Abstract

Hospitals across the country face the same reoccurring problem: tracking and effectively managing high volumes of mobile medical devices. In the case of a MEL, the need to manage hundreds, often thousands, of assets and loan requests every month is a constant challenge. Inevitably, the complexity of these issues often compromises efficiency, safety, patient care and risk management.

This white paper explores how radio-frequency identification (RFID) technology can provide a viable and effective way to manage mobile medical devices. After explaining how RFID works, it analyses in detail the benefits of using RFID to track and manage mobile medical devices. It also explains several myths and two key obstacles which have previously hampered RFID deployment in healthcare.

The white paper is supplemented with a detailed case study on the use of RFID technology at Cambridge University Hospitals NHS Foundation Trust. Dr Peter Jarritt, Clinical Director of Medical Physics and Clinical Engineering, explains the reasoning behind the use of RFID at Addenbrooke’s Hospital, and how sufficient funds were obtained. To assist decision making, the case study is supported with extensive data in relation to the benefits RFID is delivering.

Author


With input from

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Key definitions

**RFID** – Radio-frequency identification (RFID) is a technology which uses radio waves to identify, authenticate, track and trace objects or devices. RFID has two main components: a tag and a reader.

**Active tag** – A type of RFID tag which contains a long-life battery power source, allowing a radio-frequency signal to be actively transmitted at regular intervals.

**Proprietary reader** – The recipient for the radio-frequency signals transmitted by the active tag. Proprietary readers can be fixed point and/or mobile.
Section 1

The challenges of managing mobile medical devices

Hospitals across the country face the same reoccurring problem: tracking and effectively managing high volumes of mobile medical devices. Some trusts have set up a medical equipment library (MEL) to create a central pool of managed equipment while others have contracted this role out or choose to keep equipment ownership on a departmental basis. Whatever model is used, there is an obligation to ensure all equipment is clean and fit for safe patient use.

In the case of a MEL, the need to manage hundreds, often thousands, of assets and loan requests every month is a constant challenge. As well as loan requests, the MEL will need to manage cleaning and repairs, statutory maintenance (planned preventive maintenance or PPM) and Medicines Healthcare products Regulatory Agency (MHRA) recalls, making it vital to know the current location of every device.

However, thousands of mobile medical devices moving around a busy hospital environment, coupled with hundreds of staff vying for their use, creates a complex network of device tracking and management issues. Inevitably, efficiency, safety, patient care and risk management can become compromised.

The cost of losing mobile medical devices

Nurses waste significant amounts of time searching for devices. The majority (85 per cent) spend up to 60 minutes per shift searching for supplies including wheelchairs and infusion pumps.¹

Moreover, the average hospital loses as much as 15 per cent of its critical assets every year, leading to significant unnecessary costs relating to staff time spent searching for equipment, as well as purchasing new and renting additional equipment.² Devices that cannot be found on two consecutive occasions for maintenance are typically retired³ – often at a high expense.

¹ Cisco. 2009. The High Cost of Nurses’ Communication Challenges.
² ID TechEx. 2007.
³ RFID Journal Webinar, sponsored by IBM.
Difficulties in locating or obtaining devices can also create a vicious circle. It is not uncommon for staff to create a secret stash of devices for their own convenience, only to exacerbate all the associated problems of other staff being unable to locate devices when they are needed – whether it be for patient care or PPM.

More often than not, these challenges lead to significantly inflated costs stemming from multiple sources, such as high inventory, poor risk management, low efficiency and so forth. Figure 1 illustrates the intrinsically linked nature of this problem.

*Figure 1: The challenges of managing mobile medical devices*
RFID: A solution for managing mobile medical devices

Hospitals can no longer afford to buy new devices just because the existing supply is lost or misplaced. As a solution, radio-frequency identification (RFID) offers a viable way to manage mobile medical devices. RFID uses radio waves to identify, authenticate, track and trace mobile medical devices. The technology can also gather and store information about individual devices and their environment.

Although still a relatively recent introduction to the healthcare sector, RFID is ranked as the tenth most innovative technology of the past 25 years. The technology is mature in retail, transportation, logistics and other sectors with successful implementations providing a realistic understanding of its capabilities.

