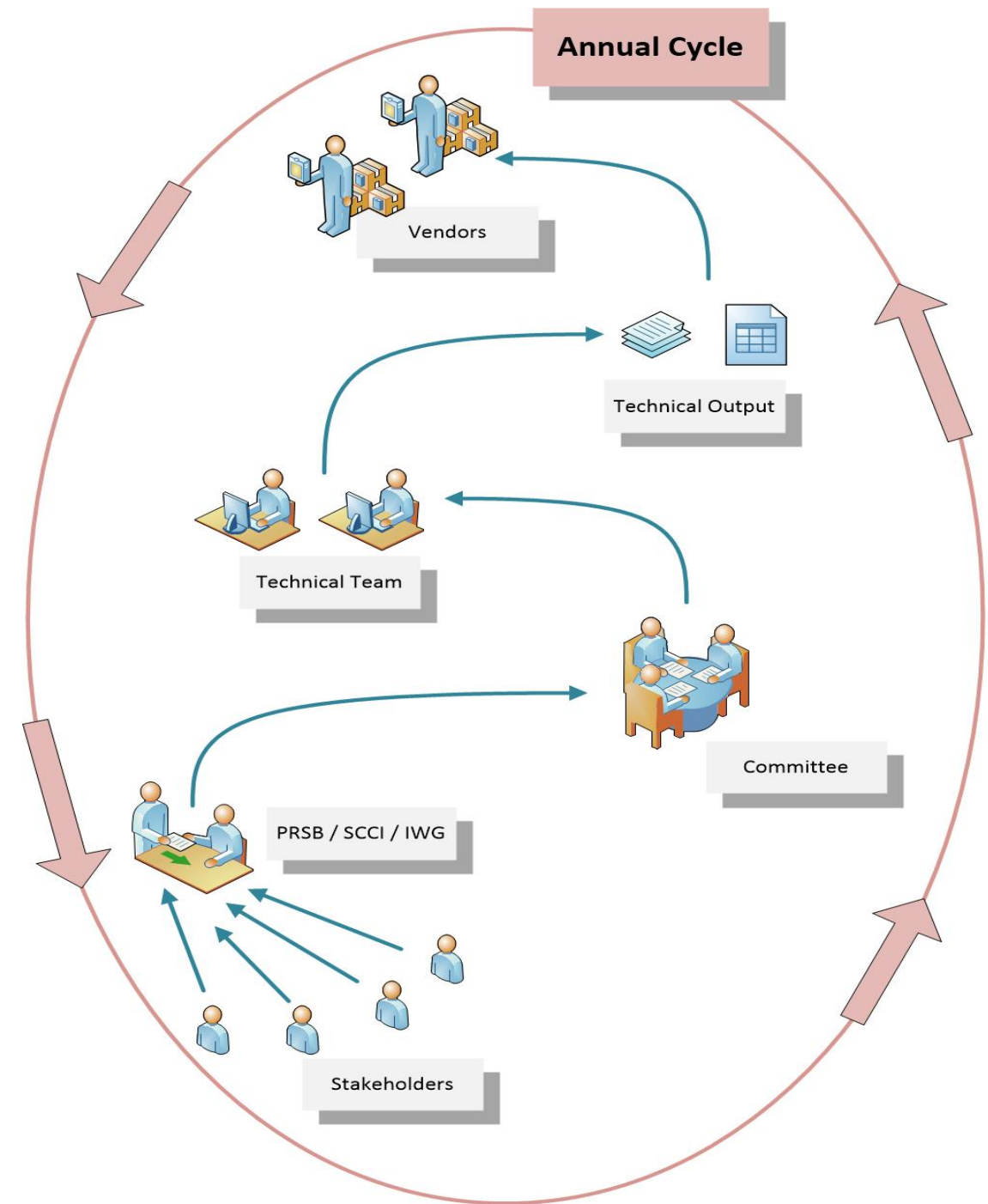
Traditional clinical standards development



