Digital Transformation of the Health Ecosystem

Azeem Akhtar
CTO & Head of Design Team

4th November, 2014
BT is one of the world’s leading communications services companies, serving the needs of customers in the UK and in more than 170 countries worldwide.

- Providing high quality telecommunications services since 1846
- Revenues of more than £18bn in 2012/13
- 89,000* employees globally
- £544m investment in global research and development in 2012/13
- Relationships with 25 universities globally, including Cambridge, MIT, Khalifah and Tsinghua

BT was the official communications services partner for the London 2012 Olympic and Paralympic Games. We carried every call, byte of data, image and sports report for the Games.

A long track record of acting responsibly and supporting the communities to whom we deliver services.

We remain highly ranked in the Dow Jones Sustainability World Index achieving in 2012 a 92% rating, our best ever score.

- One of the largest technology investors in R&D in the UK
- A total worldwide portfolio of more than 4,300 patents and applications
- BT has invested more than £3.8bn in R&D over the last five years
- More than 17,000 scientists and technologists
- Global development centres in the UK, India, & Malaysia
- R&D and innovation centres in the UK, US, UAE, India and China
- Dedicated innovation-scanning teams covering the US, Asia, Europe and the Middle East

* Equivalent full-time employees including both full and part time employees
BT Global Health: Our History of Innovation in Health

- Installation of first telephones in hospitals (1880)
- Life pager service for organ recipients (1948)
- Began delivering a national infrastructure for the NHS (1985)
- Creation of one of world's biggest databases for the NHS (2003)
- Patient information on the move (2005)
- Built a Virtual Private Network to connect the NHS (2007)
- Bringing benefits of telehealth to patients with chronic conditions (2010)
- Offering digital hospital solutions to customers around the world (2011)
- Patient information on the move (2013)
What solutions do we provide?

Bringing together a broad portfolio of services into an integrated solution
### Digital Transformation of the Health Ecosystem: *Some hospital fundamentals*

**A Typical Hospital:** 6 Major Capabilities, 140 Service Lines

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**3rd Party Systems Access**
- Building Security
- CCTV / Surveillance
- Guarding
- Identity and Access Management
- Patient Systems Access
- Patient Systems Access (PHR)

**Staff Safety**
- Staff Systems Access
Digital Transformation of the Health Ecosystem: BT’s Core Capabilities Connect Care

Connecting Care
## WHY A DIGITAL HOSPITAL?

Skyrocketing medical cost, higher patient expectations, reduction of errors are pushing for building digital hospitals across the globe.

### Key Benefits

- Patient Safety
- Operational Efficiency of Hospital
- Reimbursement Management (Revenue Cycle)
- Consumer Impact (Patient Satisfaction)
- Physician/Staff Recruitment and Retention
- Best use of Capital Resources
- Competitive Advantage
- Regulatory Compliance
- Improved Employee Productivity

### Driving Factors of Digital Hospitals

- Skyrocketing medical costs
- Higher patient expectations
- Reduce risk of error while moving towards digitization of medical information
- Growing need to move away from paper work
- Reduced waiting times for patients
- Comply with increasingly stringent government regulation and legislation

### Inhibitors for driving the need for Digital Hospitals

- Security of computer systems
- Theft and hacking of medical data/Internet security
- 15% more expensive to build than local hospital
- Significant regulatory complexity
- Integration of multiple systems and technologies
What is a BT Digital Hospital?

- Integration of health ICT infrastructure into your new-build project at design stage
- Installation and configuration of communications and ICT infrastructure
- Design, build and test of your ICT infrastructure, ensuring readiness ahead of go live dates
- Systems integration of facilities management, building management and clinical information systems
- Security protection and risk management of your health ICT assets
- On-going day-to-day management of your ICT environment
- Integration of new health ICT products and services into existing care environments
Digital Transformation of the Health Ecosystem: BT's Digital Vision

Hospital and Health System Challenges:
- Access, Affordability, Safety, Quality, Sustainability
- Must adapt to many shifting but coalescing factors,
  - Ageing populations
  - Changing patterns of disease & chronic disease
  - Mobile health care workforce
  - New medical technologies and pharmaceuticals,
  - Increasing public and political expectations

ICT Infrastructure Foundation – Flexible, Scalable, Adaptable, Future-Ready + Interoperability / Systems Integration