IdTechEx predicts the market for RFID tags and systems in healthcare will rise rapidly from $120.9 million in 2008 to $2.03 billion in 2018. The three broad drivers behind this growth include:

1. Demand for increased patient safety and quality of care
2. Organisational and financial considerations
3. The desire to lead and/or innovate

RAND Europe also describes tracking medical devices as one of the most promising RFID healthcare applications. Table 1 illustrates some typical applications for RFID technology in the hospital environment.

<table>
<thead>
<tr>
<th>Infusion devices</th>
<th>Beds</th>
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<tr>
<td>Scanners</td>
<td>ECG monitors</td>
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<td>Mattresses</td>
<td>ECG printers</td>
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<tr>
<td>Feeding pumps</td>
<td>Syringe drivers</td>
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</table>

How RFID works

RFID has two main components: a tag and a reader. There are two types of RFID tags: passive and active. Passive tags (Figure 2) have no internal battery and therefore require power from the reader to initiate signal transmission. Passive tags are used across many industries for security and asset management, allowing inventory systems to automatically sense when an item is being taken or returned. Although they offer many untapped and exciting benefits for the hospital environment, they are less suited to tracking high value mobile devices and therefore beyond the remit of this white paper.

Active tags (Figure 3) contain a long-life battery power source, allowing a radio-frequency signal to be actively transmitted at regular intervals. Depending on the type of tag, a network of WiFi access points or proprietary readers receive the signals, usually transmitted from a distance of tens of metres. The regular signal transmission provides up to date data, including the date, time and location where the equipment was last seen, as well as the battery status.

“There are two types of RFID tags: passive and active.”

Proprietary readers detect the radio-frequency signals transmitted by active tags. They comprise both fixed point readers and handheld personal digital assistants (PDAs) fitted with a compatible reader and software (Figure 4).

Fixed point readers detect tagged devices as they pass through a fixed point, such as a doorway. In contrast, PDAs are mobile and allow users to detect tagged devices as they move through the hospital. Once the PDA has collected the data, users can transfer it to the main database. This can be done either via the wireless network if it is in range or alternatively the PDA can use a USB connection to dock with a local PC workstation.
77 per cent of all healthcare organisations that invest in RFID choose active tags because of their suitability for medical device tracking.⁷

As well as tags and readers, RFID systems also include a database and software for processing the data. The software is typically integrated with other equipment management software for truly efficient and effective medical device management.

Using RFID, devices can be uniquely identified and located in a quick and efficient manner. Authorised users can perform ad hoc equipment searches and run reports from any local PC using the main database and a web-based application.

Active tags: WiFi access points or proprietary readers?

“...most hospitals do not have a sufficient WiFi infrastructure...”

Active tags transmit signals that can be received by either WiFi access points or proprietary readers. While WiFi access points offer flexibility, most hospitals do not have a sufficient WiFi infrastructure to support RFID requirements – and the cost of creating one is often prohibitive. A proprietary solution, comprising fixed and mobile PDA readers, therefore provides a cost-effective, viable alternative.

Benefits of using RFID to track and manage mobile medical devices

The benefits of using RFID technology to track and manage mobile medical devices are far reaching.

They can be categorised into four key areas:

1. **Cost reduction**
   
   Using RFID to track and manage mobile medical devices will reduce costs by:

   - **Reducing labour expenses** – RFID readers save a vast amount of time by automatically recording and managing data with no need for manual input.
   
   - **Reducing insurance premiums** – The implementation of RFID tracking can help achieve compliance with Section 11 of the Care Quality Commission’s Managing Medical Devices (QIPP and NHSLA) and achieve level 3. Maintaining a safer environment and lowering risk can in turn reduce insurance premiums.
   
   - **Reducing capital investment** – Improved device management, availability and utilisation reduces the need to invest in new equipment and additional inventory.
   
   - **Reducing loan equipment expenses** – Similarly, improved device management, availability and utilisation reduces the need to loan equipment to accommodate short-term demand.
   
   - **Reducing operational expenses** – Improved equipment utilisation means less equipment is required and greater value is obtained from existing equipment. By reducing the volume of equipment, the associated costs involved in management and maintenance can be reduced too.

2. Improved quality of care
3. Increased efficiency
4. Improved risk management

The benefits of using RFID technology
Avoiding lost and overdue rental equipment charges – Accurate tracking prevents rental equipment from being accidentally lost or forgotten about, which would incur high fees.

