# Towards a communal patient medication record

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# Introduction

- Former Clydebank GP
- Health Informatician since 2000
  - freshEHR Clinical Informatics
  - Director openEHR Foundation
  - SCIMP
  - HANDIHealth
- Commercial software developer
  - ‘GP Accounts’

# Community medication stakeholders

- GPs
- Nursing
- Mental health teams,
- Pharmacy
- Secondary care inpatients
- Secondary care outpatients
- Nursing homes
- Unscheduled care
- Patients

- GP prescriptions
- anticipatory care supply
- repeat dispensing
- transitions of care
- own supply
- patient access
- patient-led reconciliation

# Current position

No clear visibility of other prescribers actions

Patient often only the knows the whole picture

No clear governance

Non- standardised representation of medication between systems

# What's the problem?

Significant patient safety issue

- confusion and inefficiency
  - transitions of care
  - unscheduled care
  - day to day care


**Accurate medication list is maintained in the electronic Primary care medical record and communicated appropriately to patients and care providers.**

# What's the solution?

'Closing the Loop' commission

- 'patient medication record'
- 'community' record
  - Inpatient prescribing excluded other than at transitions of care

# Supported Meds Reconciliation

## eMedicines Reconciliation Form - Version 1.0

CHI Number: 0101011016 Patient Name: Mickey Mouse DOB: 01/11/2001

Greater Glasgow and Clyde

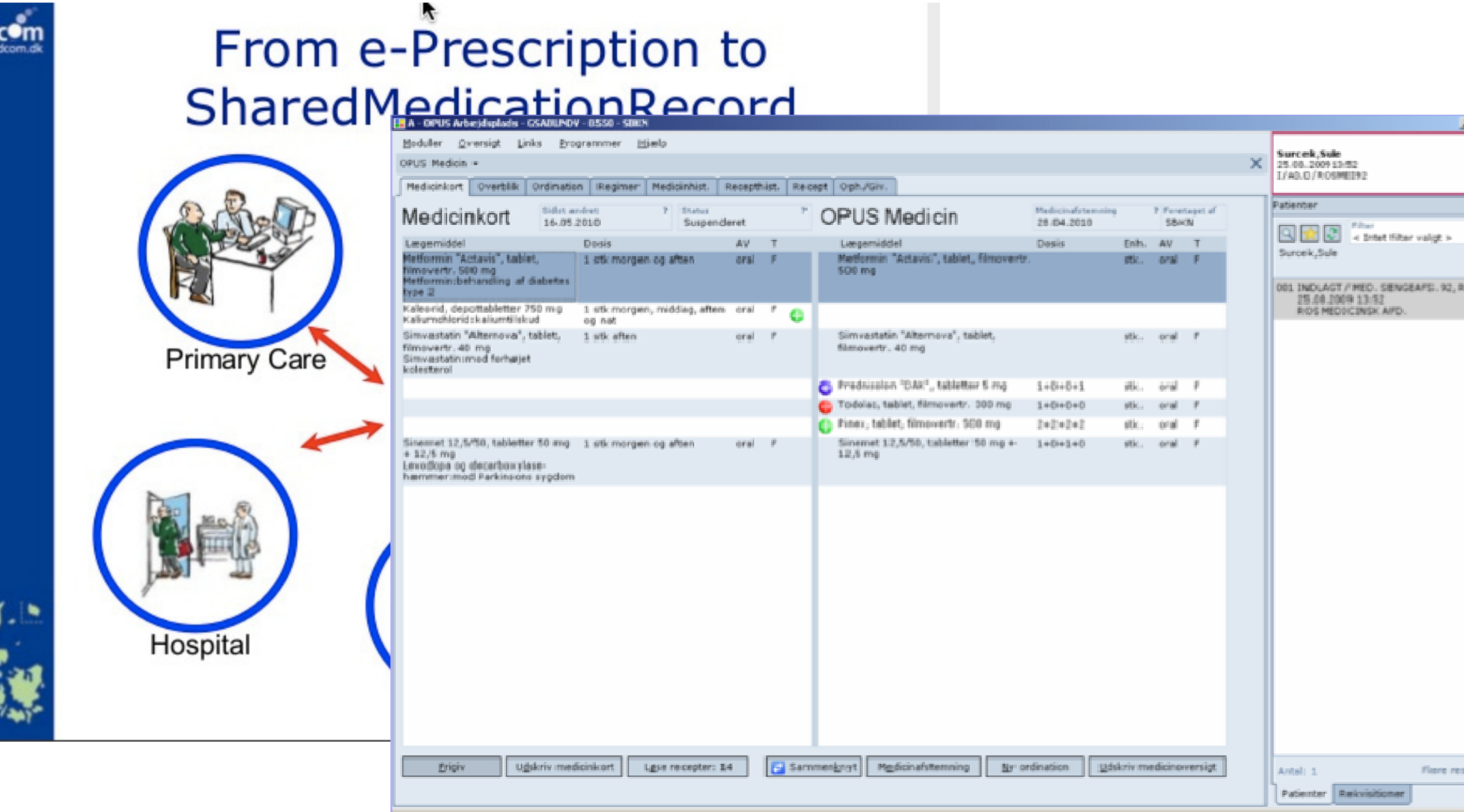
| Hospital Name: | Southern General |
|---|---|

| Patient Details | |
|---|---|
| Name: | Mouse, Mickey |
| Address: | 257 GARDEN AVENUE<br>BONNYBRIDGE<br>FALKIRK |
| Postcode: | PA41 1YW |
| CHI Number: | 0101011016 |
| CRN: | |

| Sources Checked | | | | | |
|---|---|---|---|---|---|
| ECS | X | Patient | X | Carer | |
| Relative | | GP Surgery | | GP Printout | |
| Patients own drugs | | Other | X | | |
| Other | details of other source here.... | | | | |

| arted | Drug | Formulation | Dose | Frequency |
|---|---|---|---|---|
| 08 | SALMETEROL cfc free inh 25micrograms/actuation | 1 120 dose inhaler | INHALE 2 DOSES TWICE DAILY | INHALE 2 DOSES TW |
| 09 | GABAPENTIN caps 300mg | 56 capsule(s) | TAKE ONE 3 TIMES/DAY Instalments: D | isp weekly |
| 10 | CITALOPRAM tabs 20mg | 28 tablet(s) | ONE IN THE MORNING | ONE IN THE MORNIN |

# Danish single medication record database



# The technical challenges

Where does the medication information live?

