

Towards a communal patient medication record

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SCIMP
HANDIHealth
openEHR Foundation

SCIMP Conference Oct 2014

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

Hospital Name: Southern General

Patient Details

Name: Mouse, Mickey
Address: 257 GARDEN AVENUE
BONNYBRIDGE
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....				

Started	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 30mg	28 tablet(s)	ONE IN THE MORNING	ONE IN THE MORNIN

Danish Single Medication Record database

From e-Prescription to Shared Medication Record



Primary Care



Hospital

OPUS Medicin - CSADMDV - 0550 - SØEN

Medicinkort: 16.05.2010 Status: Suspendert

OPUS Medicin Medicinfæstning 28.04.2010 Forstået af SØEN

Lægemiddel	Dosis	Enh.	AV	T	Lægemiddel	Dosis	Enh.	AV	T
Metformin "Actavis", tablet, filmovertr. 500 mg Metforminbehandling af diabetes type 2	1 stk morgen og aften	stk.	oral	F	Metformin "Actavis", tablet, filmovertr. 500 mg		stk.	oral	F
Kaleonid, depottabletter 750 mg Kaliumchlorid-kaliumtilskud	1 stk morgen, middag, aften og nat	oral	F						
Simvastatin "Alternova", tablet, filmovertr. 40 mg Simvastatinmed forhøjet kolesterol	1 stk aften	oral	F		Simvastatin "Alternova", tablet, filmovertr. 40 mg		stk.	oral	F
					Prodrulsion "DAX", tabletter 5 mg	1+0+0+1	stk.	oral	F
					Todolac, tablet, filmovertr. 300 mg	1+0+0+0	stk.	oral	F
					Pinos, tablet, filmovertr. 500 mg	2+2+2+2	stk.	oral	F
Sinemet 12,5/50, tabletter 50 mg + 12,5 mg Levodopa og decarboxylase-hæmmer mod Parkinsons sygdom	1 stk morgen og aften	oral	F		Sinemet 12,5/50, tabletter 50 mg + 12,5 mg	1+0+1+0	stk.	oral	F

Drigiv Udskriv medicinkort Udskriv recepter: 14 Sammenlign Medicinfæstning Udskriv ordination Udskriv medicinsøvsigt

Antal: 1 Patienter Revisionshistorik

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

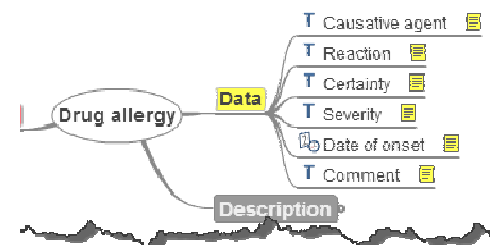
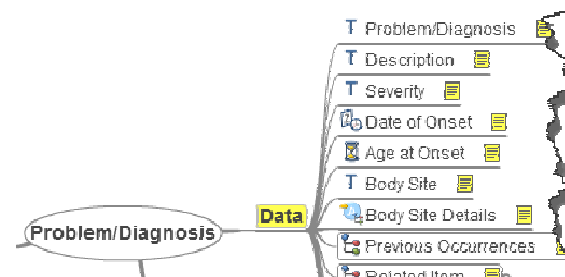
Aligned with dm+d CUI