Avoiding fines – Prompt patient care in the accident and emergency (A&E) department is essential for avoiding costly fines. If equipment can be accurately and rapidly located, unnecessary delays can be easily avoided.

**Improved quality of care**

*Using RFID to track and manage mobile medical devices can help improve the quality of patient care by:*

- **Ensuring the right equipment is available where and when it is needed** – This is because RFID software provides excellent management and forecasting capabilities.

- **Ensuring equipment is clean and fit for purpose** – The RFID system will detect equipment in need of servicing, and even equipment recalled by the manufacturer. Asset history reports will further indicate where, when and for how long the equipment was last cleaned, allowing increased monitoring and control.

- **Reducing delays** – Accurate equipment location knowledge and an up to date maintenance system leads to more timely and responsive care through better coordination.

**Improved risk management**

*Using RFID to track and manage mobile medical devices can reduce the risks associated with healthcare provision by:*

- **Improving preventive and corrective maintenance** – RFID systems can be used to track critical information including when the device was last serviced, when the next service is due and so forth. It can therefore reduce/eliminate negligent clinical incidences arising from lapsed device maintenance.

- **Improving process and event audit capacity** – RFID systems facilitate rapid device auditing and in turn, allow equipment to be audited more frequently to demonstrate proactive risk management.

- **Improving regulatory compliance** – RFID systems minimise the circulation of potentially dangerous, unsuitable or unmaintained equipment and therefore aid compliance with section 11 of the Care Quality Commission’s Managing Medical Devices (QIPP and NHSLA).
Providing accurate data for decision making – Informed decisions to reduce risk can be made based on accurate, up to date and comprehensive data. Asset history data, for example, will show where the equipment has been, for how long and whether maintenance is overdue.

Improved monitoring of contract service providers – Comprehensive asset history data will reveal how long a tagged asset was in a certain area, such as cleaning or waiting for repair.

**Increased efficiency**

*Using RFID to track and manage mobile medical devices will improve efficiency in a number of ways:*

**Increases clinical operational efficiency** – An up to date database of the location of all tagged devices can be accessed from any local PC or PDA. The database indicates the date and location of where each device was last seen, which in turn eliminates time that would otherwise be wastefully spent searching. By publicly recording the device location, this feature also prevents clinical staff from deliberately hiding or hoarding equipment.

**Improves engineer efficiency** – Engineers can quickly and accurately collect data from around the hospital. RFID makes it easy to find equipment, eliminates handwritten (and often erroneous) serial numbers and the need to handle each piece of equipment individually. It also eliminates the need to search for device and serial numbers.

**Reduces time to audit** – Automatic auditing eliminates the need to manually input data and therefore saves a significant amount of time.

**Rapid management reports** – Asset and location history reports can be quickly and easily generated to help manage equipment more efficiently and effectively. For example, the movement of individual devices over a chosen time frame can be audited to verify where a specific device has been used, and even help forecast future demand.
RFID myths

Over the years, a number of myths associated with RFID deployment in healthcare have emerged, as explained below:

**Myth 1:** *A wireless infrastructure is essential for RFID*  
While WiFi RFID systems require an extensive wireless infrastructure, proprietary RFID systems do not. This means RFID can be used at all hospitals, regardless of what infrastructure is available.

**Myth 2:** *It is difficult to physically integrate parts of RFID technology (such as the tag) with the medical device*  
Many of the RFID tags available today are very small and specifically designed for attaching to all types of medical devices. Users have reported no problems in physically integrating RFID technology with the medical device.  

**Myth 3:** *RFID technology has limited portability due to the insufficient battery capacity of active tags*  
Technology has now advanced to the point that an active tag can benefit from more than 12 months of continuous use before the battery needs replacing.

**Myth 4:** *Integrating RFID with other systems causes errors*  
If the integration is carried out correctly, this is not an issue. RFID systems are successfully integrated with many other equipment management software programs.

**Myth 5:** *RFID involves high hardware and implementation costs*  
While this can be true for WiFi RFID systems, proprietary alternatives are low cost but equally adequate. As demonstrated in the Cambridge University Hospitals case study in section 2, a proprietary RFID system can be afforded even where the budget is substantially limited.

