Information aspect of SOA in healthcare

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Agenda

- Information-centric viewpoint
  - SOA integration supports key information exchanges, depends on information standards
  - See how this works in two sample scenarios
- Two scenarios
  - Electronic Health Record is shared across organizations, providing critical information at point of care
  - Within one acute hospital, information is collated and made operational to improve health outcomes and manage length of stay

A simple tale...

Pat Wrekin lives in Shropshire (England) and is generally in good health.
Pat visits his GP and local hospital regularly: he has a planned programme of care for Type 2 diabetes.

While taking a few days holiday in Derbyshire, Pat goes out walking alone. Pat is found by another walker lying unconscious and injured, apparently due to a fall, and is taken to A&E at the local hospital.

Where are the standards?

(1) Without computers

GP practice record-keeping

Diabetes National Framework

Clinical Terminology

"Pat Wrekin has Type 2 diabetes, and […summary of other relevant clinical information…]"

Community of practice and common language supports effective exchange of information between people

National guidelines in emergency medicine

Hospital record-keeping

Clinical Terminology

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Where are the standards?

(2) With a shared record

GP practice record-keeping

Diabetes NSF

EHR structure, EHR content and integration standards enable the information to be conveyed via a shared data store.

Clinical Terminology

"Pat Wrekin has Type 2 diabetes, and […summary of other relevant clinical information…]"

Shared Electronic Health Record (EHR)

National guidelines in emergency medicine

Community of practice and common language is still essential for the information to be understood when it comes out of the computer at the other end

Hospital record-keeping

Clinical Terminology

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Accurate, reliable communication using a shared EHR

- Shared EHR and other aspects of ICT interoperability are part of a long tradition of common language and standards of practice
  - The “schools” of Hippocrates and Galen
  - Symbols and codes (written by hand)
  - Professional bodies, recognized qualifications
- Effective concise communication about a complex situation requires:
  - Shared background knowledge
  - Ability to send, receive & understand the communication
  - Enough specific background knowledge about the situation concerned to understand the significance of the communication
  - Confidence in authenticity, confidentiality etc
- EHRs can only work if humans and computers work together

Where are the standards?

(3) Meaningful communication using data

"Pat Wrekin has Type 2 diabetes, and […summary of other relevant clinical information…]"

What do I need to know to understand this data?