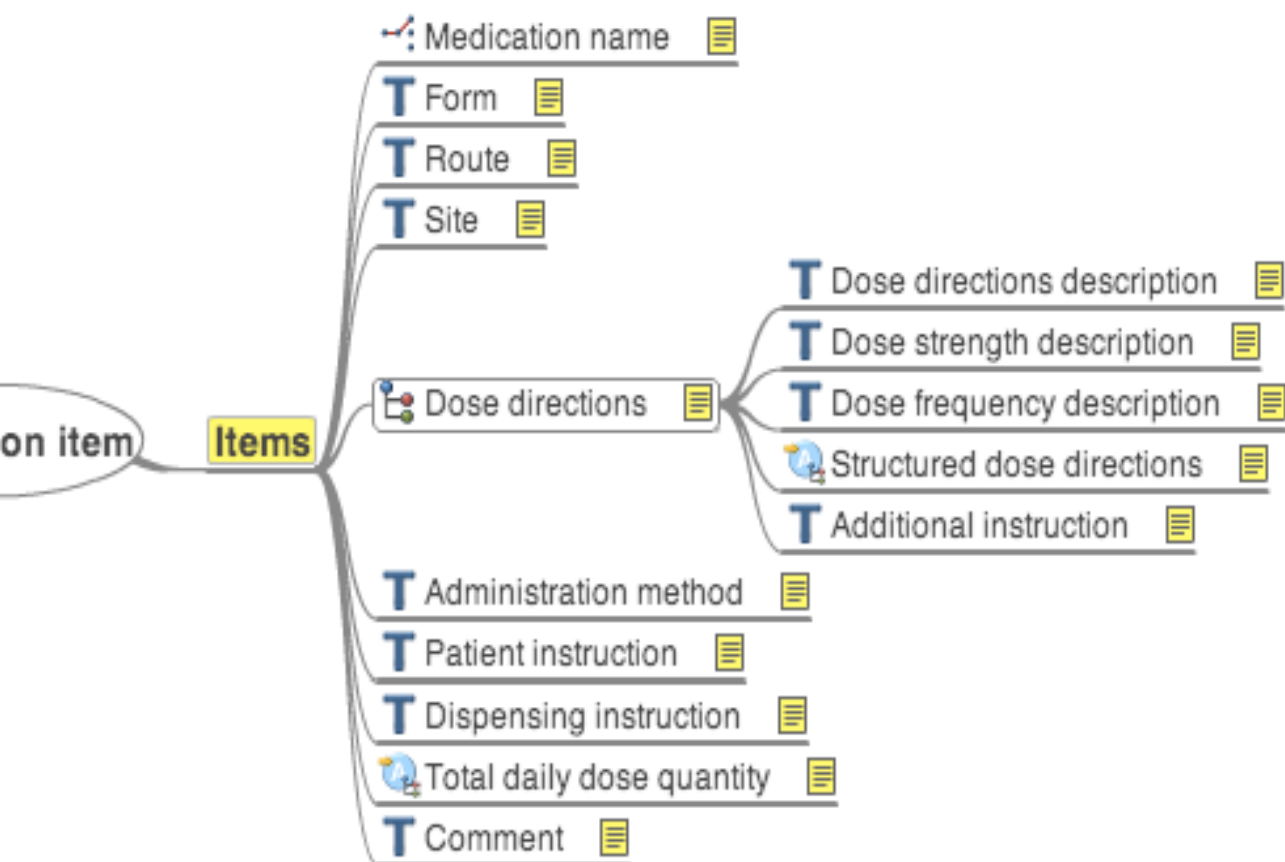
Open, shared data models - 'Archetypes'

- 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 appropriate)
Medication form	Eg capsule, drops, tablet, lotion etc.
Route	Medication administration description (oral, intravenous, etc.) may include method of administration, (eg, via nebuliser, via NG tube) and/or site of use (eg, 'to wound', 'to left eye', etc).
Dose	This is a record of the total amount of the active ingredient(s) to be given at each administration. It should include, eg, units of measurement (eg, tablets, volume/concentration of liquid, number of drops, etc).
Medication frequency	Frequency of taking or administration of the agent or medication.
Additional instructions	Allows for: * requirements for adherence support, eg, aids, prompts and packaging requirements * additional information about specific medication where specific brand required * patient requirements, eg, unable to swallow
Do not discontinue warning	To be used on a case-by-case basis if it is vitally important not to discontinue a medicine in a specific patient
Reason for medication	Reason for medication being prescribed, with

Product vs dose based prescribing

Product:

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

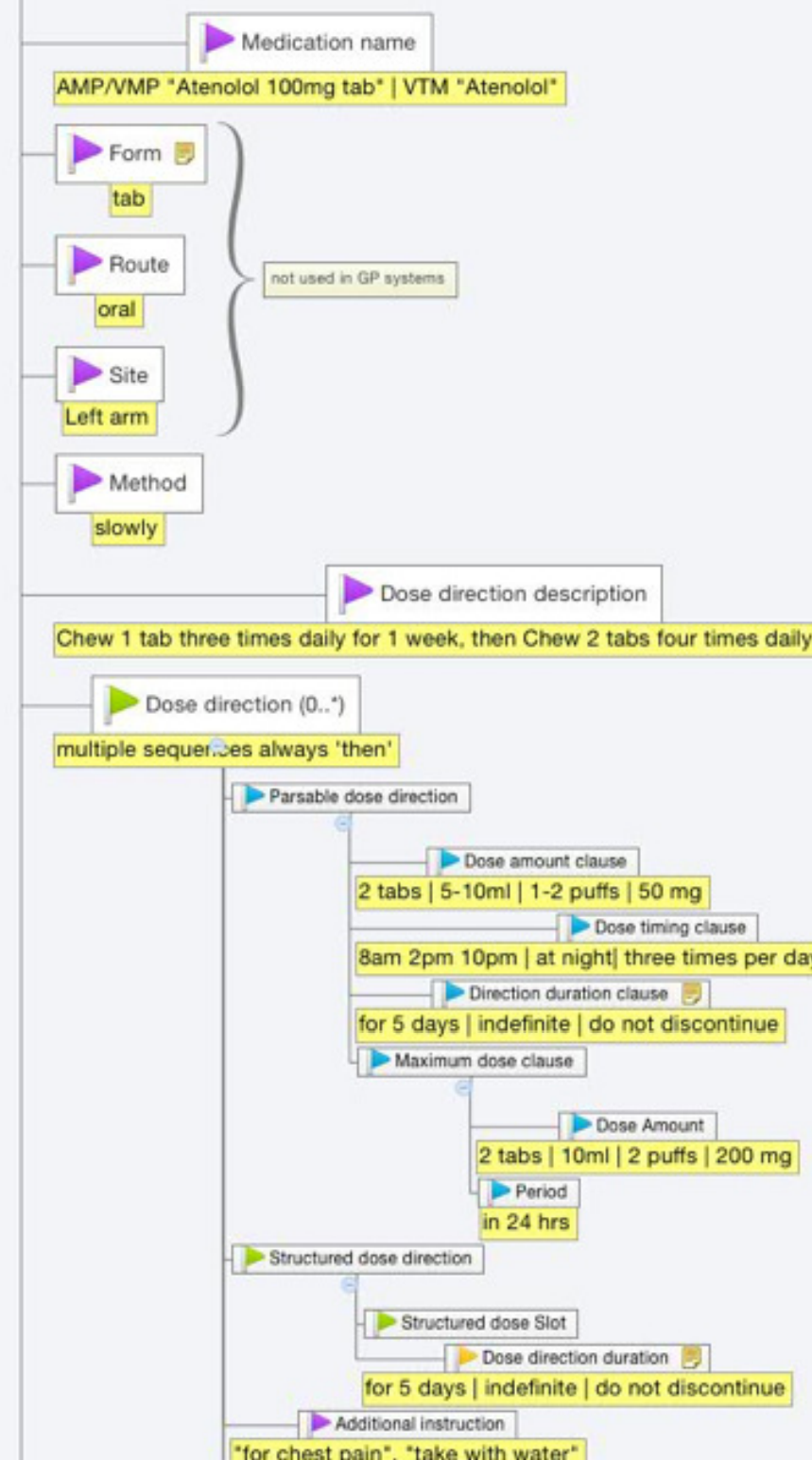
- Successful use as research tool
- Confined to GP prescriptions

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

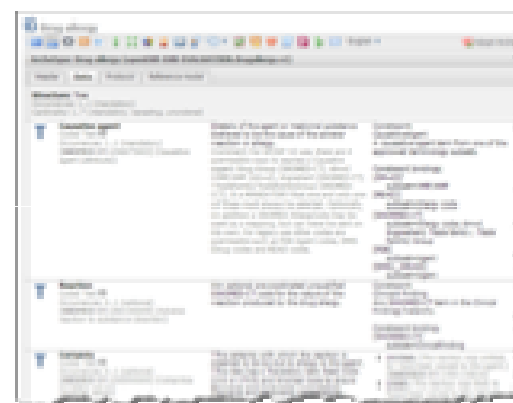
Dose syntax near completion

- 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

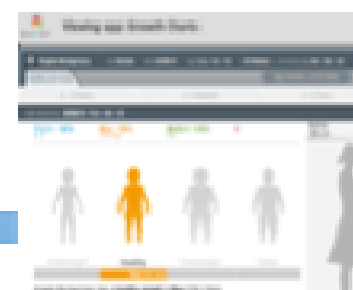
SMARTplatforms

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

Make contact with your...