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8 Based on feedback from users of Harland Simon’s RFID Discovery system.
Obstacles to RFID deployment in healthcare

There have been two key obstacles to RFID deployment in healthcare: organisational and financial. The implementation of RFID in healthcare is still in its infancy. The early adopters, however, have all shown a desire to lead and innovate. More importantly, they adopted the technology at a time when very little sector-specific performance data existed.

Fortunately, solid evidence on the benefits of using RFID to track and manage mobile medical devices is now available. The business case for adopting RFID is therefore much easier to present.

Of course, the characteristically lengthy and often challenging decision making process within the NHS is likely to persist and hamper adoption. However, as highlighted in the case study in section 2 of this white paper, with creative thinking it can be overcome.

The case study also shows how a proprietary RFID system for tracking and managing mobile medical devices can be launched with a substantially limited budget. Alternatively, if preferred, finance from the RFID supplier may be available and presents an attractive, affordable option to proceed.

“As with the introduction of any new technology, RFID will lead to a change in working practices.”

As with the introduction of any new technology, RFID will lead to a change in working practices. These changes, however, will only serve to make tracking and management easier and often automatic. The change should therefore be widely welcomed. Providing the system has been set up correctly, there should be no integration issues.

It can be concluded that while organisational and financial obstacles have previously hampered RFID deployment, there is no reason why they should continue to do so in the future.
**Section 2**

RFID case study: Cambridge University Hospitals NHS Foundation Trust

**RFID at Addenbrooke’s Hospital**

Addenbrooke’s Hospital is a world-renowned teaching hospital in Cambridge, England. It is run by the Cambridge University Hospitals (CUH) NHS Foundation Trust, which is a member of the National Institute for Health Research.

**Key challenges**

In November 2011, Addenbrooke’s MEL decided to launch RFID. The MEL was frustrated by the chronic difficulties presented in managing thousands of mobile medical devices, and well aware of the untapped potential of RFID for healthcare.

**Addenbrooke’s RFID timeline**

- 2009 - 2011: Investigated various RFID solutions
- Oct 2011: Preliminary discussions took place
- Nov 2011: Decision to launch RFID
- Nov 2012: RFID Discovery integrated with equipment management software for efficiency
- Jan 2012: RFID Discovery tracking went live
Dr Peter Jarritt, Clinical Director of Medical Physics and Clinical Engineering, highlights that the key challenges faced by the MEL at Addenbrooke’s included:

- **Finding devices** – Attempts were time consuming and often unsuccessful
- **Poor equipment utilisation** – Value for money was not being obtained from capital investments
- **Low equipment availability** – It was difficult to match supply to demand because many devices were lost, misplaced, overdue for servicing or in need of repair
- **Inflated capital expenditure on new equipment** – New devices were being unnecessarily purchased to replace lost, misplaced, unusable or unavailable devices
- **Staff hoarding** – Staff were hoarding devices for their convenience, which was creating a vicious circle and only exacerbating the challenges
- **Staff borrowing** – Staff were frequently borrowing devices from other wards, which was causing havoc for the MEL
- **High rental charges** – From overdue and replacement fees because devices had been misplaced or lost
- **Infection control** – The absence of transparent equipment monitoring hampered efforts
- **Providing a high standard MEL service offering** – It was difficult to give wards and clinics the equipment they needed, when they needed it
- **Maintaining a high standard of patient care** – Providing devices in a timely manner was not easy

“We recognised that all of the above challenges were related and had to be managed as a process,” says Dr Jarritt. “We also saw the potential of maintaining an accurate, location specific inventory for assessing training needs and managing medical device training records within the trust. We knew the automation of this would save a significant amount of time and effort.”
Funding

900 devices were initially tagged, including infusion pumps, feeding pumps and syringe drivers. With no dedicated budget for RFID, the MEL allocated the necessary funding by using spare budgets from other projects.

Dr Jarritt explains: “RFID tags are widely used but hospitals are traditionally very backward in adopting new technology. Since it is always difficult to write a business case, we took a less conventional route and independently scraped together spare funds instead.”

“We opted for the highly affordable proprietary RFID Discovery solution from Harland Simon. Although entry level, it offered all the functionality we required and enabled us to kick-start the trial. The mobile PDA readers, which are provided with RFID Discovery and can be carried around the wards for auditing, were also ideal for the particular challenges we had.”