Controlled vocabularies

```
<Summary date="20-05-2006">
<GPid>12341234</GPid>
<Patient>
<Name>Pat Wrekin</Name>
<NHSnumber>12345674567</NHSnumber>
</Patient>
<Diagnosis code="abcabc" >Diabetes: Type 2</Diagnosis>
<Allergy>None recorded</Allergy>
<Alert>None recorded</Alert>
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This is a simplified format compared to real data (eg HL7 CDA)

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Reference information Model (HL7v3 RIM)

XML data format

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One more step…

GP system sends a summary to the regional EHR (eg CCD)
Regional EHR provides summary on request to the hospital's EHR system

GP system

"Pat Wrekin has Type 2 diabetes, and […summary of other relevant clinical information…]"

EHR A

EHR B

EHR structure, EHR content and integration standards enable the information to be conveyed from computer to computer

Security and access policies are essential for confidence in the authenticity and confidentiality of information shared

Interoperability = “It just works”

Mr Wrekin? ah yes, he has Type 2 diabetes, he’s controlling his diet well…

This is the swan gliding serenely along; the many standards involved are the feet paddling energetically below the surface…

OK, he’s diabetic…

Well-behaved standards are…

- Adoptable
  - Easy to learn about & evaluate
  - Well defined in scope, conformance etc.
- Harmonized
  - Talk about the same kinds of things in the same way