NHS HACK DAY
GEEKS WHO LOVE THE NHS



Patient-driven medication reconciliation

diy-hopd.rhcloud.com

Apps BBC Gmail Google+ LinkedIn Twitter Facebook News CKMs openEHR UK openEHR HANDI Xlate UK I openEHR openEHR UML Bab. Other Bookmarks

HANDI Open Platform Demonstrator



Medsreca Wurst

Age: 24y 5m
Gender: Female
DOB: Mar. 9, 1990
Address: Flat 3b 123 Acacia Avenue, Leeds

Healthcare team members:



Send Report to GP

Our records show

Add a new Medication

Beconase Aqueous 50micrograms/dose nasal spray (GlaxoSmithKline)

2 SPRAYS BD IN EACH NOSTRIL

✓ I take this as prescribed

⚠ I take a different dose

✗ I don't take this at all

Your updated records

Beconase Aqueous 50micrograms/dose nasal spray (GlaxoSmithKline)

2 SPRAYS BD IN EACH NOSTRIL

Changed Dose

The dose has been doubled by the renal clinic

Amlodipine 5mg tablets

ONE TAKEN DAILY

✓ I take this as prescribed

⚠ I take a different dose

TogglDesktop-7_1_....dmg

Show All



Medsreca Wurst

Age: 24y 5m

Gender: Female

DOB: Mar. 9, 1990

Address: -

Healthcare team:



Allergies

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

Medications

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

Age:

24

Weight:

BMI:

22.86 kg/m2

Normal

Pressure:

mm[Hg]



(Systolic)

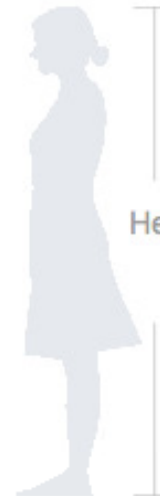


(Diastolic)

Saturation:



Height:



Dose syntax in trial use



Mohammed Hussain @EPSPharmacist · Oct 23

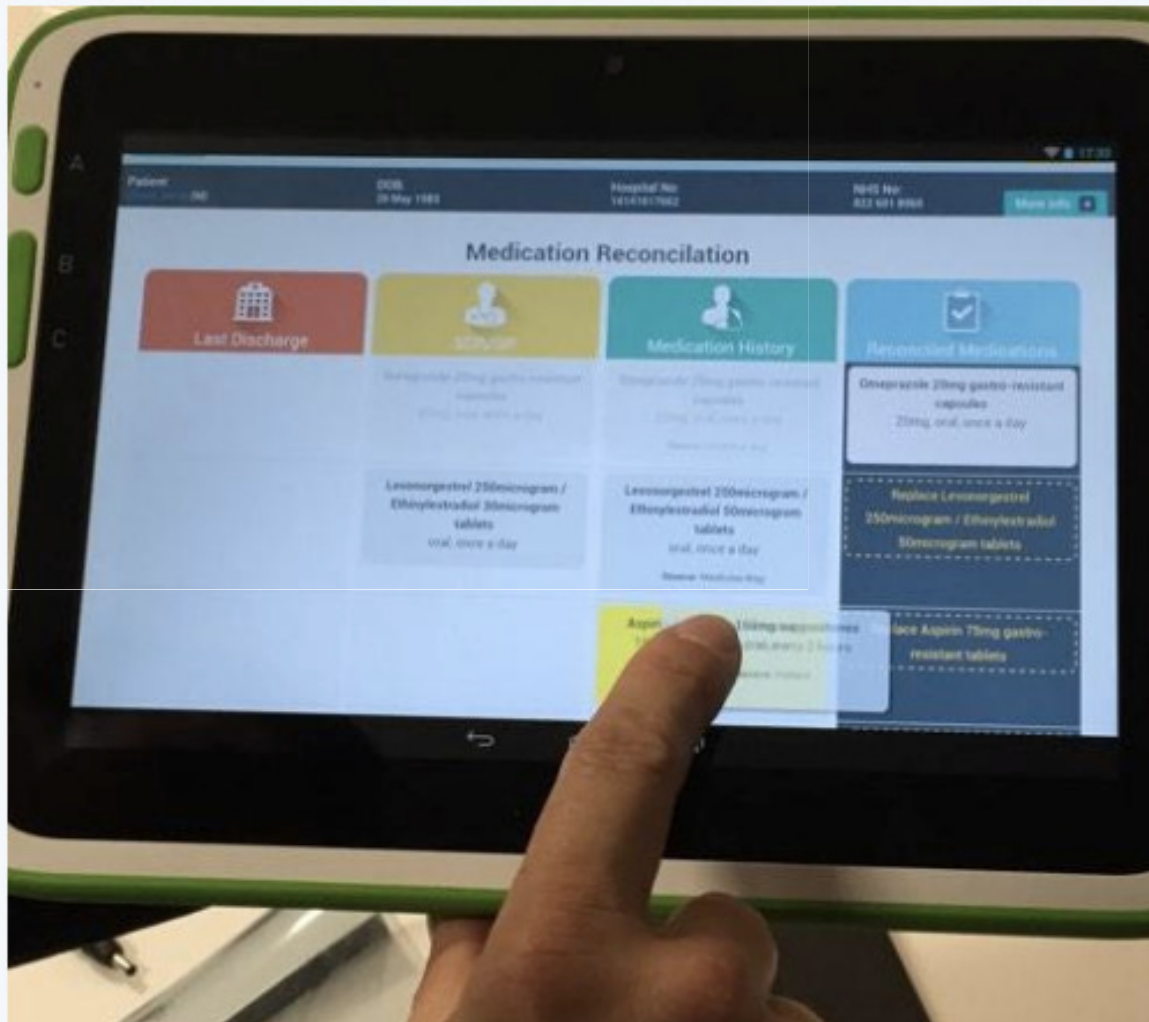
The Meds rec tool would've been right up @HospChiefPharm street!