Addenbrooke’s MEL – Key facts

| 26,000 devices | Inventory |
| 900 | Initial number of tagged devices |
| 4,000 | Current number of tagged devices |
| 185,000 | Loan days per year |
| 37,927 | Loan deliveries and collections per year |
| Less than 14 mins | Average wait time |
How it works

RFID Discovery at Addenbrooke’s uses a system of fixed and handheld PDA readers to track tagged devices. Each medical device is fitted with an active RFID tag which transmits its unique identity several times a minute. As the devices move around the hospital, they are automatically tracked by strategically placed fixed point readers, which have a read range up to 30 metres. As soon as a device is detected, the central equipment database is updated.

Similarly, as medical engineers travel around the hospital, equipment searches can be run using the PDAs. The PDAs have a read range of up to 20 metres and record the date, time and location when they receive a tag transmission. This data can be uploaded to the main database using either the local WiFi or by using a USB connection to dock with a local PC workstation (Figure 5).

A key benefit of a mobile PDA is the fact that it can be used to detect equipment where it would not otherwise be seen, such as behind closed curtains, cupboard doors and even in patients’ bags.

Figure 5: RFID Discovery in practice

A web-based application allows users such as nurses and engineers to perform a location search to see the last known location of a device. History reports will also show where an asset has been over a defined timeframe.

The data collected by RFID Discovery helps improve device visibility and optimise utilisation to improve overall operational and financial performance.
The results and benefits

Simon Dawkins from the MEL at Addenbrooke’s meticulously analyses and monitors the data collected by RFID Discovery to improve the department’s intelligence and performance. The following 10 points touch on just a handful of the many benefits facilitated by RFID Discovery.\(^9\)

1. Increased device supply

Figure 6 shows a sharp increase in the number of units the MEL has been able to supply for a variety of devices between January 2011 and March 2013. The ability to supply more devices is the direct result of improved device management facilitated by RFID Discovery. In turn, other benefits are achieved, including increased device utilisation, reduced capital expenditure and an improved MEL service.

Figure 6: Device supply 2011-2013

<table>
<thead>
<tr>
<th>Month</th>
<th>Infusion</th>
<th>Syringe Driver</th>
<th>Feeding Devices</th>
<th>Monitors</th>
</tr>
</thead>
<tbody>
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<td>Mar 13</td>
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Please note all figures are illustrative only and are affected by an infinite number of variables, such as capacity, weather, staff, time of year and so forth.
2. Better device movement tracking

Figure 7 shows that in January 2011, the MEL tracked the movement and delivery of 1,526 devices. By March 2013, this figure increased more than four times to 6,333 devices as a direct result of efficient and effective device management. By tracking the movements of more devices, the MEL benefits from greater intelligence over device movement and use. This provides vital information for informed decision making.

Figure 7: Aggregate supply 2011-2013
3. Increased device movement

By enabling devices to be easily located, RFID has facilitated greater device utilisation (reflected in the increased movement) and in turn, greater value is being obtained from the investment made into each device. Figure 8 shows an increasing trend for device change/movement, specifically after the introduction of RFID Discovery in February 2012. Approximately 45 per cent of devices are now coming back to the MEL from a different location. Pre-RFID, Simon estimates this figure would have been just 6 per cent.

Importantly, RFID Discovery’s web-based application provides a clear breakdown of where devices have been and when. This provides vital information to make informed decisions about their use and allows demand to be better forecasted.

*Figure 8: Device movement 2011-2013*
4. Improved actual delivery ratio

The monthly delivery ratio relates to the number of devices being delivered. Any increase in this ratio may suggest an increase in device utilisation. By means of example, the monthly delivery ratio for infusion pumps in January 2011 was 2.5:1, where every infusion pump was being delivered 2.5 times. By March 2013, this ratio increased to 4.1:1.

An increase in device utilisation will bring a range of benefits, including increased value for money and reduced unnecessary capital expenditure.

Figure 9: Monthly ratio 2011-2013
5. Improved maintenance inspection

As shown in Figure 10, there is a clear upward trend in maintenance inspection rates between April 2012 and March 2013. Between November 2012 and March 2013 in particular, RFID Discovery has enabled the rate to plateau with 99 per cent of all devices managed by the MEL being inspected.

Maintenance is particularly important for risk management, infection control and the provision of a high level of patient care. The more frequently the MEL is able to inspect a device, the safer and more thoroughly cleaned it will be. A high inspection rate minimises the risk of contaminated devices circulating.