  - Easy to map/translate common subject matter
- Compact and Modular
  - I can adopt just the stuff I need without too much brainache, special setup or performance overhead
  - If I need more later, it's an easy upgrade
- Orthogonal & loosely coupled
  - My standard doesn't mess up your standard when they're used together

SOA is pretty good at all this!

SOA support for Pat Wrekin

- Business level services
  - Lodge a summary in the shared EHR
  - Retrieve a summary from the shared EHR
- Information payload
  - eg HL7v3 CDA Continuity of Care Document (CCD)
  - …includes agreed usage of terminology etc.
- Underlying infrastructure
  - Technology
    - Wide range of choices
    - Same interactions and information can pass through different platforms (“airspaces”)
  - Policy
    - Access, consent, privacy etc etc…
    - …needed whatever the technology

2nd Scenario: RealTime

RealTime helps acute hospitals improve clinical and financial performance through better bed management, discharge planning and reduction of the average length of stay. It supports the measurement of key performance indicators, process change and adherence to best practice guidelines.

- Tracking bed status
- Planning bed flow
- Discharge planning
- Applying Best Practice
- Reporting KPIs

RealTime

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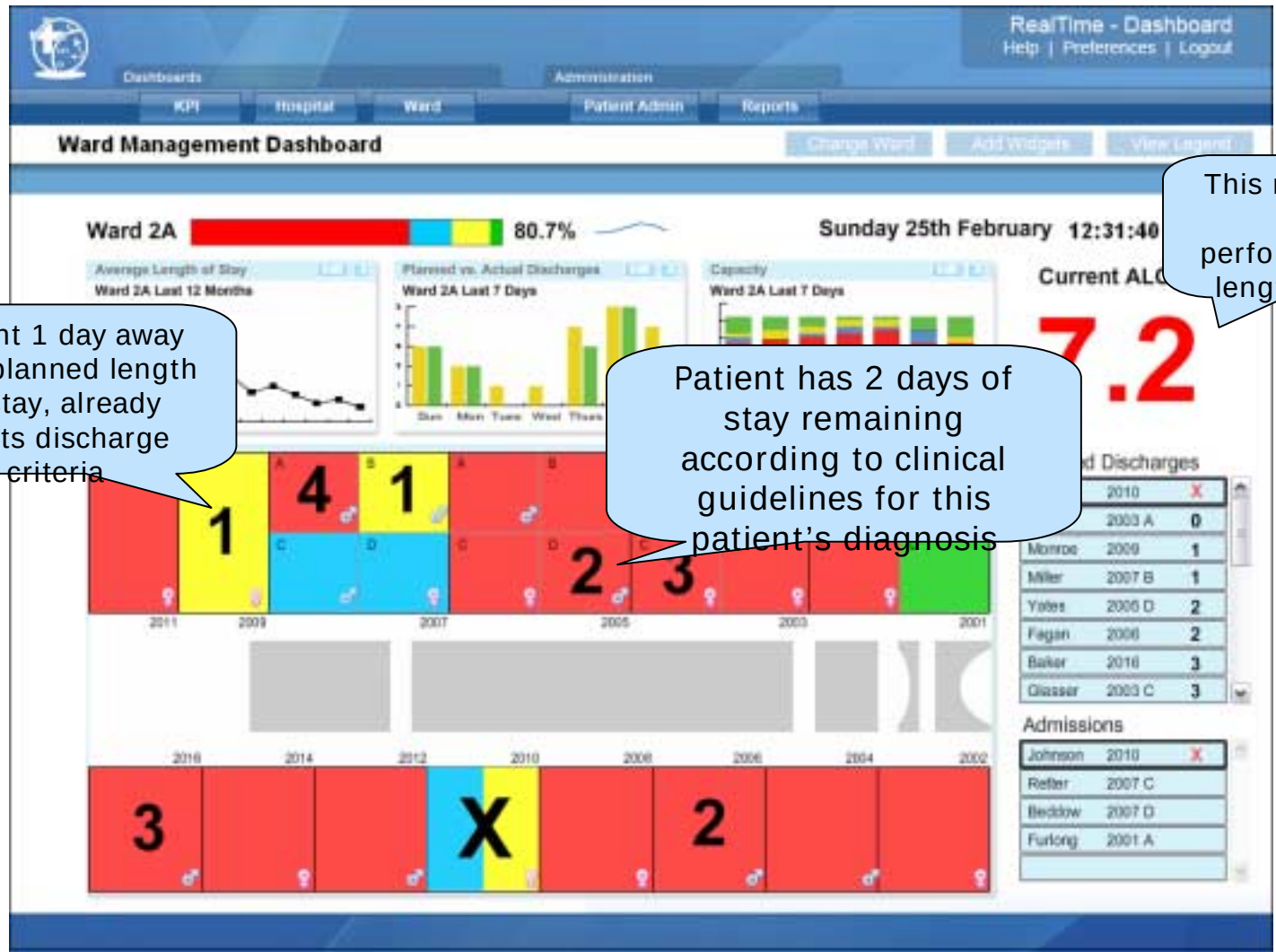
Eagle Medical Management

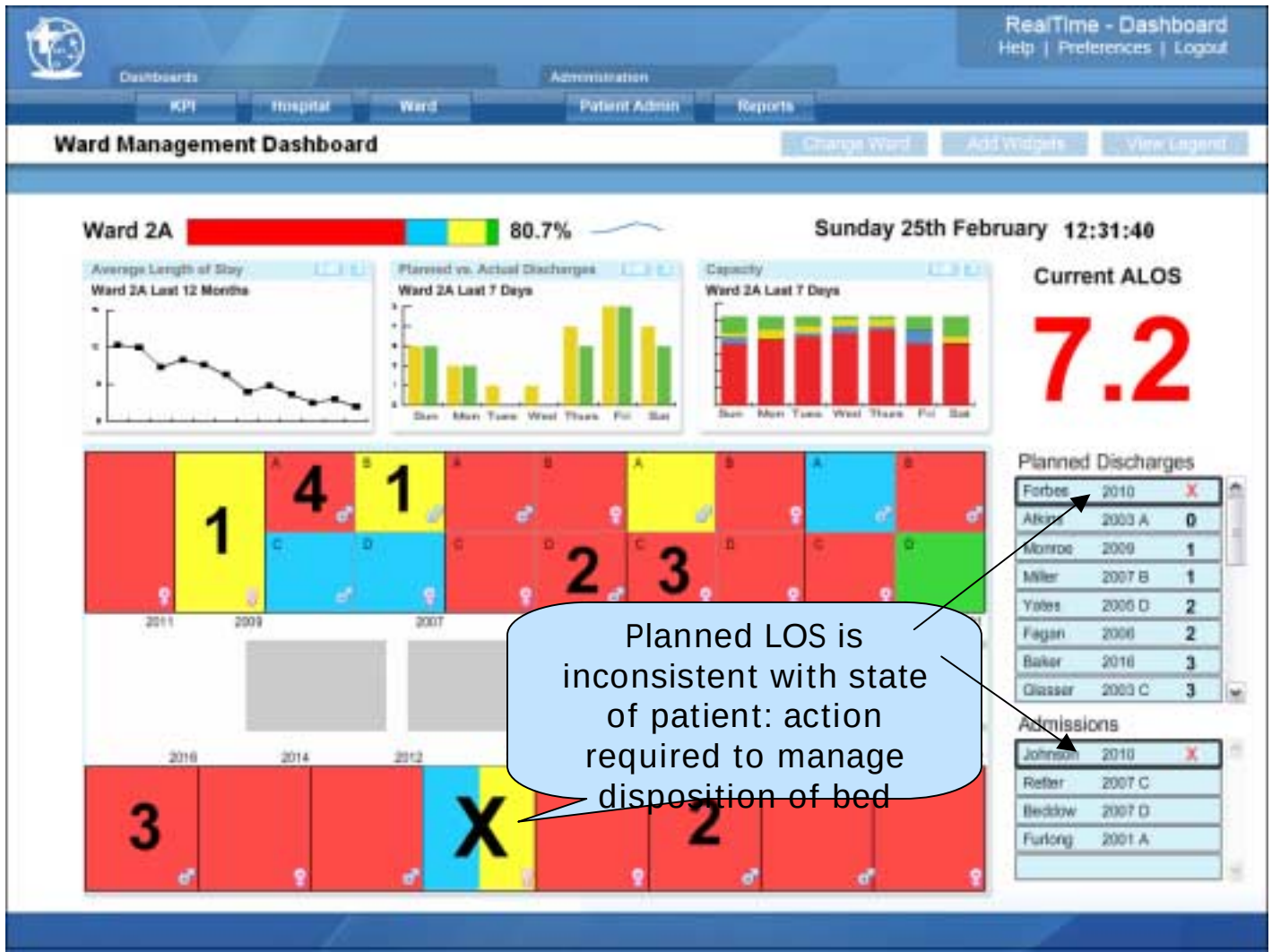
Improving clinical performance