@NHSOpenSource #innovation

Like the @NHSSCR link 👍



Hide photo

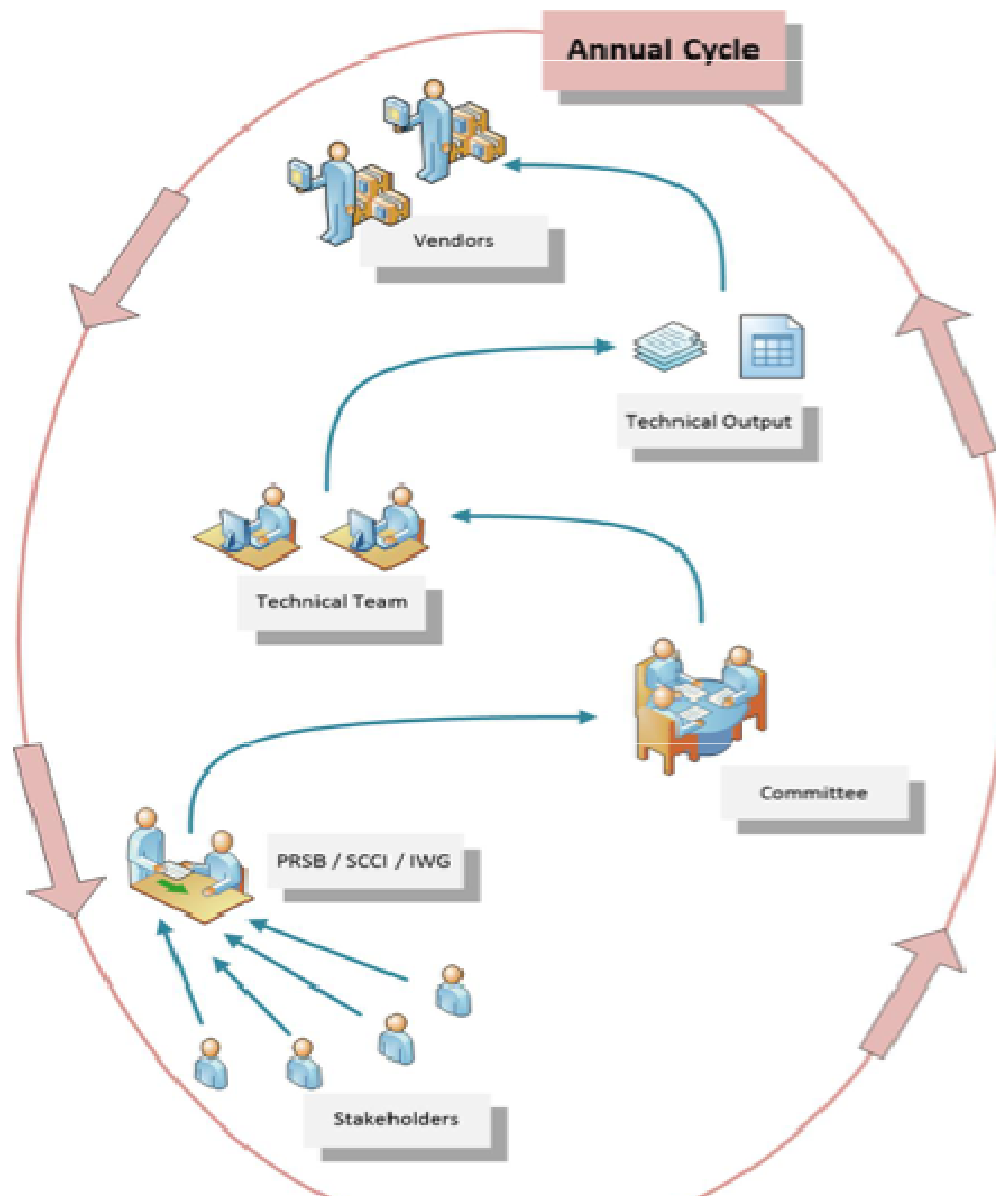


OPENe

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.woodcoteconsulting.com/farwell-to-ruthless-standardisation/>

Are standards necessary?

