GS1 supporting integration through interoperability and open standards

World Beating Care Through Digital

Dr Chris Johnson
Chief Medical Information Officer

Andrew Raynes MSc
Director of Digital and
Chief Information Officer (CIO)

@Royalpapworth
Meet the team
Papworth - Our History...

1979  First open heart transplant
1982  Papworth starts coronary angioplasty
1984  Europe’s first successful heart-lung transplant
1985  World’s first transbronchial biopsy to detect rejection in lung transplants
1986  World’s first heart, lung and liver transplant
1991  First implantable cardiac defibrillator
1992  First Ventricular Assist Device operation
1994  Adult Cystic Fibrosis Centre opens
2001  UK National Centre for Pulmonary Thromboendarterectomy opens
2006  UK’s first beating heart transplant
2010  First subcutaneous implantable cardiac defibrillator
2011  UK’s first Total Artificial Heart patient discharged home
The UK’s first successful heart transplant patient

Keith Castle following surgery performed by Sir Terence English
How times have changed...

1983, L Ritchie

Lionel Richie “Hello....I just want to let you know...cause I wonder where you are and I wonder what you do”

2018, B Young

“Really I'm lying girl you know I just want your number, You better 079 me, 079 me, 079 me Girl I see you change your picture 'pon your WhatsApp” (‘pon meaning on / upon)
Our new Hospital

• Five operating theatres, five catheter laboratories (for non-surgical procedure) and two hybrid theatres
• Six inpatient wards, 310 beds, including a 46-bed critical care unit and 24 day beds
• Mostly en-suite, private rooms for patients
Lorenzo EPR – Success or struggle...

- Implemented Lorenzo with full EPMA in under 7 months
- Digitised over 1m Clinical documents
- Reduction in missed doses reported on Trust incident reporting system.
- Reduced administrative and Pharmacy time for example completing forms and performing admin tasks at £42K per annum.
- Reduced patients length of stay - 130 bed days saved
- Reduced our carbon footprint by £1594
- Integration and interoperability through a new Order Communications System (Requests and Results) - interfacing with 4 systems including EPIC through our TIE Viaduct and use of bar code technology.
- Lorenzo Digital Exemplar
Electronic Prescriptions & Medicines Administration (EPMA)

Implemented as part of the Lorenzo EPR Programme in June 2017

Whole site approach
- inpatient and outpatient areas paper-free prescribing,
- First of type
- First organisation to use the Lorenzo infusions prescribing module

Integrated decision support
- Bespoke clinical decision support with conflict-based warnings for drug interactions, duplication, and contraindications

Audit trail
- Prescription and administration details clear and easily attributed to user

Downtime drug charts
- Printable drug charts available in case of system down time,

Processes improved
- Discharge prescribing process streamlined,
- Routine chart re-writes no longer required
Requests and Results (Order Comms)

- A huge challenge... Decommissioning ICE and a 4 way integration
- Requests and Results (order comms) 7 Months
- Enables requests and acknowledgement of Radiology and Lab results
- In Tray functions means rapid and easy acknowledgement
- Uni Directional interface with EPIC
- Bar codes saving time with Lab staff reducing the need to type rather scan bar codes and entered direct on to EPIC
- Bi-Direction interface from EPIC to Lorenzo
Pathology Positive Patient ID pathway (PPID)

Lorenzo R&R → Results mapped to correct patient → Sample resulted and authorised → CIS Metavision (Critical Care system)

Patient identified at the bedside using GS1 barcoded wristband. → Patient confirmed as correct and sample taken → Papworth Winpath Pathology LIMS

Is this a Papworth sample or a CUH sample? (Barcode defined)