- Improving clinical performance is a multidisciplinary effort depending on information
  - Cuts across traditional hospital IS boundaries
- Key knowledge is distributed across different system components
  - Bed “geography” and occupancy status
  - Patient administration process status
  - Clinical guidelines for discharge for specific diagnoses
  - Other case management factors
    - eg transport & social support aspects of discharge planning
  - Electronic Health Record
- SOA integration brings it all together
  - Information integration enables effective human decision making

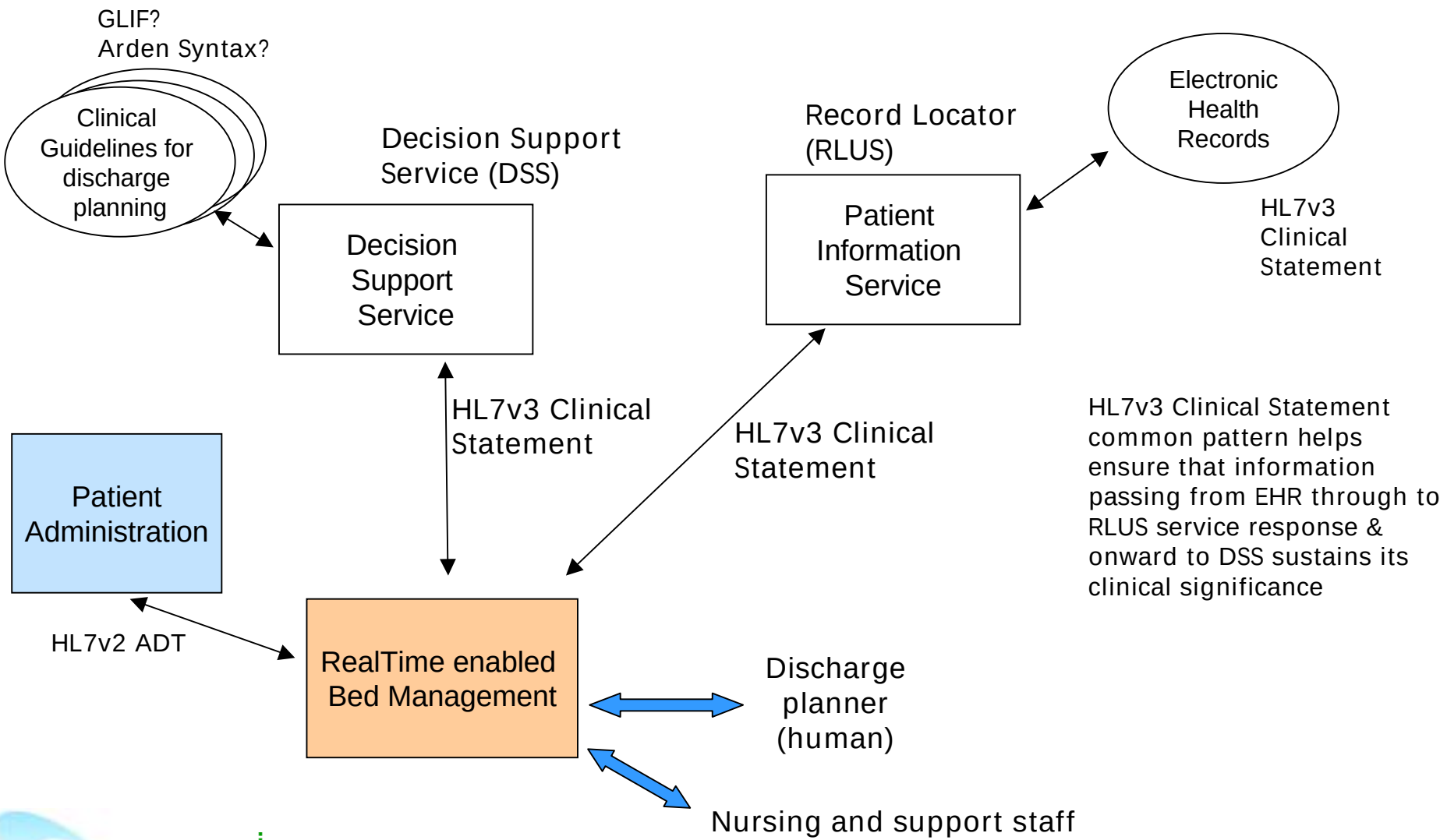
Integrated information view



Integrated information view

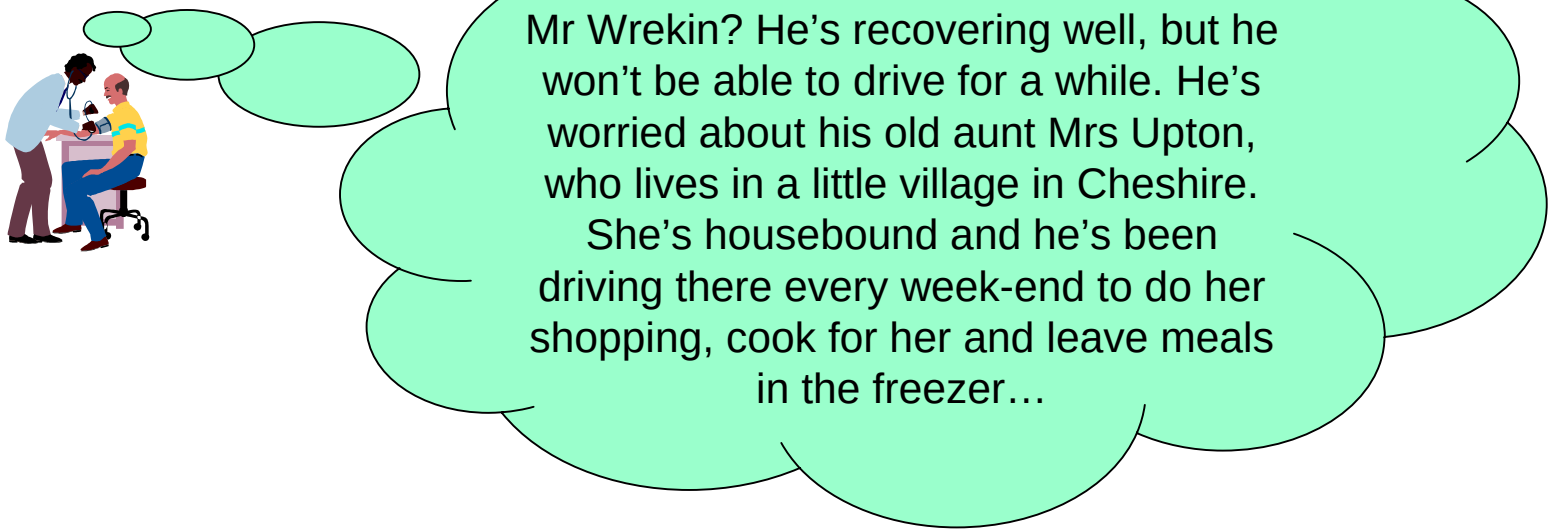


SOA support for RealTime



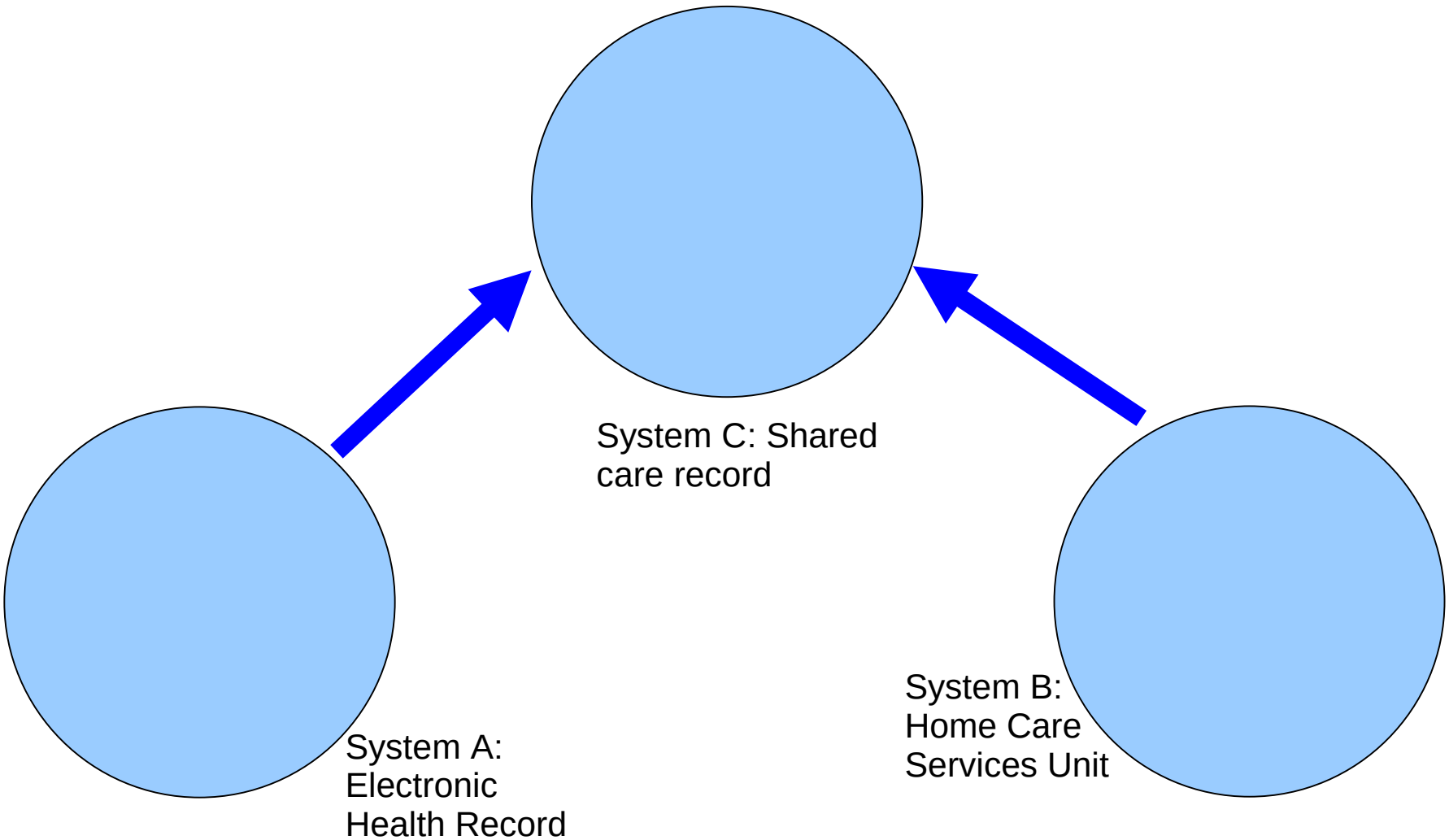