- Single central database
- Health Board database
- GP system

Performance vs. politics?

# The people challenges

How does governance work?

- What is the role of the GP?
- How are clinical conflicts resolved?
- What is the role of the patient / carer?
- “Washing our dirty laundry?”

# The interoperability challenges

How do we resolve the ‘wicked’ interoperability issues?

- Standardised, computable ‘medication models’
- Product vs. dose based prescriptions
- Computable dose timings
- ‘Medication event’ vs. ‘Medication statement’

# Playing all the right notes?

NHS Scotland GP messaging

- Emergency Care Summary / Key Information Summary
- SCI Referral (Gateway)
- ePharmacy
- NHS Data Services API (portals)
- GP2GP (2015)

Each developed by a different teams

- non-interoperable representations of medication
- replicated *4 around the UK

# Medication models

Based on GP2GP medication models

- merge in requirements for
  - ECS / KIS / ePharmacy / SCI-GW
  - Other UK models : SCR, IHR, EPS2
- Aligned with PRSB / RCP Headings

Can we persuade systems suppliers to adopt?

# Modelling approach

Based on openEHR but technology neutral

- models of ‘clinical content’
- Exchange -> messages / APIs
  - SCI-XML, GP2GP, HL7 FHIR inte
- can be used natively inside openEHR-based systems

Aligned with dm+d, CUI

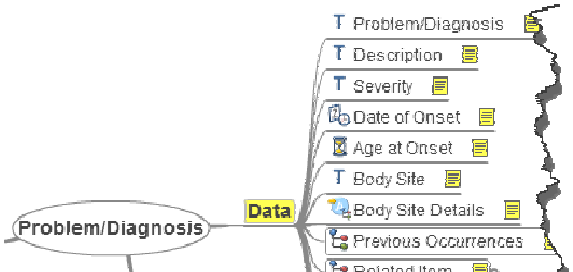
# open, shared data models - ‘Archetypes

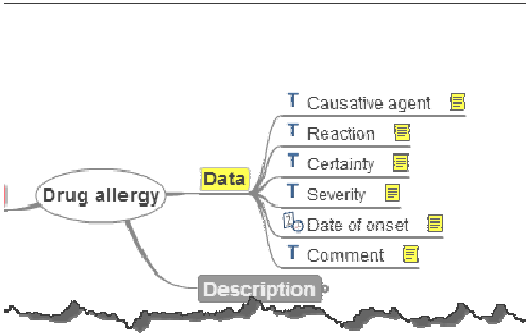
Clinically-led + collaboratively authored

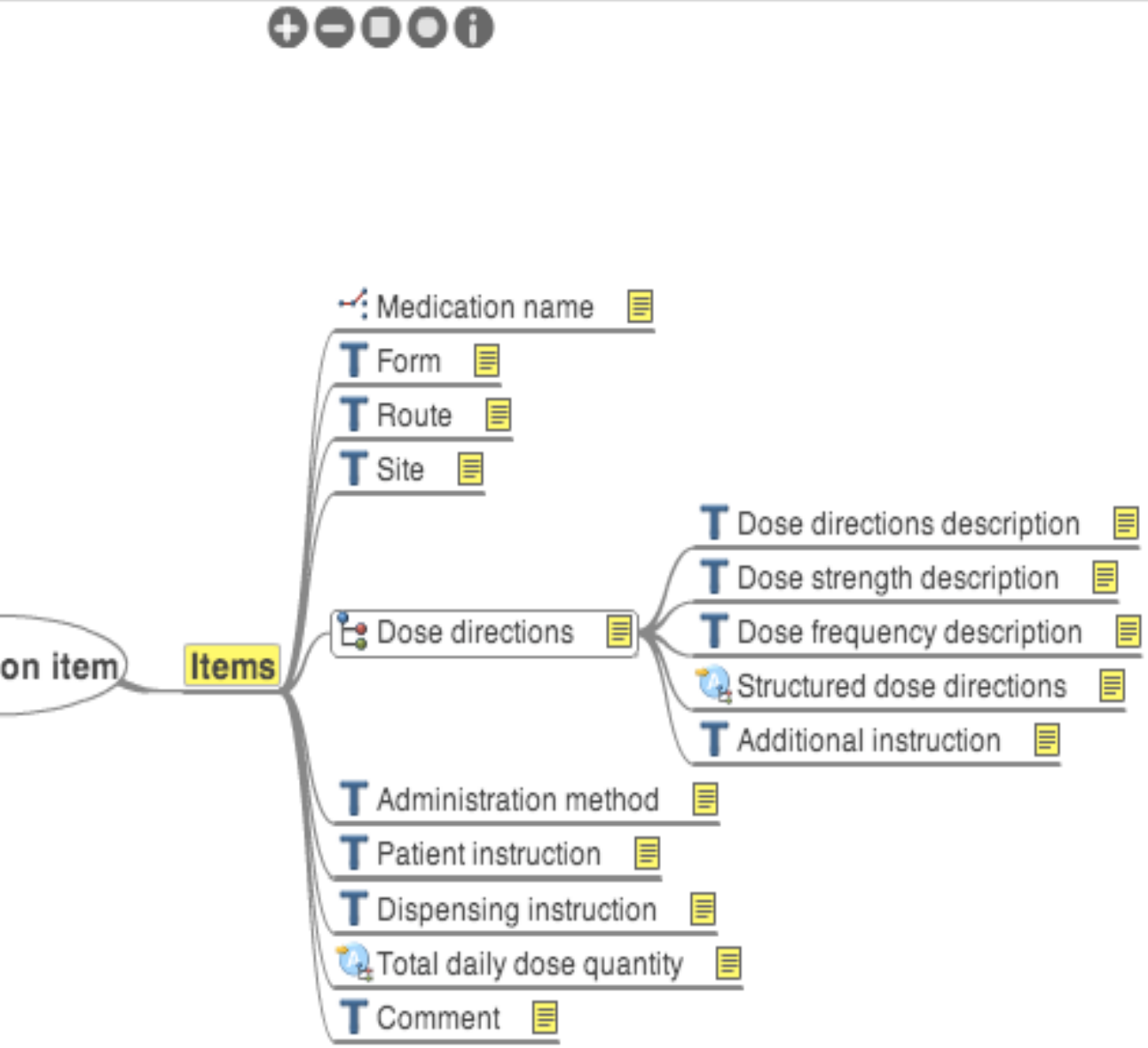
- open-source ‘crowd-sourcing’ methodology
- Shared open repository  ‘CC-BY-SA’ licence