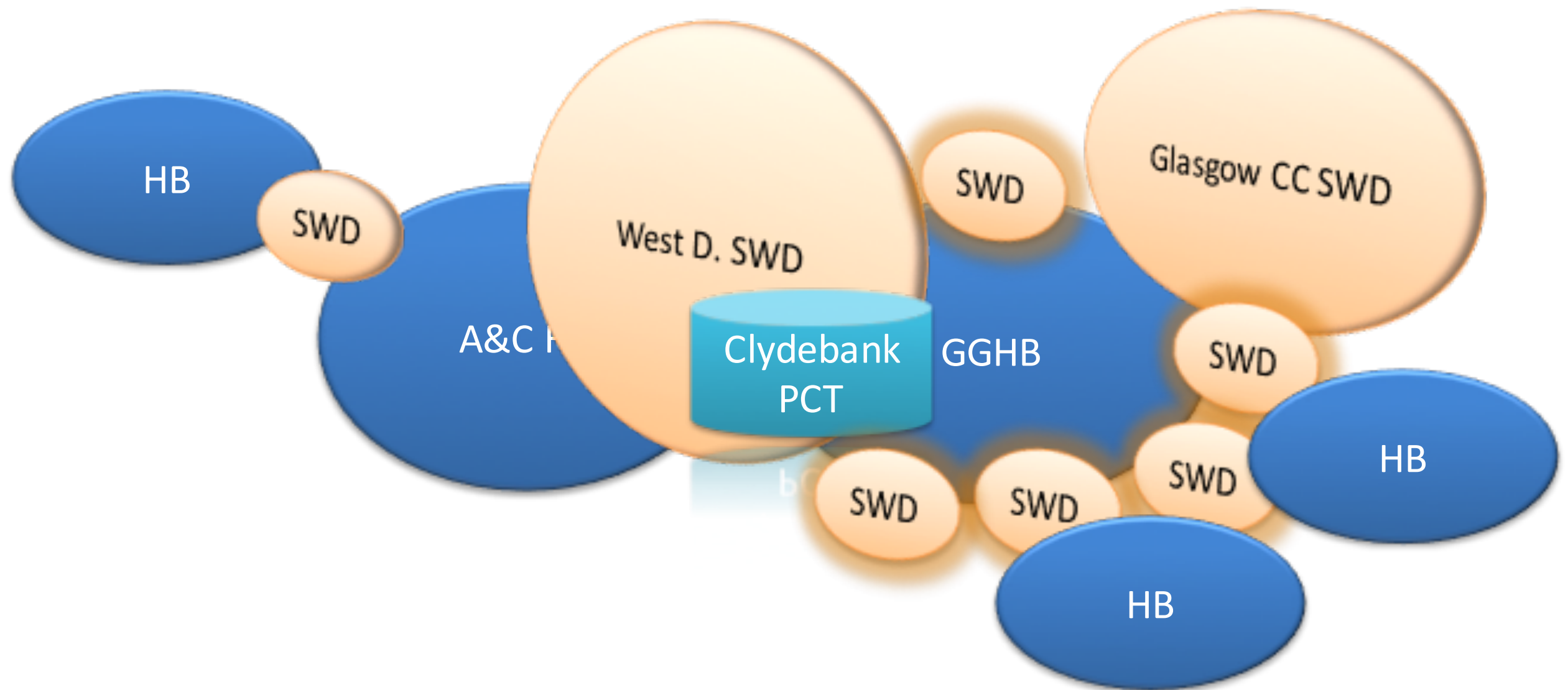
Healthcare Information Standards Process