Core BT Products
BT Digital Hospital: *The solution set defined by benefits*

The Compounding Effect of Layered Efficiencies enabled by ICT

**Operational Efficiencies**
- Automate everything that you can
  - e.g. AGVs (Automated Guided Vehicles) / Robots for laundry, food
  - RFID/RTLS Asset Management

**Clinical Efficiencies**
- **EMRs; BYOD:** BT Vocera Paging System
- Pharmacy automation and Closed Loop Medication Management
- Telemedicine / videoconferencing between doctors, specialists and patients reduces the need to travel, improves stroke outcomes etc.
- RFID/RTLS Patient Management

**Smart Building Efficiencies**
- **Bed/Room management** – power down and alert for cleaning on patient exit - improved productivity etc.
- **Reduce Hospital-acquired infections** - Automatically monitoring and maintaining humidity, ventilation, air pressure, and HEPA filters in real-time, temperature and humidity conditions to prevent mould, fungi, and bacteria, and dust contaminants

**Innovative Technology Efficiencies**
- Analytics
- Innovations in other industries - can be adapted for health
- Airlines - check-in online,
- Fitness – wearable biometric devices e.g. ’fitbit’ for post heart attack rehabilitation / improved fitness measurement etc.
BT Digital Health Transformation ‘Roadmap’

‘AS IS’ to FUTURE STATE ASSESSMENT
Assess an existing Hospitals systems, processes and IT
‘Roadmap’ Transition Process to a new state

- Understand the current environment
- Compare to BT Digital Health Blueprint
- Identify steps and maturity

Use the Maturity Model to assess state
Use the blueprint to scope

Design & Plan
Design new environment
- Plan business and ICT change
- Create Incremental change plan

Execute & Transform
Implement and execute to plan

Open the doors to the ‘new’ hospital

People
Processes
Technology

Current State
Assess & Identify

New Health Service

© British Telecommunications plc
Maturity Model

The Maturity Model not only sets out a vision of where health is heading, but also provides a way for the Hospital to be scaled and scoped.

<table>
<thead>
<tr>
<th></th>
<th>A: Fragmented</th>
<th>B: Basic</th>
<th>C: Complex</th>
<th>D: Digital</th>
<th>E: Extending</th>
<th>F: Full</th>
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<tbody>
<tr>
<td><strong>EPR/HIMS</strong></td>
<td>Point systems</td>
<td>PACS and nursing documentation, basic EPR</td>
<td>Closed loop medication, structured documentation</td>
<td>Complete EMR, CCD based</td>
<td>Optimised against demand</td>
<td>Services traded across health information fabric</td>
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<tr>
<td><strong>Corporate</strong></td>
<td>Minimal basic systems</td>
<td>Standard corporate systems, limited BI</td>
<td>Common access and basic collaboration</td>
<td>Service oriented</td>
<td>Service as Asset</td>
<td>Integrated Value and Analytics</td>
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<tr>
<td><strong>Facilities</strong></td>
<td>Local Procurement</td>
<td>TCO based procurement</td>
<td>Integrated combined workflow</td>
<td>Optimised as service</td>
<td>Fully Integrated</td>
<td>Patient Centred 'invisible Jeeves'</td>
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<tr>
<td><strong>Patient Experience</strong></td>
<td>None</td>
<td>Basic entertainment</td>
<td>Full web services</td>
<td>Integrated across provider services</td>
<td>Integrated with home and telehealth</td>
<td>Active personal avatar supporting patient's desired outcomes</td>
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<tr>
<td><strong>Telehealth</strong></td>
<td>Point service, telecare only</td>
<td>Point service, some telehealth</td>
<td>Full basic services, some teleconsultation</td>
<td>Risk stratification services, Assisted Living</td>
<td>Dynamic provision of diagnosis and care</td>
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<tr>
<td><strong>Security</strong></td>
<td>Independent and fragmented</td>
<td>Formal policy, inconsistent implementation</td>
<td>Proper information risk strategy, ISO27K ISMS implemented</td>
<td>Common rules, federated trust networks, standard rules-based sharing</td>
<td>Move from provision of standard services to 'orchestration' around demand signals</td>
<td>Move from provision of services to contracting for outcomes based on personal choices</td>
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<tr>
<td><strong>Interoperability</strong></td>
<td>Paper based request and fulfilment</td>
<td>Critical core systems exchange data (usually clinical only)</td>
<td>Exchanges flow across health economy including analytics</td>
<td>Collaboration and Optimisation across multiple providers</td>
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<tr>
<td><strong>Analytics</strong></td>
<td>Local processes, manual reporting</td>
<td>Local BI and dashboards</td>
<td>Full comparison and benchmarking with drilldown. Local optimisation</td>
<td>Scale collaboration across organisations and geographies</td>
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<tr>
<td><strong>Universal Comms</strong></td>
<td>Basic separate systems</td>
<td>Increased use of messaging</td>
<td>Suite of capabilities available, tendency to revert</td>
<td>Dynamic collaboration, behaviour adapting</td>
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<tr>
<td><strong>Network and Infrastructure</strong></td>
<td>Local procurement and implementation</td>
<td>Static' networks, racked managed servers</td>
<td>Fluid network and servers 'as a service'</td>
<td>Integrated, instrumented infrastructures</td>
<td>BT Commercial in Confidence – Not for Distribution</td>
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At BT we have a powerful vision to help you deliver healthcare that connects
BT Trace – RFID/RTLS
Cut medical equipment inventory by up to 10%