Agility in response to continually changing clinical demand

- Clear ownership, change request mechanism
- Tight version control






| Medications and medical devices | |
|---|---|
| **Subheadings** | **Clinical description** |
| Medication name | May be generic name or brand name (as ap |
| Medication form | Eg capsule, drops, tablet, lotion etc. |
| Route | Medication administration description (ora may include method of administration, (eg, via nebuliser, via NG tube) and/or site of us wound', 'to left eye', etc). |
| Dose | This is a record of the total amount of the a ingredient(s) to be given at each administra It should include, eg, units of measurement tablets, volume/concentration of liquid, nu drops, etc. |
| Medication frequency | Frequency of taking or administration of th agent or medication. |
| Additional instructions | Allows for:<br>* requirements for adherence support, eg, aids, prompts and packaging requirements<br>* additional information about specific med where specific brand required<br>* patient requirements, eg, unable to swall |
| Do not discontinue warning | To be used on a case-by-case basis if it is vit discontinue a medicine in a specific patient |
| Reason for medication | Reason for medication being prescribed, wh |

# Product vs dose based prescribing

**oduct:** **paracetamol** 500 mg tablets – oral – DOSE **take 2** – four times a day

VMP from Drug Dictionary — Dose Syntax compliant coded data

…can be determined by a computer as equivalent to:

**Dose:** **paracetamol** – oral – tablets – DOSE **1000 mg** – four times a day

VTM from Drug Dictionary — Dose Syntax compliant coded data

- Unavoidable
  - due to  difference in the process of inpatient vs. outpatient prescribing

# Dose syntax??

How can we capture a prescription like …

“Co-codamol 8mg/500mg/5ml oral suspension 5-10mls 4-6hourly for 7 days for pain, maximum 40mls daily”

that makes the drug name, dose amount, timing and maximum dosage computable

# Dose syntax - aims

GP, outpatient, community prescriptions

- support automated medicines reconciliation at transitions of care
- calculate Total Daily Dose for quality assessment purposes
- explore usage as data entry method

Out of scope

- inpatient prescriptions
- complex GP prescriptions
- patient usage instructions ‘before meals, ‘take with water’

# Dose syntax - sources

Blue Wave / English NHS /CfH Dose syntax work

- Comprehensive, complex
- Low uptake

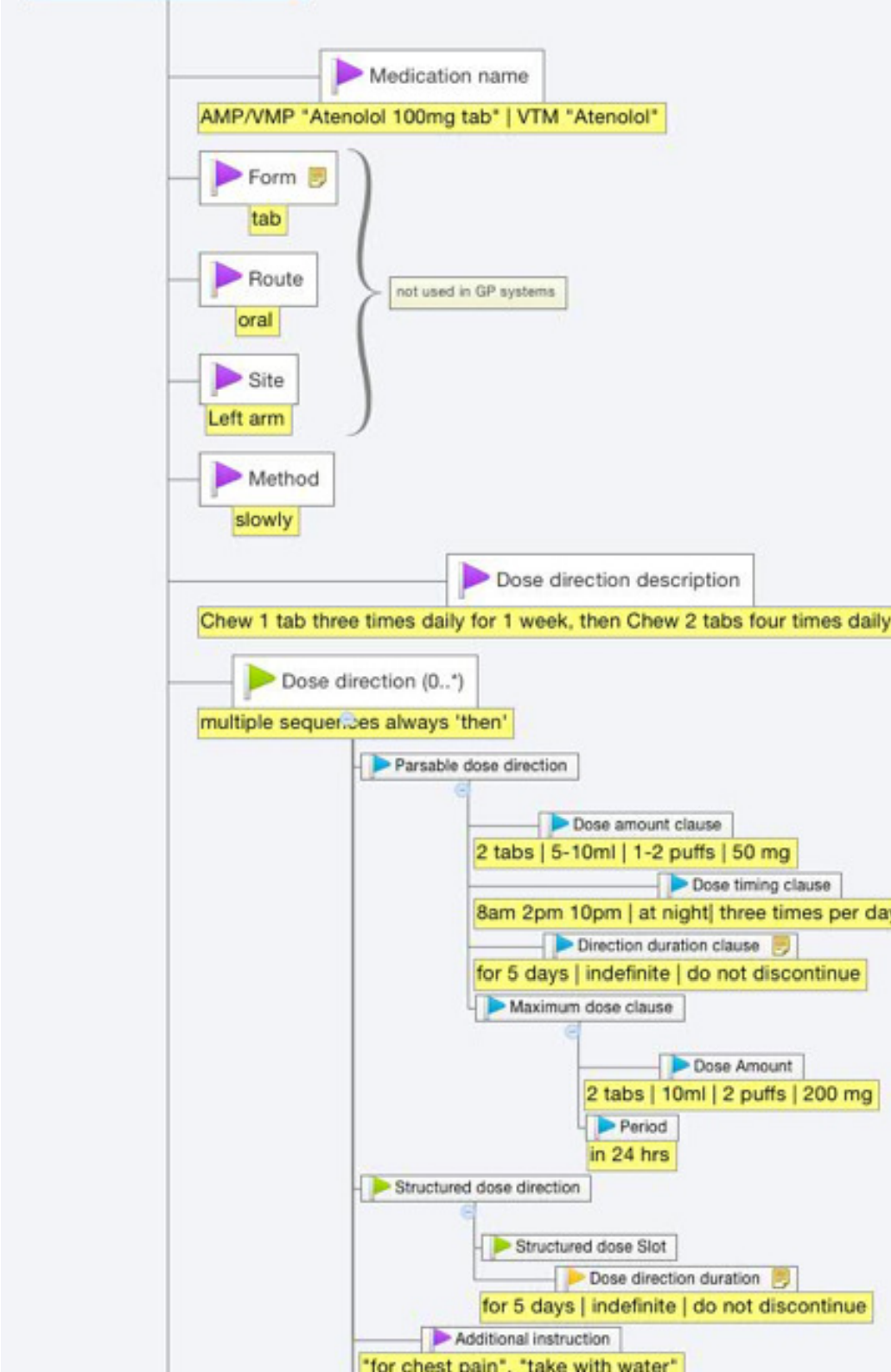
Uni. Dundee ‘EBNF’ Dose syntax

- Successful use as research tool
- Confined to GP prescriptions

# Archetype + Dose syntax

Proposed solution is a mix of archetype' structural model + parsable syntax which carries dose amount + timing