#FAIL

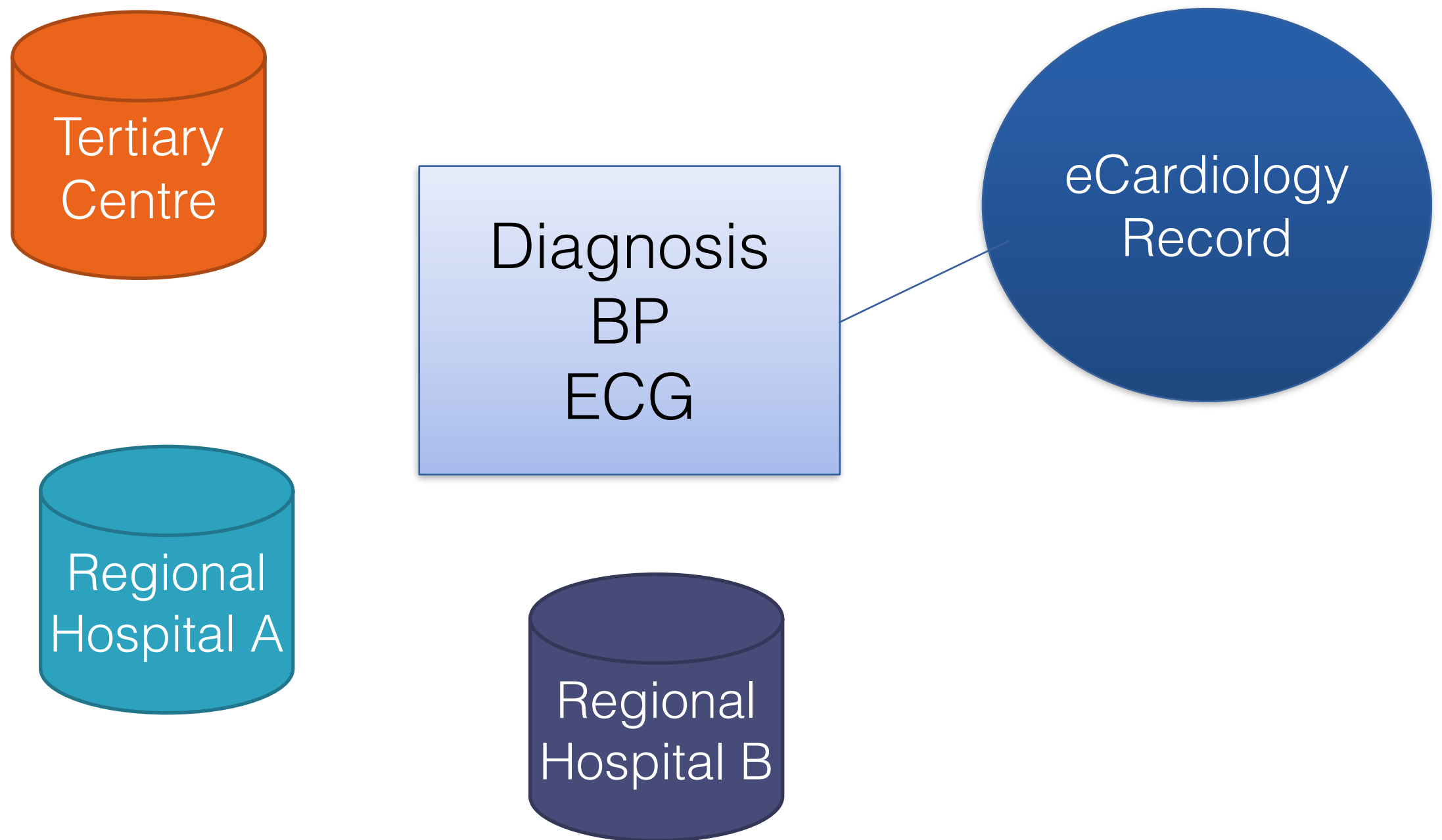
- Clinical stakeholders engage through top-down governance
- Committee-based
- Late vendor engagement
- Fixed review cycles
- Unclear / unresponsive change request mechanism



‘multiple non-coterminosity’