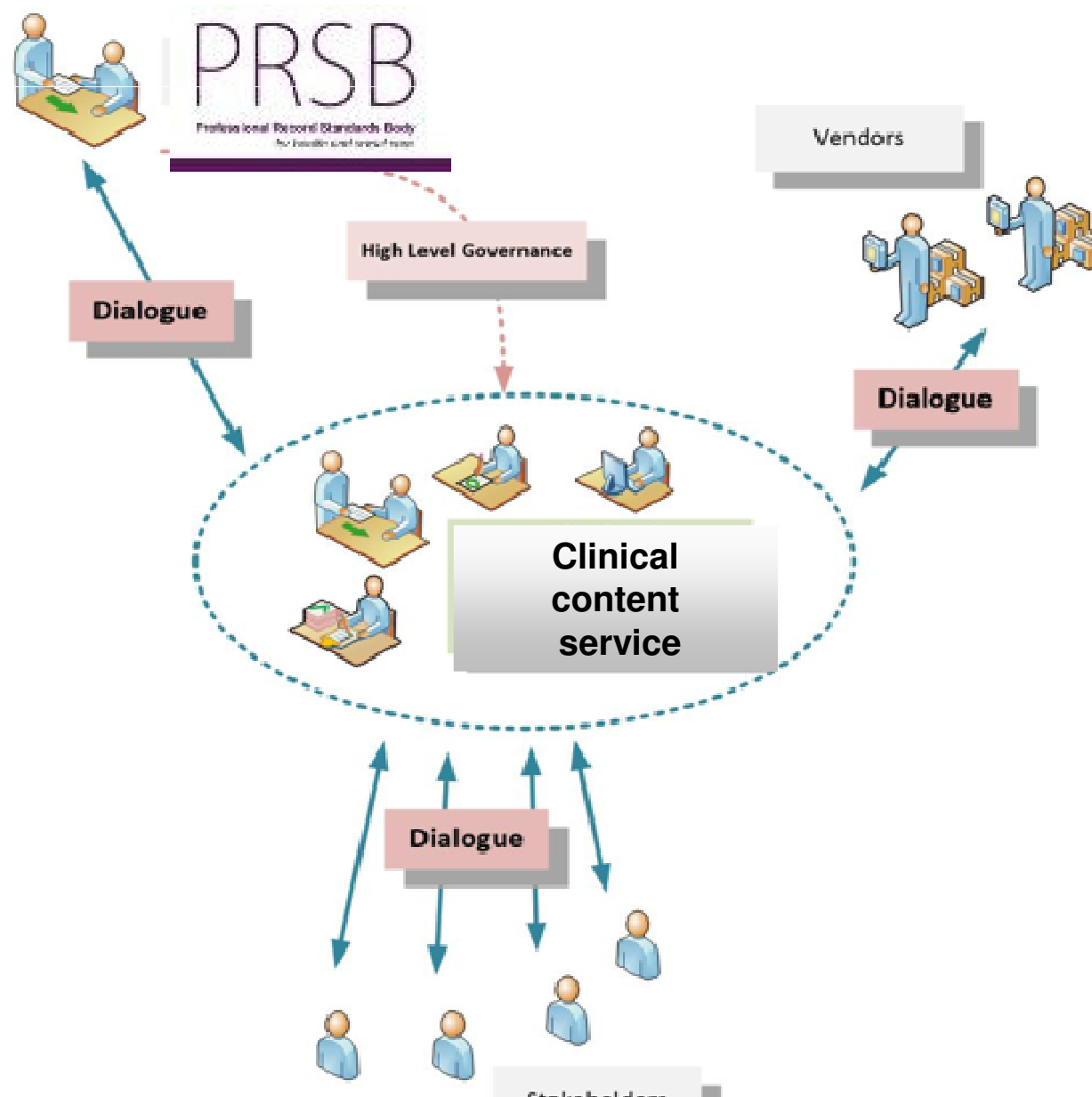
November 1, 2013 § 9 Comments

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.

THE GUIDE TO
HEALTH
INFORMATICS
ENRICO COIERA

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

Clinically-led standards development



- Clinical stakeholders, vendors engage directly with clinically-led content service
- Continual dialogue with stakeholders via web-collaborative tooling
- No fixed review cycles
- On-demand change request directly to clinical content service
- PRSB has high-level governance role

Web-based clinical review

Content Review Summary: Adverse reaction

[Switch to detailed view](#)

Content Review Summary: Adverse reaction (Revision: 6) (5)

Invitation

Headline

Co

Paul Miller (17-Apr-2013) 

I still feel the name is fundamentally misleading to clinicians as the archetype is to be used for adverse reactions, not just immune mediated reactions.

119511003]

Heather Leslie (30-Apr-2013) 

There is debate in many circles, but it can commonly be agreed that allergies and intolerances are a subset of the broader notion of an adverse reaction. On the other hand it is not clinically understood that intolerances are a subset of allergies, which is implied by the naming. So being devil's advocate here - I recognise that naming this archetype is largely for historical reasons, but given that this archetype may be in use for many years to come, is it worth considering renaming the concept for posterity? Further, are you recording the allergy or evidence of the allergic reaction? There are many that argue that this is a really important distinction.

Sam Patel (03-May-2013) 

I speak from a secondary care perspective and I will probably rock the boat here, but a distinction is vital between allergy and adverse reaction. The latter can fall within a side effect profile and be addressed if not severe i.e. nausea. I understand that the latter fields may compensate for this, but unless it is clear, agents to treat life threatening conditions may be excluded because of an 'allergy' label. E.g patients with severe streptococcal infection will do better on a penicillin, but this may be excluded because of a vomiting episode on one occasion and the label of 'allergy/adverse reaction'. If there is sufficient detail in the remainder of the archetype then fine, but I feel you can't have one without the other.

Colin Brown (29-Apr-2013) 

prefer "Adverse Reaction" as a more inclusive term for titles etc, it includes "allergies".
As implied by SCT's term
I think BMJ articles supported this a few years ago - could search it out...

Editor Feedback:

@Paul @Colin I agree that adverse reaction would be a better term. This archetype has its roots in the GP2GP 'Drug allergy' archetype where its use is quite limited to the recording of drug allergies and adverse reactions