- "10mg td"
- "3 n"



# Examples I

Atenolol 40mg tablets one tablet in the morning

```
{
"Medication Name" : "Atenolol 40mg tabs"
"Parsable dose direction" :  "1 m"
}
```

Atenolol – oral - 40mg in the morning

```
{
"Medication Name": "Atenolol 40mg tabs"
"Route": "oral"
"Parsable dose direction" :"40mg m"
}
```

# Examples

Paracetamol liquid oral 125mg/5mls 5-10mls up to every 4-6 hours as required for pain or fever, maximum 40mls in 24 hrs

```
{
"Medication Name": "Paracetamol liquid 125mg/5mls"
"Route": "oral"
"Parsable dose direction": " 5-10ml ^4h/6h prn [40ml h24]
"Additional instruction": "for pain or fever"
}
```

Enalapril – oral - 2.5mg once daily for 2 days, then 5mg once daily for 7 days, then 10 mg once daily indefinitely

```
{
"Medication Name": "Enalapril"
"Route": "oral"
"Parsable dose direction": "2.5mg od:2d;5mg od:7d;10mg od:ind"
```

# Where are we now?

Medication models about to be published

- going through PRSB approval
- being used in some NHS England funded projects

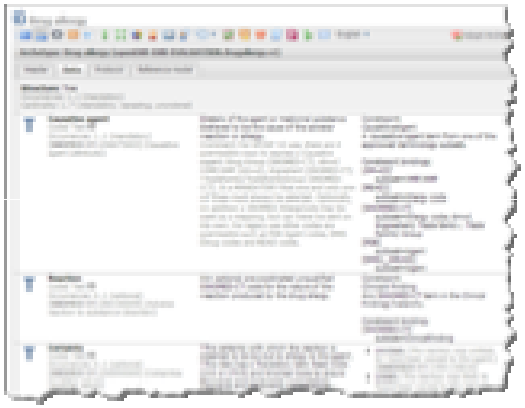
Dose syntax near completion

- then goes to implementers for consultation

# Leeds NHS Care Record: open Platform

**openEHR Clinical Content "Archetypes":**

- Medication, allergies (GP2GP/ RCP/NHSS)
- Problems, procedures (international)
- End of Life content (ISB)
- Vital Signs, NEWS (international)