The maximum dataset: e-Cardiology record



Building consensus

MAXIMAL DATASET

eCARDIOLOGY TEMPLATE

Diagnosis
Date of Diagnosis
Date Recorded

BP
Systolic
Diastolic
Position
Cuff Size

ECG
Automated report
Heart rate
PR interval
QRS interval

eCardiology
Record

Regional
Hospital A

Regional
Hospital B

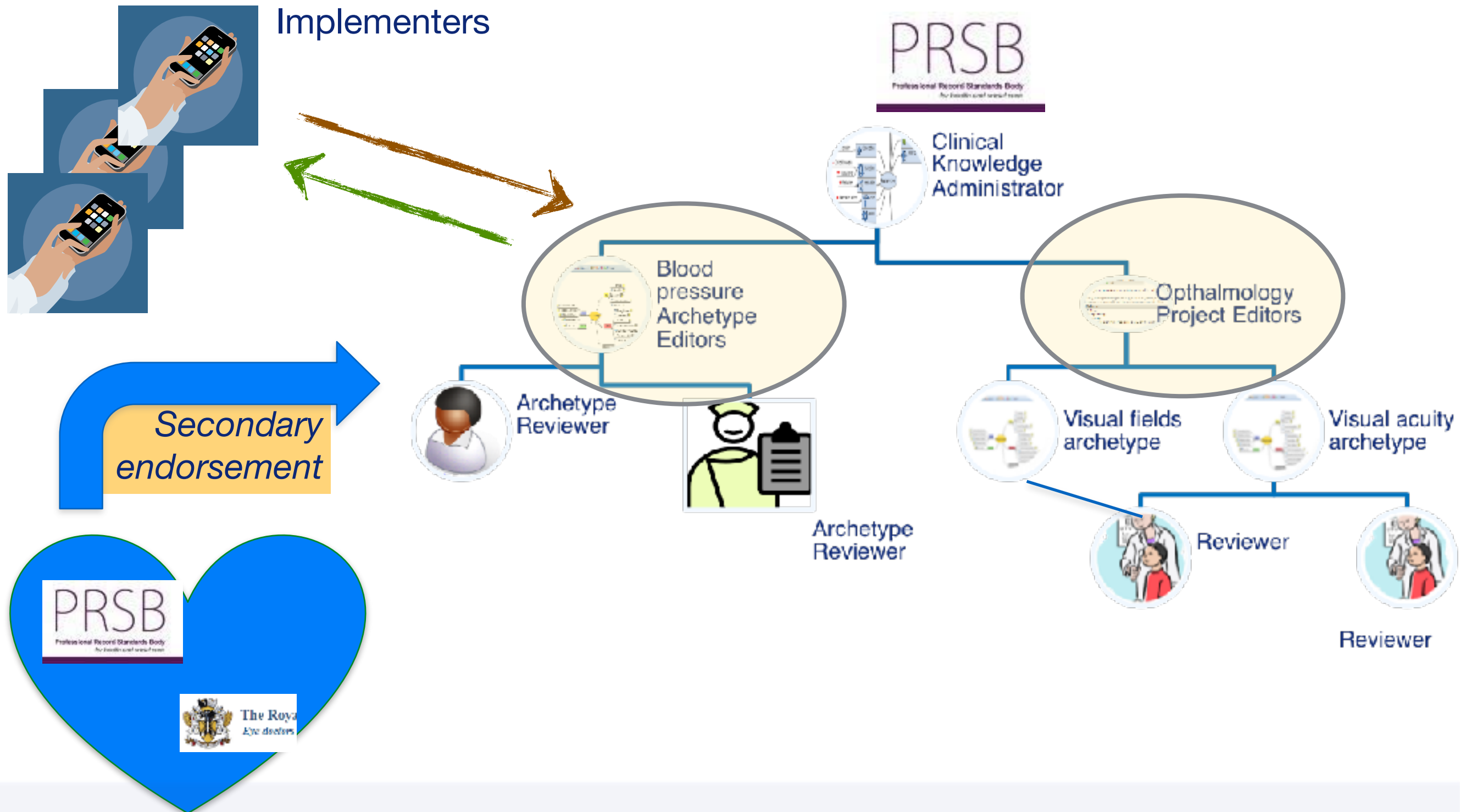
Tertiary
Centre

openEHR

Positively manage diversity

- Democratisise clinical content modelling
 - widest natural community possible
 - Web 2.0 “social network” applications
- Capture content at all organisational levels
 - Include diverse models
 - Today’s outlier may be tomorrow’s standard

Evolutionary standardisation 'distributed Governance'