HL7v3 Clinical Statement common pattern helps ensure that information passing from EHR through to RLUS service response & onward to DSS sustains its clinical significance

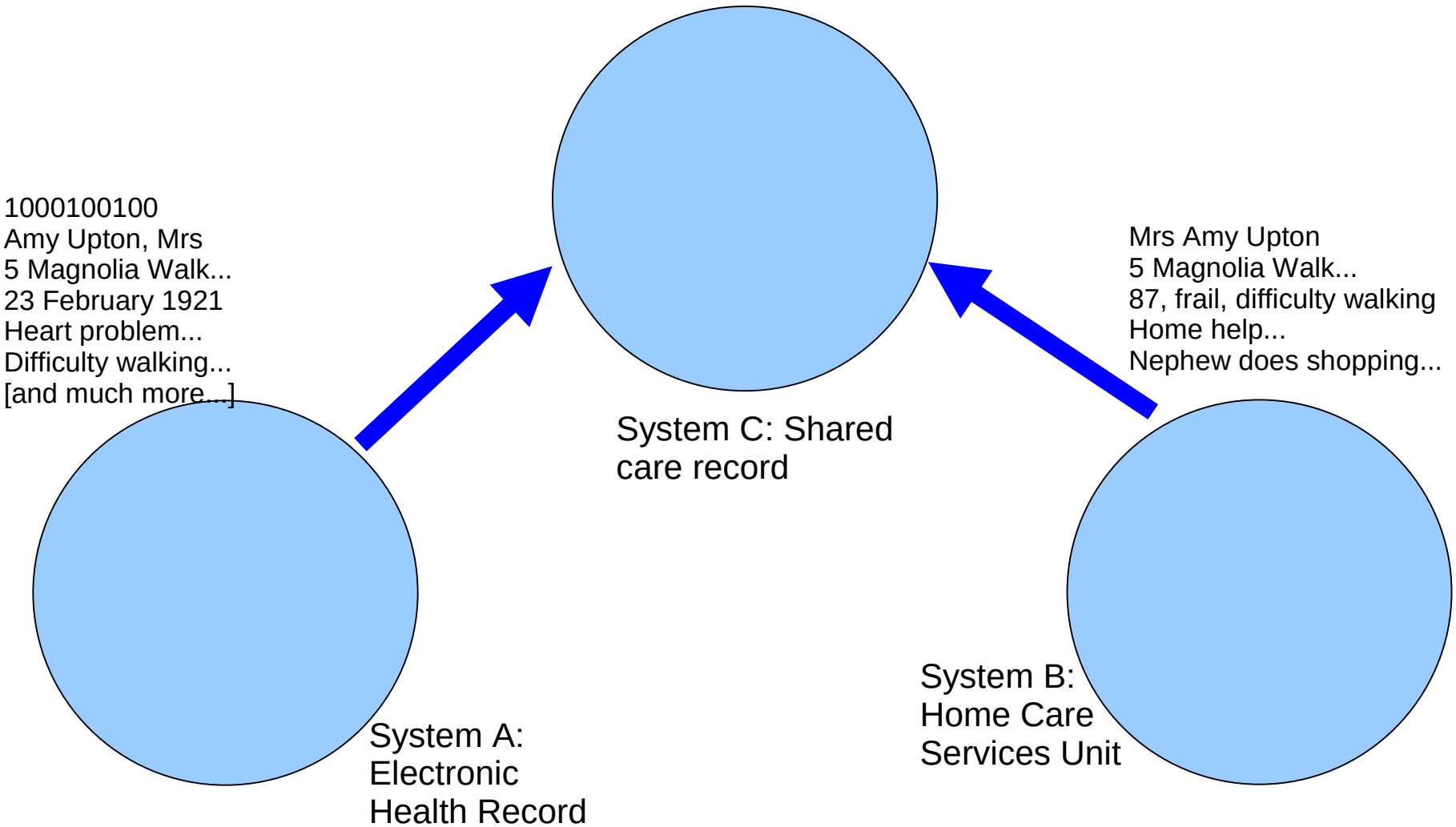
Back to Pat Wrekin…

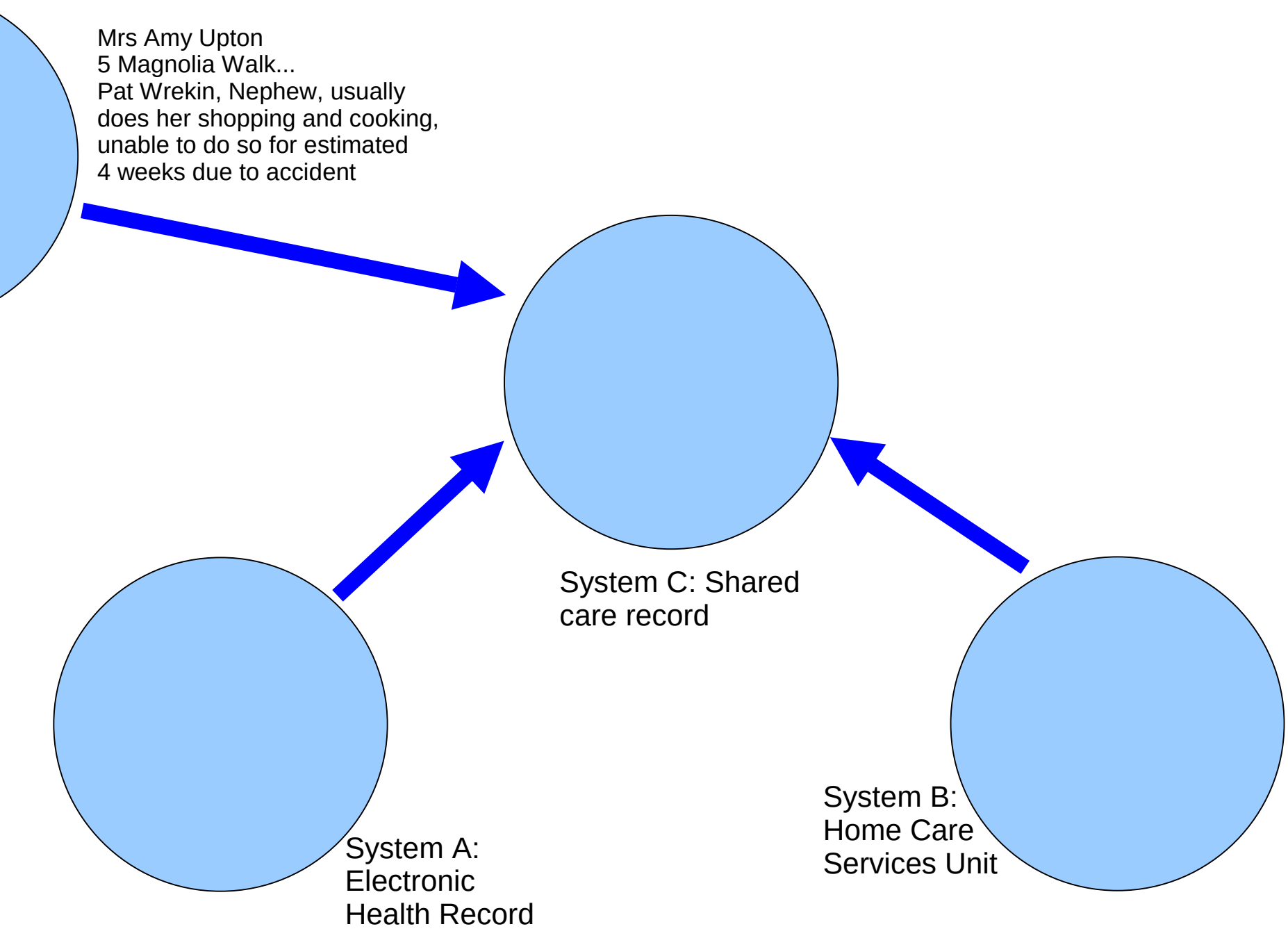


Mrs Upton is being cared for by both health services and social care services. They share information, and know that Pat does her shopping and cooks for her.

In our ideal world, Pat Wrekin's GP sends a message to Mrs Upton's local social care team to advise them of the new situation.


System C: Shared care record
System A: Electronic Health Record
System B: Home Care Services Unit


1000100100
Amy Upton, Mrs
5 Magnolia Walk...
23 February 1921
Heart problem...