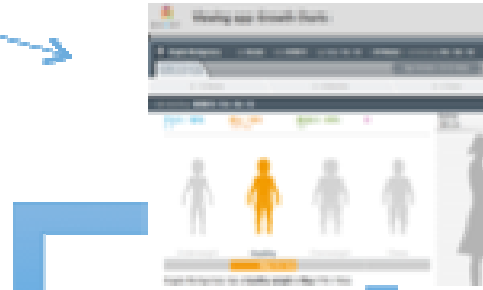


**Open APIs:**

ESB/Spine

ITK Integration component

SMARTPlatforms



openEHR Foundation accredited Open Standards CDR Service layer

Commit

Retrieve

Query

Leeds Clinical Portal via SMARTPlatform APIs

N3 hosted

'OceanEHR' Clinical data repository

# NHSS Medication models in use

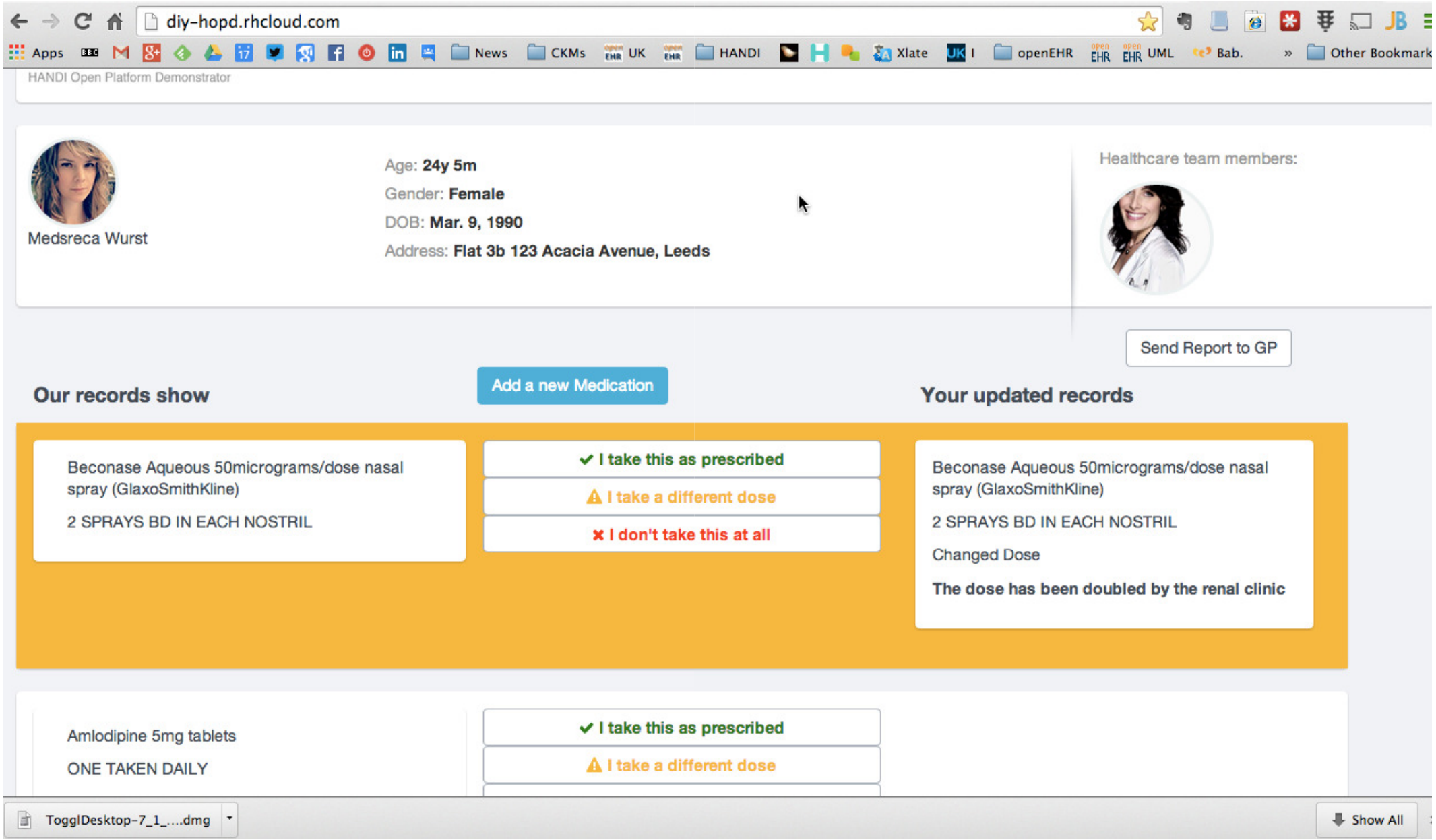
## Renal PatientView

- *Manage* your condition and medications
- *Monitor* your symptoms and tests

NHS HACK DAY

GEEKS WHO LOVE THE NHS

# Patient-driven medication reconciliation



ANDI HOPD

n Platform Demonstrator

**Patient Controlled Health Record Portal**

## Medsreca Wurst

Age: **24y 5m**

Gender: **Female**

DOB: **Mar. 9, 1990**

Address: **-**

Healthcare team:

| Age: | Weight: | BMI: |
|---|---|---|
| 24 | | 22.86 kg/m2 Normal |

essure:
mm[Hg]

(Systolic) (Diastolic)

Saturation:

Height:

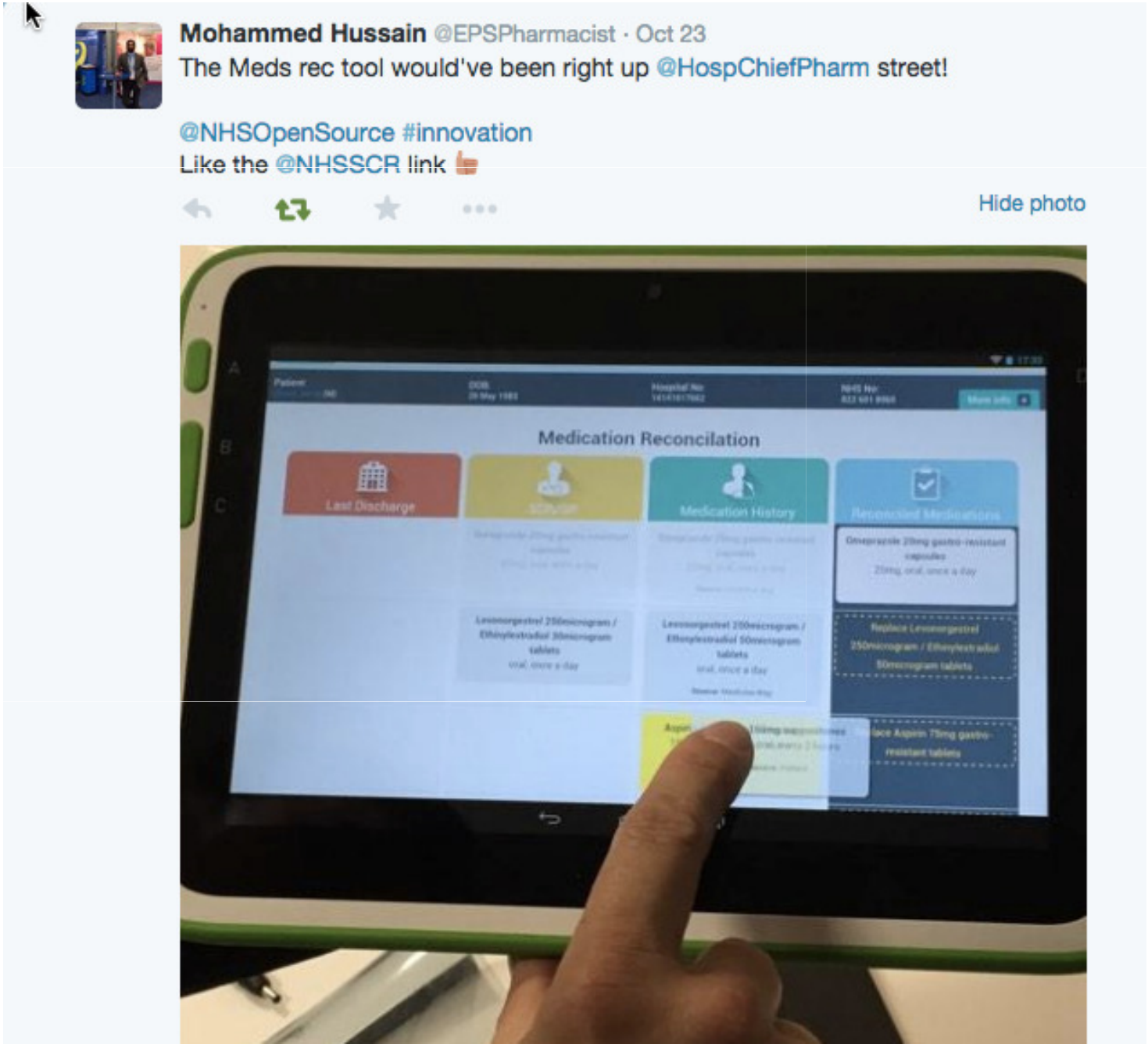
### Allergies

- 06-Aug-1989 - Adverse reaction to Penicillins
- 06-Aug-1989 - Adverse reaction to Penicillins