Archetype versioning

Definition	Language	Header	Attribution
Body temperature (openEHR-EHR-OBSERVATION.body_temperature.v1)			
Revision: not set Lifecycle: AuthorDraft Languages: en de ru nb es-ar pt-br ar-sy fa es Last updated: 22.3.2020 22:11:48			
Body temperature (openEHR-EHR-OBSERVATION.body_temperature.v2)			
Revision: 2.0.4 Lifecycle: published Languages: en de ru sv fi es-ar nb pt-br ja ar-sy fa it es Last updated: 22.3.2020 23:34:00			
Major revision			
Body temperature (Event) Id: at0000 Mandatory (1..1)			
→ data			
Any event (Event) Id: at0003 Optional, repeating (0..*)			
→ data			
Temperature (Quantity) Id: at0004 Mandatory (1..1)			
→ state			
Body exposure (Coded Text) Id: at0030 Optional (0..1)			
Environmental Conditions (Slot(Cluster)) Optional (0..1)			
Exertion (Slot(Cluster)) Optional (0..1)			
Menstrual Cycle (Slot(Element))			
Description of thermal stress (Text) Id: at0041 Optional (0..1)			
→ protocol			
Site of measurement (Coded Text) Id: at0021 Optional (0..1)			
Device (Slot(Cluster)) Optional (0..1)			
→ data			
Any event (Event) Δ [term]			
→ data			
Temperature (Quantity) Δ [term,constraint]			
Comment (Text)			
→ state			
Body exposure (Choice) Δ [term,constraint]			
Environmental conditions (Slot(Cluster)) Δ [term,constraint]			
Optional, repeating (0..*)			
Exertion (Slot(Cluster)) Δ [term,constraint]			
Optional (0..1)			
Description of thermal stress (Text) Δ [term]			
Id: at0041 Optional (0..1)			
Current day of menstrual cycle (Count)			
→ protocol			
Location of measurement (Choice) Δ [term,constraint]			
Id: at0021 Optional (0..1)			
Device (Slot(Cluster)) Δ [term]			
Optional (0..1)			
Structured measurement location (Slot(Cluster))			
Extension (Slot(Cluster))			

Publication and Secondary Endorsement



- Project editors decide on formal publication, acting as “Benign Dictators”
- Professional bodies, vendors and PRSB may **Endorse** a resource as a secondary exercise
- this does not restrain the formal publication process
 - “By Royal Appointment”
- PRSB hires and fires Editors