Papworth → CUH

Sample booked into LIMS using barcode → Samples booked into CUH Epic Beaker LIMS

CUH staff scan bar code to verify patient ID and tests required → Sample resulted and authorised
<table>
<thead>
<tr>
<th>Stage</th>
<th>Cumulative Capabilities</th>
<th>15/16</th>
<th>16/17</th>
<th>17/18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 7</td>
<td>Complete EMR integrates all clinical areas (e.g. ICT, ED, Outpatient) displacing all (Medical) paper records in the hospital; Continuity of Care standards to exchange data, Data Warehouse used as basis for clinical and business analytics.</td>
<td>🟠🟠🟠</td>
<td>🟠🟠🟠</td>
<td>🟠🟠🟠</td>
</tr>
<tr>
<td>Stage 6</td>
<td>Clinical Documentation interacts with advanced Decision Support (based on discrete data elements) AND Closed Loop Medication Administration</td>
<td>🟠🟠🟠</td>
<td>🟠🟠🟠</td>
<td>🟠🟠🟠</td>
</tr>
<tr>
<td>Stage 5</td>
<td>Integrated Image Management Solution (e.g. PACS) displaces all film-based images throughout the hospital</td>
<td>🟠🟠🟠</td>
<td>🟠🟠🟠</td>
<td>🟠🟢🟢</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Electronic Ordering provides Clinical Decision Support (based on rules engines) in at least one clinical service area and/or for medication</td>
<td>🟠🟠🟠</td>
<td>🟠🟠🟠</td>
<td>🟠🟢🟢</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Clinical documentation as well as Electronic ordering of Physician and/or Nursing care services; includes tracking of Medication Administration (eMAR)</td>
<td>🟠🟠🟠</td>
<td>🟠🟠🟢</td>
<td>🟠🟢🟢</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Clinical Data Repository/Electronic Patient Record allows collection and normalisation of data from disparate clinical sources throughout the hospital</td>
<td>🟠🟠🟠</td>
<td>🟠🟢🟢</td>
<td>🟠🟢🟢</td>
</tr>
<tr>
<td>Stage 1</td>
<td>Information Systems for major ancillary departments (Laboratory, Radiology, Pharmacy) are installed or data output from external service providers are processed electronically</td>
<td>🟠🟢🟢</td>
<td>🟠🟢🟢</td>
<td>🟠🟢🟢</td>
</tr>
<tr>
<td>Stage 0</td>
<td>Information Systems for major ancillary departments (Laboratory, Radiology, Pharmacy,) are not installed or data output from external service providers cannot be processed electronically</td>
<td>🟠🟢🟢</td>
<td>🟠🟢🟢</td>
<td>🟠🟢🟢</td>
</tr>
</tbody>
</table>
Turn tradition on its head – try new stuff

1. What if we empower the patient?
   - Self-service...
   - Patient portals
   - Patients on-line and visualise process
   - Patients use self service Kiosks
   - Text alerting with responsibility
   - Wifi and entertainment

2. What if we use technology to help signpost citizens out of the system?
   - Connected care and interoperability
   - Advice and Guidance and educating public on services
   - Telemedicine
   - Audio visual technology
   - Unified communications
   - Decision trees/support (Watson) best use of resources

3. What we can learn from retail?
   - Access
   - Track and trace reduces waste
   - Maximise activity
   - Person, Product, Place
   - Use what you need and replenish (automation)
   - GS1 Barcode standards

- Capacity vs demand
- Growing elderly population
- RTT and Performance Targets
- Pressure across the care System
- Financial pressures
Infection Droplets and Droplet Nuclei travel lengths

1-3 Feet  3 -5 Feet  5 -160+ Feet
15 air changes per hour in rooms and adjacent corridors
GS1 Focus

- **Nurse led** Steering Group
- **Road map** for core enablers

Focus Priorities for the new Hospital
- Location numbering
- RFID Asset Management Medical Equipment
- Patient wristbands
- Staff swipe cards
- Smart fridges
- Blood track
- Interoperability
Vendor Neutral Connectivity
• Support for FHIR, API, IOT and non-compliant applications via virtual data integration

Store, Parse & Index
• Build longitudinal patient record based on persisted and virtual data indexes
  • Schema-less data-store
  • Surveillance and alerting

API Gateway
• Portfolio of published API (FHIR)
• Build composite APIs and applications based on internal API and external APIs.
• Data Stewardship and Governance

Innovate Without Lock-in
• Exploit connectivity to broad spectrum of data services
• Enable Digital enterprise landscape
• Curated data for upstream value
Royal Papworth Hospital Today

- First open heart transplant in 1979
- 100th anniversary – 2018 is our centenary year
- 98% of our patients said they would recommend us to friends and family
- First centre in UK to offer Baloon Pulmonary Angioplasty (BPA) for treatment of pulmonary hypertension
- Over 100 heart and lung transplants and a record 5 heart transplants in 36 hours
- Royal status received in 2017
- Launch of a new Digital Strategy
- Lorenzo as our EPR, EPMA and Order Comms in 14 months and integration with EPIC through our Viaduct TIE – A UK first!
- Film launched in 2018

New state-of-the-art hospital opens next month!
GS1 supporting integration through interoperability and open standards

World Beating Care Through Digital

Dr Chris Johnson
Chief Medical Information Officer

Andrew Raynes MSc
Director of Digital and
Chief Information Officer (CIO)

@Royalpapworth