### Medications

- Beconase Aqueous 50micrograms/dose na spray (GlaxoSmithKline 2 SPRAYS BD IN EACH NOSTRIL
- Amlodipine 5mg tablet ONE TAKEN DAILY
- Beconase Aqueous 50micrograms/dose na spray (GlaxoSmithKline 2 SPRAYS BD IN EACH NOSTRIL
- Amlodipine 5mg tablet ONE TAKEN DAILY

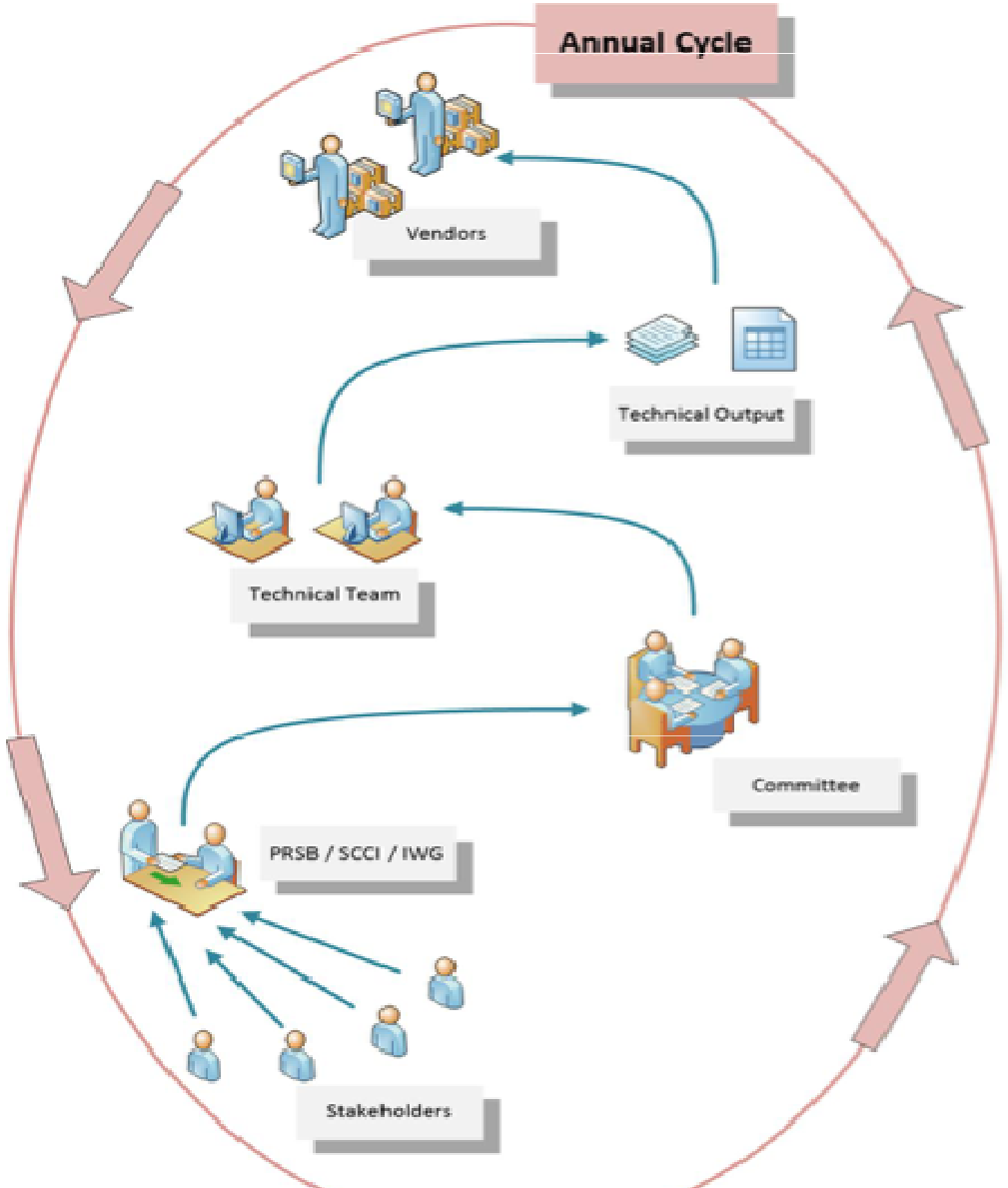
# Dose syntax in trial use




OPENe

# Balls and windage


# Traditional standards development




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

# Are ‘Standards’ necessary?

## FAREWELL TO “RUTHLESS STANDARDISATION”

SEPTEMBER 2, 2014 WOODCOTE LEAVE A COMMENT

“Ruthless Standardisation” was the failed mantra of the NHS National Programme for IT. The Programme is dead, but in some places this view still persist but it is time to consign it to history as something else that “seemed a good idea at the time”