*Figure 10: Maintenance inspection rate 2012-2013*
6. Reduced capital expenditure

Simon estimates that the first year capital savings as a result of RFID Discovery are well in excess of £100,000. There are consequently dozens of examples that illustrate how RFID Discovery has enabled the MEL to reduce capital expenditure. Below is just one:

Moving mobile ECG monitors to MEL control

“The result is a lifetime capital cost saving of £92,000.”

The PPM/repairs of mobile ECG monitors was historically just 57 per cent. Many devices were unnecessarily out of use and underutilised, leading to an inability to match supply to demand. In turn, capital expenditure was inflated, as new monitors were frequently being purchased to cope with demand.

In March 2013, the management of the monitors was moved to MEL control. As a result, the department was able to use RFID Discovery to drive a series of changes, including wall mounting five existing monitors and better use of the existing supply. The result is a lifetime capital cost saving of £92,000.10

The one-off cost of tagging 500 ECG monitors was just £16,000. With PPM/repairs now at 90 per cent, the MEL is able to ensure supply consistently meets demand without investing in any new monitors.

7. Improved management of contractors

RFID Discovery can highlight some surprising figures in relation to the performance of contractors, and in turn be used to monitor and improve contract compliance.

In a recent example, unacceptable contractor performance was the key reason behind low device availability and in turn, substantial unnecessary capital expenditure. In another example, RFID Discovery was able to prove that a medical device had only been cleaned for 1 minute 30 seconds – a process that should take 7 minutes.

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10 There are also several other savings which have been made that are not included in the capital expenditure. These include tendering, administration, acceptance testing, ongoing maintenance and repairs, reduced training, etc.
8. Improved device management

Every MEL has to manage the issue of staff borrowing devices from a neighbouring ward without the device first returning for maintenance and inspection. The complications caused by this are huge. Before the arrival of RFID Discovery, such devices were liable to become lost or unfit for use.

As an example, demand for ECG printers from the MEL has recently been at an all-time high. Without RFID Discovery, the MEL would have purchased more ECG printers to be able to continue supply.

However, RFID Discovery revealed that two-thirds of the printers were in the wrong place. The problem was therefore not one of device numbers, but of devices being moved and, in turn, misplaced. By tagging all of the printers, the actions of staff become transparent and therefore open to monitoring. Lost or unfit for use devices can also be easily found.

Importantly, RFID Discovery additionally indicates which wards are using devices long-term, and therefore need to purchase their own rather than loan.

9. Quicker and more effective auditing

RFID Discovery has reduced the time it takes to audit the average ward at Addenbrooke’s from 1 hour 30 minutes to just 4 minutes. This enables more effective use of engineers’ time and facilitates more frequent auditing.

With a full site audit now taking place every week, risk management is significantly improved. Furthermore, forecasting abilities are strengthened, allowing demand to be proactively managed and a constant sufficient supply to be maintained.

10. Improved location accuracy

RFID Discovery has increased device location accuracy from 65 per cent to 92 per cent in just six months (between November 2012 and May 2013). Those who need to find a particular device can run a search using the web-based application on their local PC to save a considerable amount of time. For the A&E department in particular, this efficiency is vital for meeting targets and avoiding fines.

For a further brief case study on the benefits of using RFID Discovery to improve mobile medical device management, please refer to the PCAM case study in the appendix.
The future for RFID at Addenbrooke’s

The RFID Discovery system at Addenbrooke’s is now self-funding and clearly demonstrates the benefits it delivers to stakeholders. What’s more, further trials are currently running to see how else RFID Discovery can be applied to achieve additional device management benefits. These include a trial in four of the trust’s operating theatres to help reduce the cost of delays.

Simon emphasises how there is “no limitation” for the application of RFID in the acute hospital environment. By the end of the year, he aims to tag up to 10,000 devices with many more to follow.

Advice for other trusts

Approximately 26 trusts have already viewed the RFID Discovery system at Addenbrooke’s. Dr Jarritt explains: “RFID has a huge number of applications – especially for anything that’s costing money or creating risk. It is low risk, inexpensive and particularly vital for automated equipment management. Many, if not all, MELs could be improved by leveraging the benefits of RFID technology. My advice for other trusts considering implementing RFID is to think about the wide ranging applications and to just get on with it. Crucially, however, trusts often don’t have good data about how their equipment is used and therefore don’t know how big or significant the problem of tracking and managing mobile medical devices is.