Do more with less

- NHS Worcestershire Health
- BT's asset tagging system helps them keep track of 6000+ pieces of medical equipment, worth millions.
  - From specialist beds to ultrasounds.
- Staff don't waste hours hunting for equipment so patients gain.
- Reduced asset inventory by up to 10%.
- Estimate a 20-30% saving in bed rental costs.
- Less risk of theft.
AGVs (Automated Guided Vehicles) / Robots

Fiona Stanley Hospital
Laundry and Food/Meal/Catering Services

Benefits:

- Transportation of meals, linen and other e.g. documents, waste
- 24 hours a day, seven days a week
- Increase operational efficiency
- Reduces wages/dependence upon manual labour
- Allows you to focus on your core business, provide good healthcare.

- Efficient automated material flow
- Negotiates multiple-floor facilities with narrow aisle-ways and human traffic
- Utilises existing right-of-ways
- Heavy weight lifting capability
- Easily reconfigure changes in layout or function
BT Managed Vocera Solution

Enables healthcare professionals to contact each other instantly, anywhere in the hospital

Sherwood Forest Hospitals NHS
- Voice activated, wearable badge.

- By simply saying a person’s name or department, doctors and nurses are automatically connected with the appropriate person
- Can speak to them just as they would using a normal telephone.

“One of the key benefits of the BT solution is its use in improving efficiency. In particular, in A&E, we have been able to move patients more quickly into admitting departments, using the system to communicate between A&E and the site co-ordination staff.”

- Jeffrey Worrall, CEO at Sherwood Forest Hospitals NHS Trust
BT Blood Tracking Solution

End-to-end electronic control of blood administration

John Radcliffe Hospital, Oxford

• Eliminates errors
• Bar-coded labels and handheld computers with built-in scanners and printers to ensure accurate electronic blood group matching.

• Reduced costs
• Enabling front line staff to spend more time with patients.

“The BloodTracking system helps to provide better patient care, because you can use the handheld computer at the bedside to check the process. Previously, two nurses conducted transfusions, but now we only need one.”
Amanda Davies, Senior ICU Nurse, John Radcliffe Hospital, Oxford

The John Radcliffe Hospital was awarded the top prize for this solution at the 2007 Government Computing Awards for Innovation.
Pharmacy Automation / Robots and Closed Loop Medication Management System

Fiona Stanley Hospital

Benefits:

- Safer care – ~50% reduction in medication errors
- Substantially increased productivity
  - Reduces substantially number of steps and time (>50%) required throughout medication process for all providers
- Improved inventory management
  - ~ up to 30% reduction in inventory
- More time for direct patient care/ Increased staff satisfaction
  - Relieves nurses of administrative work
- Clinical analytics - improve patient outcomes from system data
- Incident and Risk Management - Monitoring/Audits
  - Efficient and secure alternative to manual tracking methods, providing real-time data for diverse audits.
  - Reporting of near misses, actual errors and adverse drug reactions
Smart Patient Rooms/ Bedside ‘Everything’ Console

Fiona Stanley Hospital

Benefits: Patient-centered, improving the patient experience by helping patients take a more active role in their own health care