http://www.woodcote
consulting.com/farwe
to-ruthless-
standardisation/

THE GUIDE TO HEALTH INFORMATICS
ENRICO COIERA

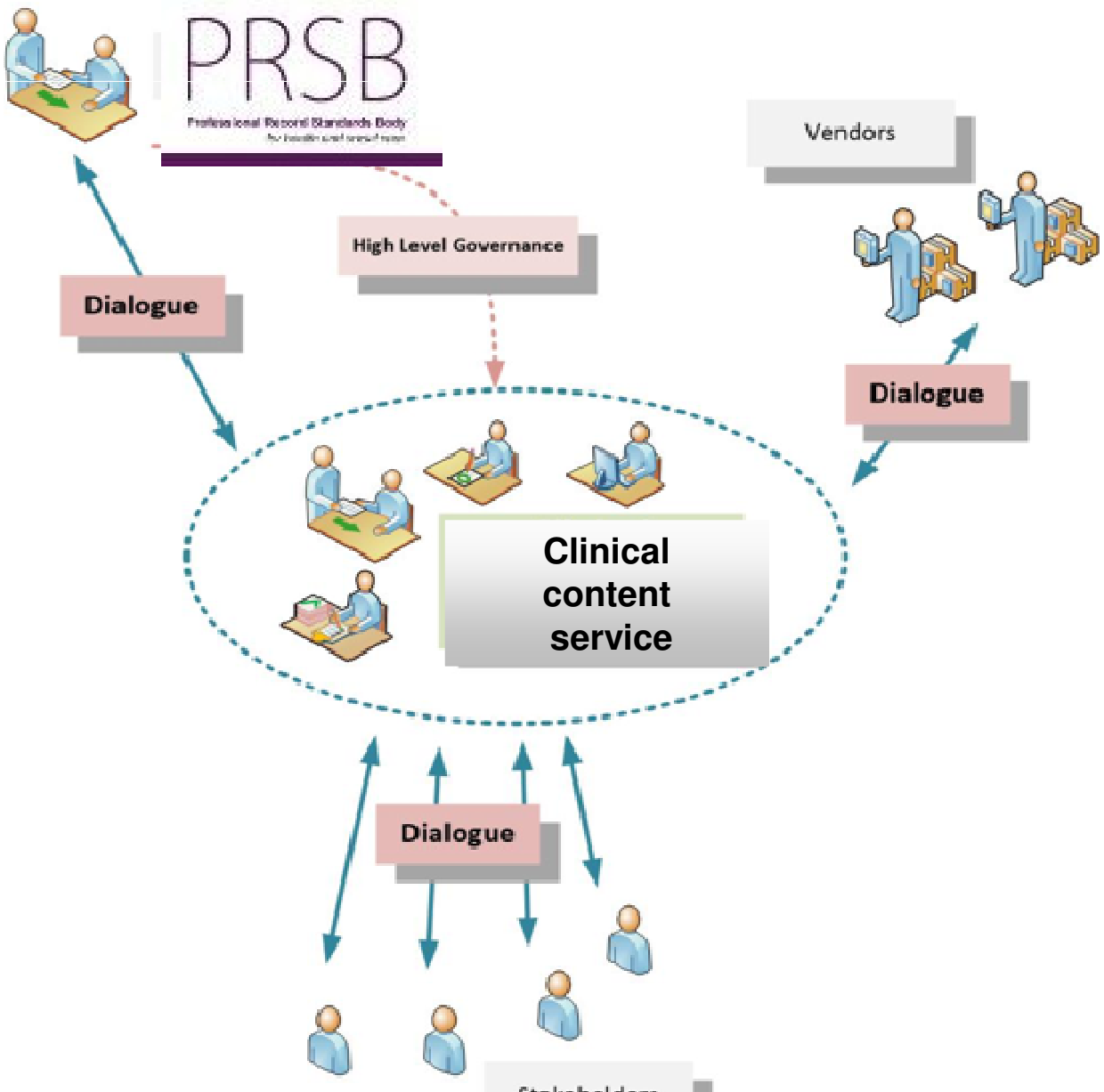
## Are standards necessary?

*November 1, 2013 § 9 Comments*

A COMMON STRATEGY FOR STRUCTURING COMPLEX HUMAN SYSTEMS IS TO demand that everything be standards-based. The standards movement has taken hold in education and healthcare, and technical standards are seen as a prerequisite for information technology.

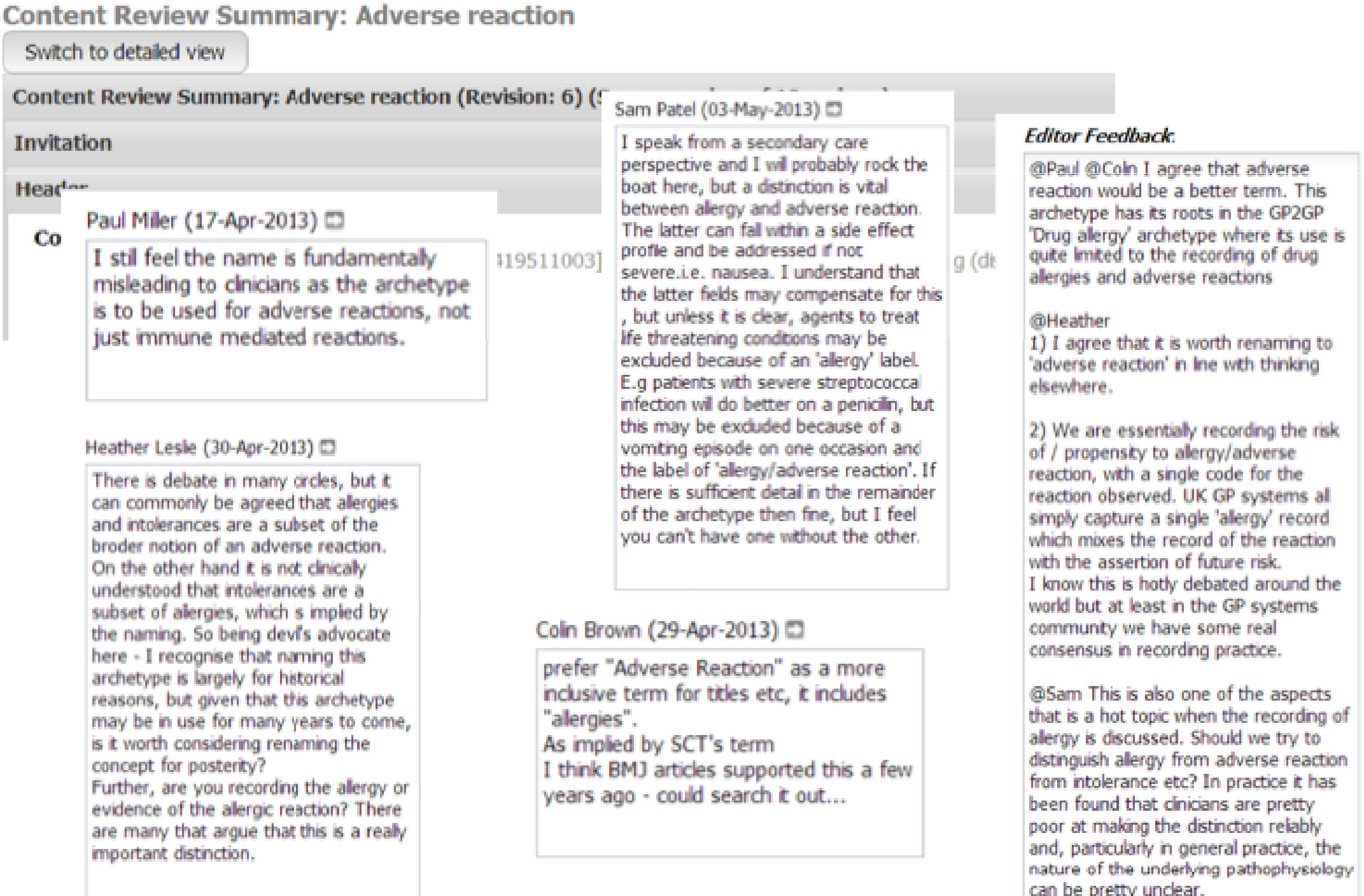
http://coiera.com
13/11/01/are
standards-
necessary/

