An Introduction to Medical Devices Connectivity -
The St George’s Experience

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What are bioengineers good at?

High level

Low level
Clinical connectivity for engineers

- Is the medical device broken? I can fix it.
- Do you need a cable? I can make a cable.
- Are you seeing data at your end yet?
- That will be 23p for the solder please.

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2 RS232 connector
9-way D-type socket (reserved for future use)
What are IT departments good at?

High level

Low level
Clinical connectivity for IT teams

- The project will be lean, Six Sigma, agile, kaizen, just-in-time and our Black Belt scrum masters are at the ready
- Limited resources until project funding comes in
- A culture of robust testing and controlled deployments
- Clinical environment is unfamiliar so we ask for help with that
1. Scan the patient’s wristband
2. Use the machine to measure the patient’s HR, BP, SpO$_2$ and temperature
3. Enter the remaining observations directly onto the screen of the Connex VSM.
4. Send the whole set of observations to the electronic patient record
Complement the delivery of major projects

Enhance clinical provision by delivering smaller improvement projects

Act as expert for connected medical equipment and software
Conventional approach to information projects

- Mandatory and statutory (e.g. GDPR)
- Commission new project
- Deliver project
- Organisational aims (e.g. paperless)
- National projects (e.g. NHS Digital)
Opportunity for better workflow
Opportunity for improved patient safety
Opportunity for cost saving

Bottom-up approach

Design solution → Engage IT → Deliver project
Bottom-up: no job too small
IT hardware

- Approved model
- Up-to-date, secure OS
- Sits on our domain
- Gets regular updates

Medical device

- Best device for the job
- Carefully maintained
- All risks managed

IT

Looks like a PC to me…

Old, insecure OS
No AV
No updates

You can’t change those

Don’t touch. It’s a medical device!

Then turn it off!

Engineering
Person specification

• A broad understanding of medical devices
• Computing skills: hardware, virtualisation, networking
• Knowledge of cybersecurity and data governance
• HL7 and DICOM
• Basic coding and scripting skills
• A practical approach to project management
• Confidence?
71% of employees are using apps not sanctioned by IT

Shadow IT

THE DANGERS OF SHADOW IT
Shadow IT can be a force for good, driving innovation and enabling business agility. But unregulated IT projects can be expensive and dangerous.
<table>
<thead>
<tr>
<th>Shadow IT...</th>
<th>Medical devices connectivity must...</th>
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<tbody>
<tr>
<td>is cyber-insecure</td>
<td>follow best cybersecurity practice where possible Risk-assess and control if necessary</td>
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<tr>
<td>disregard data governance</td>
<td>take responsibility for all aspects of data governance, with DPIAs approved at organisational level</td>
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<tr>
<td>contaminate networks and interfaces</td>
<td>work with IT to ensure networking resources are allocated properly</td>
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<td>without regard to proper project management</td>
<td>run projects robustly and transparently, with excellent documentation</td>
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What we’ve done so far

• Received, triaged and working on over 50 new project requests per year
• Support for several major clinical systems (including Philips IntelliVue monitoring) and their interfaces
• Assisted research projects with clinical data collection
• Developed complex applications to support medical device training

Future work

• Supporting medical equipment management with innovative solutions (RTLS; GS1)
• Site-wide dashboarding
• Forensic clinical data
Connectivity team 2019

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