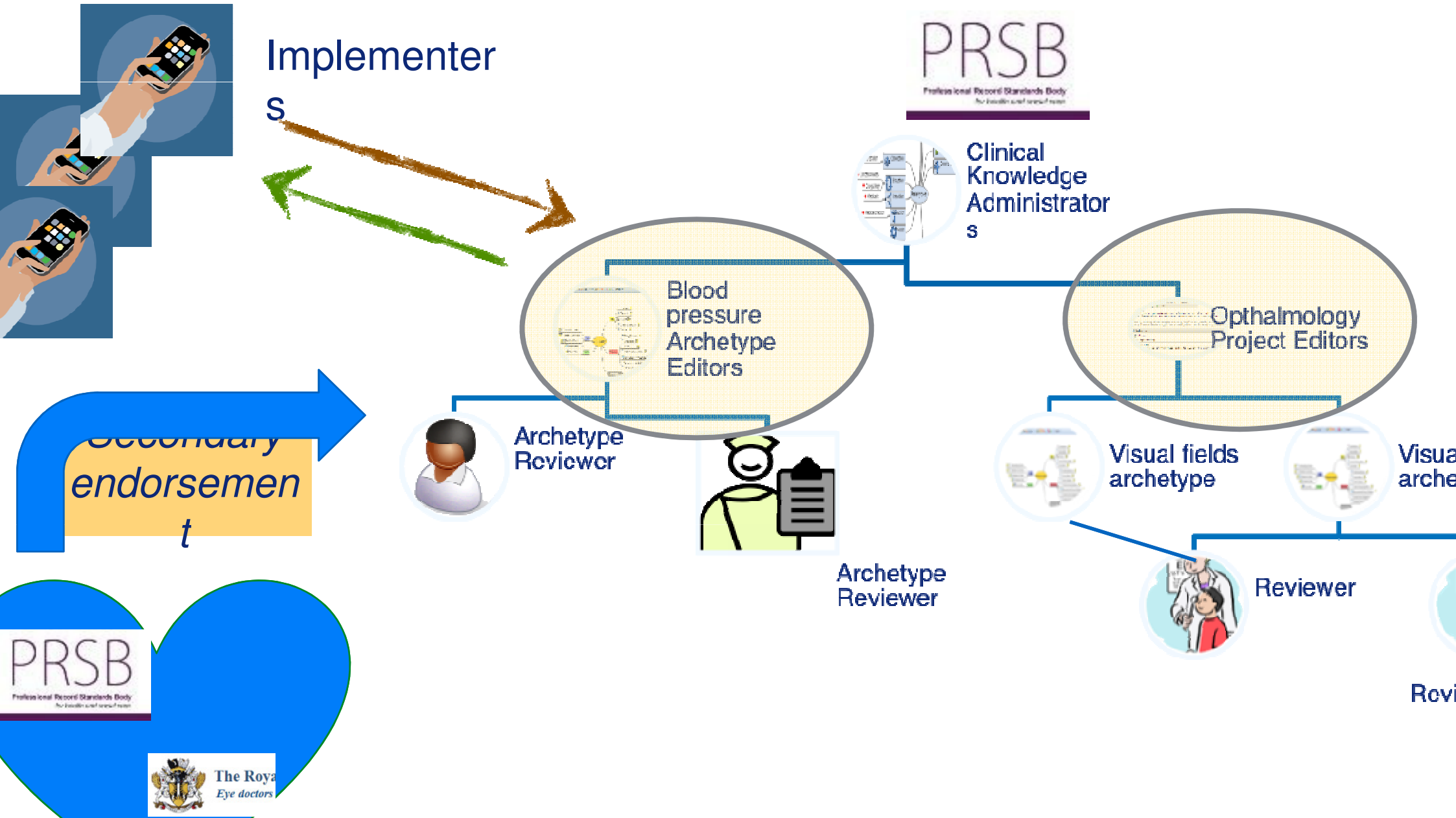
@Heather

1) I agree that it is worth renaming to 'adverse reaction' in line with thinking elsewhere.

2) We are essentially recording the risk of / propensity to allergy/adverse reaction, with a single code for the reaction observed. UK GP systems all simply capture a single 'allergy' record which mixes the record of the reaction with the assertion of future risk. I know this is hotly debated around the world but at least in the GP systems community we have some real consensus in recording practice.

@Sam This is also one of the aspects that is a hot topic when the recording of allergy is discussed. Should we try to distinguish allergy from adverse reaction from intolerance etc? In practice it has been found that clinicians are pretty poor at making the distinction reliably and, particularly in general practice, the nature of the underlying pathophysiology can be pretty unclear.

'distributed Governance'



PRSB. Publication and Endorsement



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

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