“Many, if not all, MELs could be improved by leveraging the benefits of RFID technology.”

“Aside from all the benefits, improved equipment utilisation will almost certainly mean the equipment will need to be repaired more frequently and have a shorter lifespan. Good asset management is therefore essential, as is a quick repair system. In the future, it may even prove to be more cost-effective to lease equipment rather than purchase it. This is an area we are yet to explore.

“Finally, it is important to use the data and integrate it into the business processes to be able to make truly informed decisions. There is little point in collecting data only to do nothing with it.”
Appendix

Case Study
PCAM device management

PCAM devices are used for pain control for patients in recovery and on wards. At Addenbrooke’s, they are managed by the Inpatient Pain Service which had 85 on record at a cost of £3,500 each.

The problem

A key issue was that no data was available on where the PCAM devices were or went. Accordingly, the average time spent finding and collecting the PCAM devices across the trust was five hours per day at £15 per hour. This was costing the equivalent of £18,000 every year.

The monthly utilisation rate was 2:1, where each device was used twice a month.

The Inpatient Pain Service was presented with the following options:

Option One: Do nothing and continue with the current system costing £18,000 per year
Option Two: Buy 10 more devices at a total cost of £35,000 to ease the problem of finding devices
Option Three: Fit all PCAM devices with an RFID tag, at a total cost of £3,000 to ensure they can be easily located and managed

(Score 0 most unlikely to benefit- Score 5 most likely to benefit)

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
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<tbody>
<tr>
<td>Reduction in clinical incidences involving the device</td>
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<td>5</td>
<td>5</td>
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<tr>
<td>Improved device availability</td>
<td>0</td>
<td>5</td>
<td>5</td>
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<tr>
<td>Saving in clinical staff time</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Improved device turnaround</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Compliance with recommendations and guidance</td>
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<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Reduction in revenue cost for future equipment</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Cost reduction</td>
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<td>Decreased cost of fleet repair</td>
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<tr>
<td>Improved utilisation rate</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total score of benefits</strong></td>
<td><strong>5</strong></td>
<td><strong>18</strong></td>
<td><strong>43</strong></td>
</tr>
</tbody>
</table>
The solution

The decision was made to fit an RFID tag to each PCAM device (option 3). RFID Discovery was already on site and in use by the MEL.

The results

By choosing option 3, the trust is saving £18,000 a year in time spent searching for the PCAM devices. It has also avoided £35,000 of capital expenditure, which would have been a short-term fix to ease the problem of not being able to find devices when they are needed. As well as reducing labour expenses and capital expenditure, it is also achieving benefits including improved nurse efficiency and patient care.

With the RFID tags in place, the PCAM devices can be easily located and managed. Extensive automatically collected data also provides valuable information on where each device has been and for how long to support decision making.

Simon Dawkins of Addenbrooke’s MEL estimates the utilisation rate has increased from 2:1 to at least 4:1 and importantly, complaints and issues have dropped.

Addenbrooke’s Inpatient Pain Service would now like the MEL library to take over the control of all PCAM devices: “The MEL would be the best place for all PCAM devices, especially as Simon and his team have made such a positive impact on the day-to-day management with a significant reduction in complaints from clinical areas.”

Aside from the benefits the RFID tags are bringing, it should also be noted that it took several weeks of searching to find the PCAM devices. Nine of them have not been tagged because they cannot be found. This leaves a total of £31,500 unaccounted for.
About RFID Discovery

RFID Discovery from Harland Simon uses radio-frequency technology to track and manage mobile medical devices. As a proprietary system, it incorporates active tags as well as fixed and mobile readers.

The cost of a typical 1,000 tag start up system is approximately £65,000, with each tag costing £32.50. The typical monthly finance costs (if required) over three and five years are £2,100 and £1,400 respectively.

About Harland Simon

Harland Simon PLC is a specialist RFID supplier and systems integrator based in Milton Keynes. The company is a value added reseller partner for leading RFID technology and offers a range of radio-frequency technology for use in the healthcare sector. For more information, please visit www.harlandsimon.com, email sales@harlandsimon.com or contact Andrew James on 01908 276700.

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