Difficulty walking...
[and much more...]
System A:
Electronic
Health Record
System C: Shared
care record
Mrs Amy Upton
5 Magnolia Walk...
87, frail, difficulty walking
Home help...
Nephew does shopping...
System B:
Home Care
Services Unit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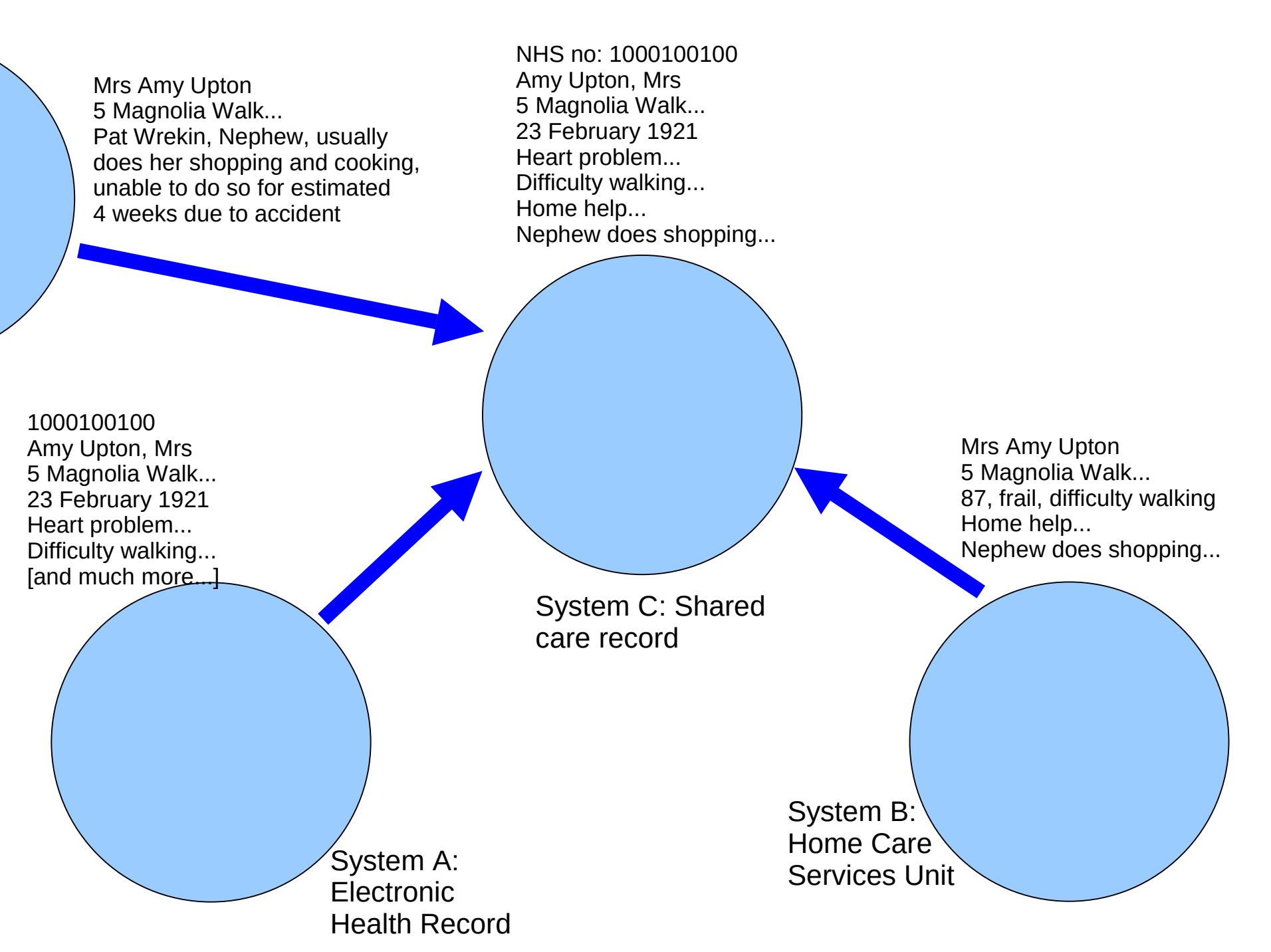
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Mrs Upton's Shopping

- All this can be stitched together using secure record exchange services with various summary records as payloads
- At least in the UK, the major blockers are not technical but social-political
  - Who pays for what
  - Who is allowed to see what
  - Who is afraid of what

Thank you for your attention

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