- Enables the patient to do everything from
  - controlling the room’s lighting etc.
  - to speaking directly with a nurse when needed.
- Entertainment (TV, video games, internet)
- Patient education sites to learn more about a health condition or a pending procedure.
- Dietary services and order their evening meal.
- Appointments and reminders will automatically be displayed at the beginning of the day e.g. MRI scheduled 10 a.m. and Physiotherapy at 1 p.m.
- Video conferencing
  - Patient can visually interact with family and friends.
  - Physician to consult with outside specialists, conduct “rounds” from a patient room, and stream video into a medical school classroom where students can ask questions.
Electronic patient records at your fingertips in seconds

Particularly for anyone with a life-threatening condition

Haemophilia Centre team at Barts Health NHS Hospital

• Critical patient data ‘at your fingertips’

• Productivity – time savings, safety

• For nearly a decade, our electronic patient record systems have been helping to put an end to the paper chase whenever care teams need to locate, share, update or act on patient information fast.

• Clinicians have records in an instant at point of care. For more informed decisions, a better patient experience and better outcomes.
BT One Collaborate conferencing
*Speed up patient discharge times*

The Whittington Hospital NHS

- BT One Collaborate audio conferencing brings together healthcare and social care teams fast for 25 patient reviews a day.
- Patients feel better: there's less hanging around.
- Beds are better utilised.
- Less travel for care providers - it's greener too.
- From one of London's slowest hospitals in patient discharges to fourth best.

"Using BT One Collaborate we have freed up **830 bed days over two years**, saving the Hospital approximately £307,000."

*Jar O'Brien, Islington Community Rehabilitation Services team lead, The Whittington Hospital NHS Trust*
Telestroke Service - BT high definition video-conferencing
*Remote diagnosis saves lives*

5 hospitals in and around Surrey

- Videoconferencing from BT means they can
  - View,
  - Diagnose and
  - Treat patients *from almost any location 24/7.*
  - Fast.

- Best chance of survival and recovery.
- Same ‘care-at-a-distance’ technology can be used for other clinical specialties.
- During the first few months the Telestroke service was used 50 times effectively allowing Adrian Blight, lead consultant for stroke medicine at the Royal Surrey County Hospital, to be at his patient’s side even though he was at home 20 miles away.

“NHS estimates suggest that care costs for each stroke patient average £60,000 over ten years. By improving patient clinical outcomes the Telestroke service will be a major contributor to NHS cost savings.”

*Colin Lee, senior project manager, NHS Surrey*
Chronic Disease Management – Telehealth
Hospital Outreach

NHS Wakefield District

- Patients with Long Term Conditions feel more in control and confident - reduces stress
- Link from their home to their care team 24/7 to monitor their vital signs.
- Integral videoconferencing helps everyone meet face to face.
- Easy to use in-home devices
- Reduces repeated trips to GPs' surgeries and clinics and unnecessary hospital admissions.
Smart Buildings Technologies / “Intelligent” facility systems

Fiona Stanley Hospital - Benefits:
Improve patient safety and quality of care, and a secure hospital environment.

- **Systematically reduce preventable adverse events** resulting from
  - **Hospital-acquired infections**
    - Automatically monitoring and maintaining humidity, ventilation, air pressure, and HEPA filters in real-time, temperature and humidity conditions to prevent mould, fungi, and bacteria, and dust contaminants
  - **Power losses**
  - **IT glitches** that prevent access to electronic health records and patient identification systems. It will also explore the key areas of patient
  - **Hospital violence**
    - video surveillance, access control, panic buttons, and integration with visitor management and identification databases
- **Sustainability – reduced carbon emissions**
  - Hospitals are often the biggest single energy consumers, and therefore emitters of carbon, in a city.¹
  - **Bed/Room management – improved productivity etc.**

¹BT Health
BT Analytics and Big Data – Health System Planning and Operational Management
Secondary Uses Service (SUS) – UK NHS

• One of the largest enterprise data warehouses in the world
• In the top 3% by size and number of users

• On peak days, SUS processes 166 million transactions from over 350 different NHS organisations to create standard and bespoke reports

• £34 billion worth of transactions to healthcare providers each year

• Answers to business questions such as:
  - Referral patterns
  - Readmissions by provider
  - Costs by Primary Care
  - Volumes of Emergency / Elective / Day case Admissions
  - Delayed discharges by destination
  - Population analysis

BT is now building a new cloud-based ‘Analytics As A Service’ offering