# Clinically-led standards development

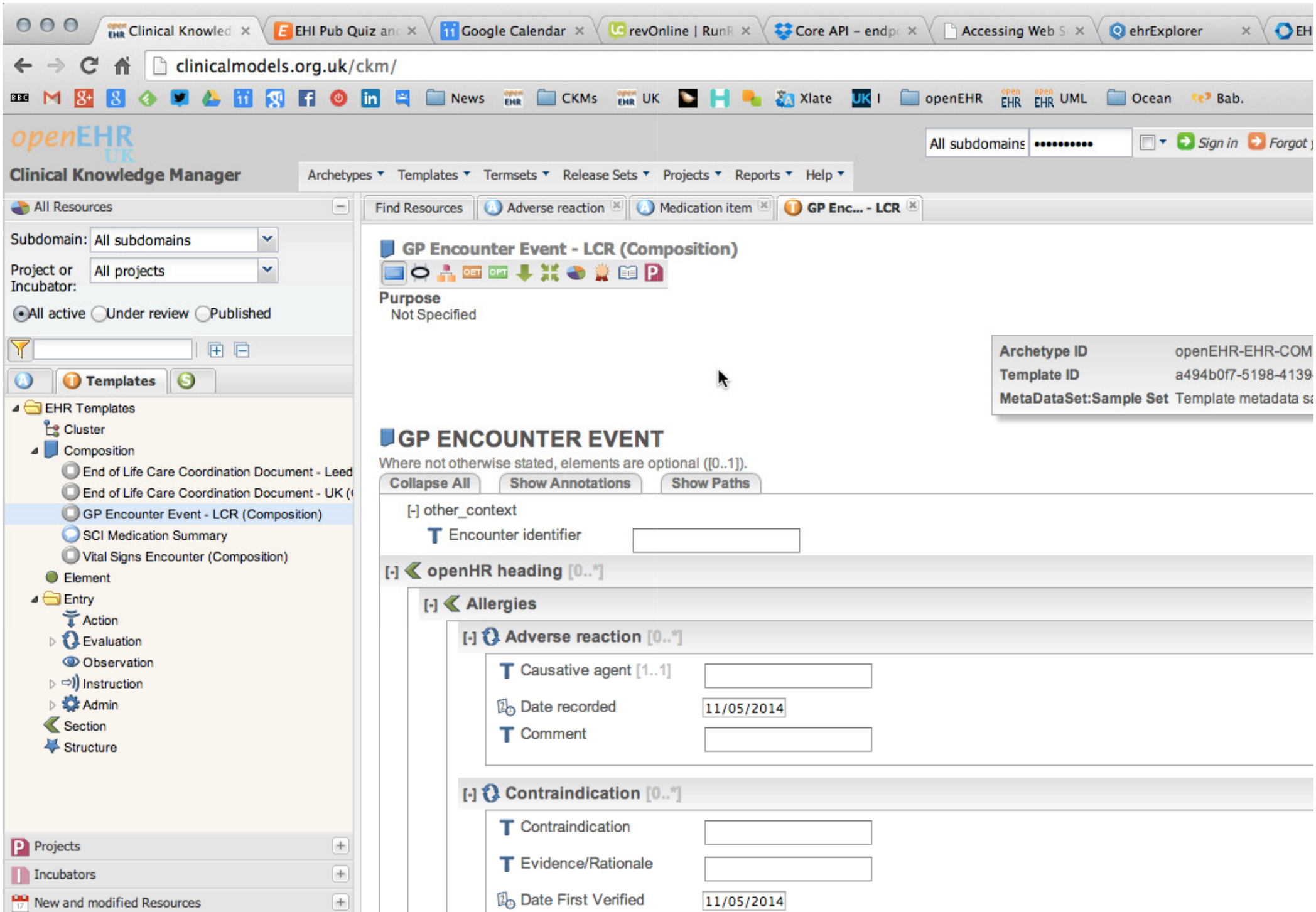



- Clinical stakeholders, vendors engage direct with clinically-led cont service
- Continual dialogue wit stakeholders via web- collaborative tooling
- No fixed review cycles
- On-demand change re directly to clinical cont service
- PRSB has high-level

# Web-based clinical review



# Web-based clinical collaboration



# ‘distributed Governance’

Implementer
s

PRSB

Clinical
Knowledge
Administrator
s

Blood
pressure
Archetype
Editors

Opthalmology
Project Editors

Archetype
Reviewer

Archetype
Reviewer

Visual fields
archetype

Visua
arche

Reviewer

Revi

*endorsemen*
*t*

PRSB

The Roya
Eye doctors

# PRSB: Publication and Endorsement


- Project editors decide on formal publication, acting "Benign Dictators"
- Professional bodies, vend and PRSB may **Endorse** resource as a secondary exercise
- this does not restrain the formal publication process
  - "By Royal Appointmen
- PRSB hires and fires Edit

# For discussion

- Does it make sense to host a single community medication record in GP systems?
- Does it need overall governance by ?? GP?
- Are we wrong to exclude inpatient prescribing?
- Should we ‘try harder’ with the dose syntax?
- Does it make sense to try to ‘do standards’ differently