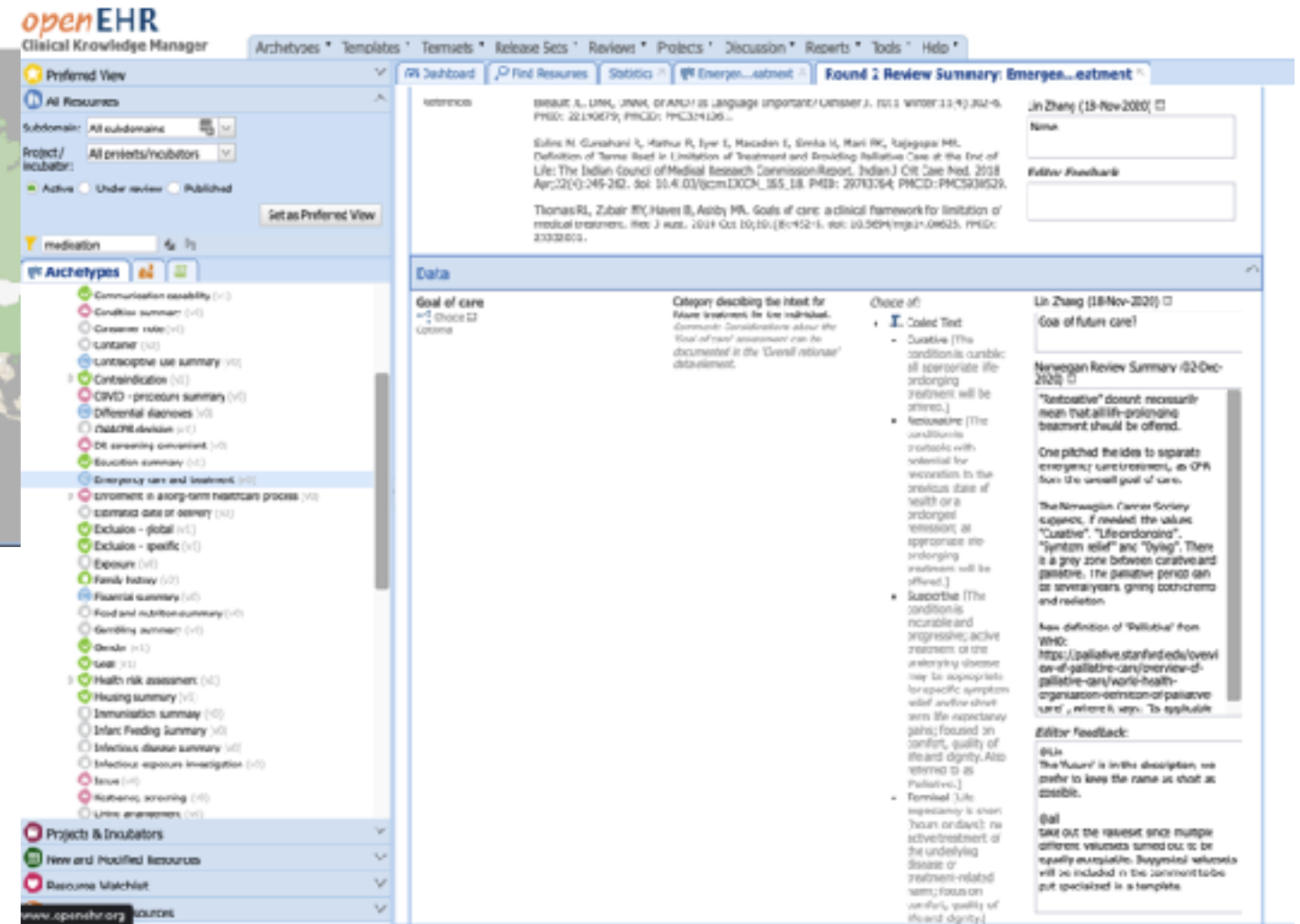
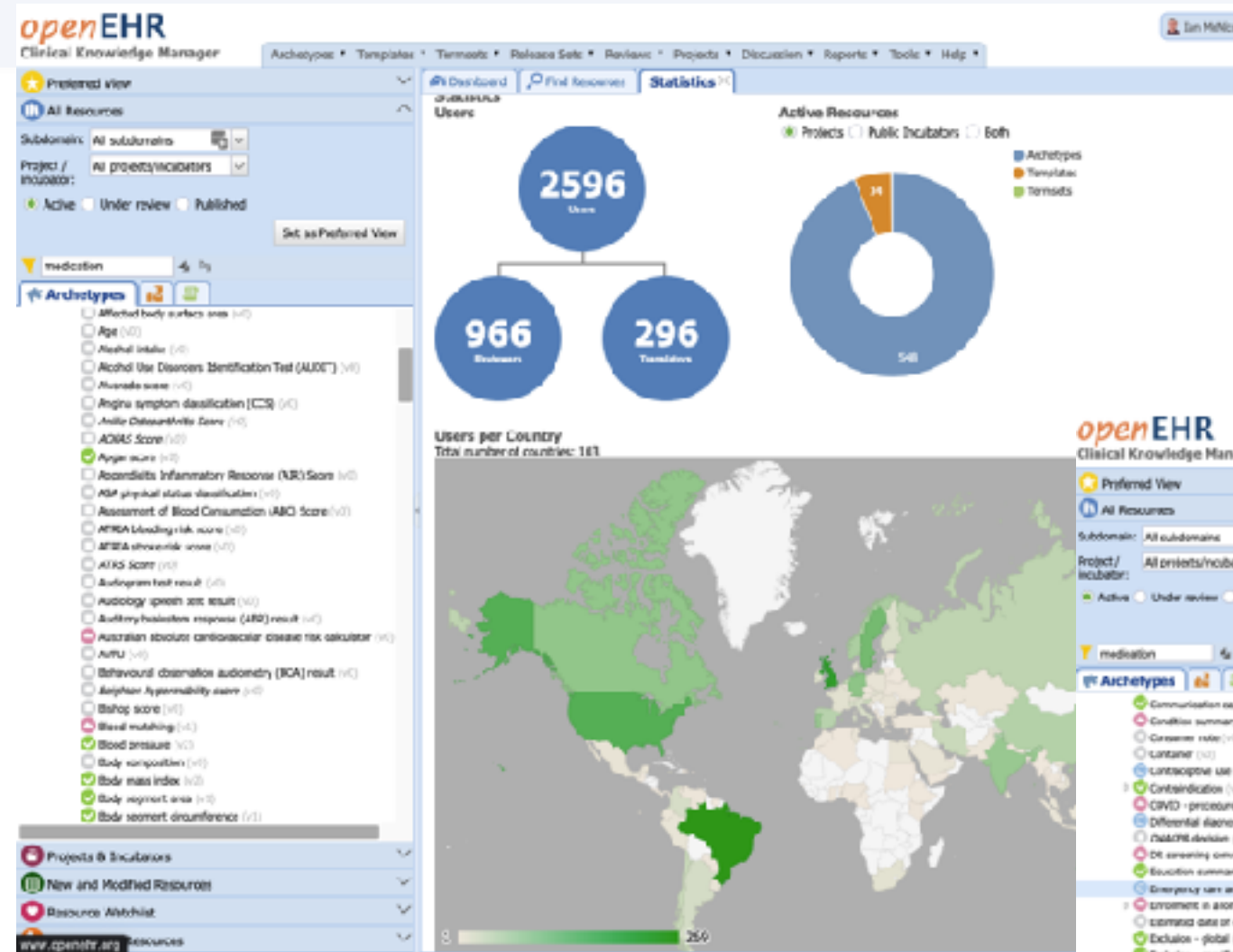
Clinical modelling core

- Core modelling team with clinical informatics leadership
- Good understanding of openEHR paradigm and appropriate use of terminology
- Close involvement with international modelling efforts
- Web- based collaborative authoring
 - Formal tooling - 'CKM'
 - Informal tooling - Wiki, GitHub

Building modelling capacity

- Vendors (esp. clinical champions/ designers)
- Professional clinical bodies
 - Academic units
 - Public health and reporting bodies
- Ground level clinicians
 - build informatics expertise
- Agile change request mechanism
 - Who do I contact if I need new content?

Clinical Knowledge Manager



ckm.openehr.org

Apperta UK CKM

The screenshot displays the Apperta Clinical Knowledge Manager (CKM) interface. On the left, a sidebar lists various templates under the 'Templates' tab, including 'GEL Rare diseases investigations non imaging diagnostics output', 'GEL Rare diseases investigations performance measures output', 'GEL Rare diseases pedigree output report.v0', 'GEL Rare diseases phenotype output report.v0', 'GEL Rare diseases withdrawal output report.v0', 'GlucoseMeterDeviceReadings', 'Housing COVID-19', 'ICHOM LPC Summary.v0', 'IDCR - Adverse Reaction List.v0', 'IDCR - Body Measurements Encounters.v0', 'IDCR - Cancer MDT Output Report.v0', 'IDCR - Immunisations List.v0', 'IDCR - Medication Statement List.v0', 'IDCR - Problem List.v0', 'IDCR - Procedures List.v0', 'IDCR - Vital Signs Encounters.v0', 'Living will UK', 'Mental Health Triage.v0', 'Mental Health Triage.v0', 'Mobility', 'My asthma plan.v0', 'NDS - Essential ACP.v0.1', 'NDS - SRRR Care Home.v0.0', 'NDS Covid-19 Data Dictionary.v0.1', 'NDS-Vaccination-Administration', 'NHS_Care_Scotland-NDS-Anticipatory_Care_Plan-ResPECT.v0.3.1', 'NHS Adverse Reactions List.v0', 'NHS Hepatitis C Assessment.v0', and 'OpenCancer Biology MDT Referral Form.v0'. The 'NHS_Care_Scotland-NDS-Anticipatory_Care_Plan-ResPECT.v0.3.1' template is selected.

The main content area shows the 'ReSPECT headings' form. The form includes a 'Status' dropdown set to 'Started'. The 'ReSPECT headings' section contains three main sections:

- 2. Shared understanding**
 - ReSPECT Summary**
 - data**
 - Narrative Summary [1..1]** (text input field)
 - Advance planning documentation**
 - data**
 - Summary** (text input field)
 - Legal welfare proxy in place**
 - data**
 - Legal proxy** (dropdown menu with 'Yes' selected)
- 3. What matters to me**
 - What matters to me**
 - data**
 - Care priority scale** (text input field with '1..100' entered)
 - What I most value**
 - data**
 - What I most value** (text input field)

ckm.apperta.org



*open*EHR