

2Gether Support solutions

East Kent Hospital

RFID Case Study

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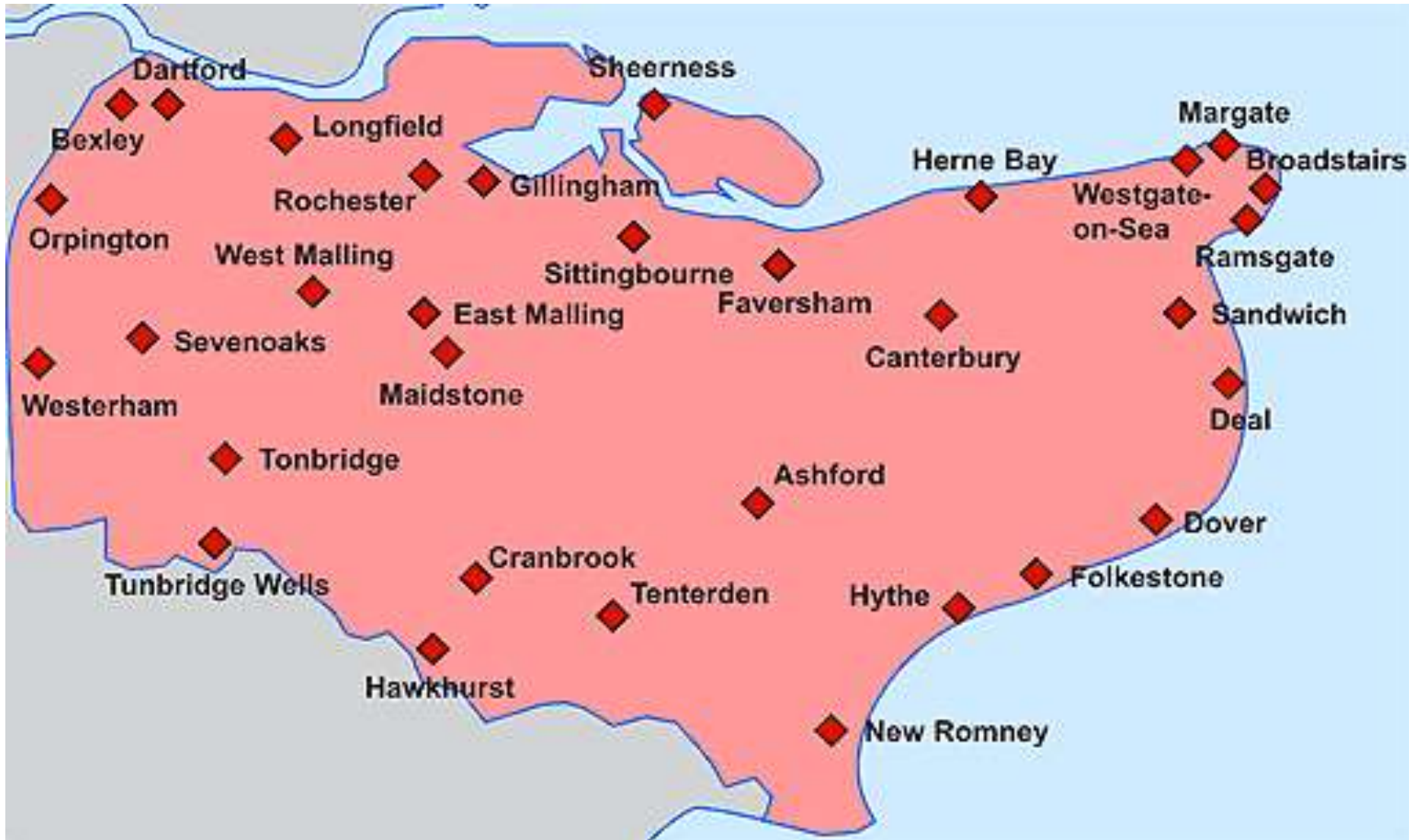
Head of Electronics, Medical Engineering & Radiology Maintenance

2Gether Support Solutions

East Kent Hospital University Foundation Trust

Clinical Engineering

Kent.... The Garden of England



East Kent Hospitals

East Kent Hospitals University Foundation Trust has a total of 1173 beds spread across three acute sites and 2 cottage hospitals.

William Harvey – Ashford

Queen Elizabeth the Queen Mother – Margate

Kent & Canterbury – Canterbury

Buckland Hospital – Dover

Folkestone Hospital - Folkestone

Ashford famous for Uumm..... Passing through to go to France



M20's Operation Stack & Project Brock



William Harvey Hospital

Largest of the Acute sites



City of Canterbury



Kent & Canterbury Hospital



Margate



Queen Elizabeth The Queen Mother Hospital



The Scale of my worries back in about 2014

Medical Engineering Managed about 21,000 medical devices across the 3 acute sites and 2 small satellite hospitals in Dover and Folkestone (48,000 Devices including Community contracts) with 35 staff



Then one day the CQC came visiting

Back in 2014 the CQC came to visit and kindly identified a few of issues around the Management of Medical Devices and I saw this as a time to invest in the future

The Problems were

- The trust expanding rapidly of sprawling sites
- Services optimised and Departments moved across sites so losing devices
- Under & Over utilisation of medical devices
- Lack of devices when needed/poor storage
- Poor standardisation of devices
- Preventative Maintenance falling well short of target (98%)
- Training associated with medical devices

Road to improvement across the trust

- Improvement & Innovation hubs
- Funding stream for more EME technicians
- Stronger, more accountable governance for Medical devices
- Buy in from all department regarding Maintenance
- Procurement of technology
- Importantly Getting IT involved and on board

Setting up of Equipment Library's

- Library's to be set up an 3 Acute sites
- Look at the Addenbrooks Hospital MEL Model
- Recruiting of Library staff
- Procurement of RFID Infrastructure and active tags
- Installing the RFID and IT Infrastructure
- Phased introduction of MEL'S
- Updating our ISO9001/13485 registration to include The Medical Equipment Library's

The big build starts



Addenbrooks Model

Site visits to Addenbrooks to meet with Simon Dawkins the Medical Equipment Library Manager

Learnt lots of small but essential tips on setting up the library and the processes of RFID tagging that were relatively new to the medical devices world

Recruiting for MEL's

- Recruited 3x Band 2 & 3x Band 3 Equipment library staff
- 3 Band 3 Associate EME Technicians
- 1 x Band 5 Equipment Library Manager

The RFID Journey

- Initial 3000 Active RFID tags
- Discussions as to what to tag for maximum gain
- Where to physically tag the device
- Location of Fixed active RFID Readers
- Integration of Harland & Simons RFID Discovery Database to Our Database Info Health's F2 V3.0

RFID Infrastructure

- Combination of fixed point readers and Hand Held PDA's
- Fixed readers in Workshops, Equipment Library's and Equipment Buffers stores
- Data fed back to the medical engineering data base and back end reports written

Phase 1 Active RFID Tagging started



What we Tagged

- Infusion Pumps
- Syringe drivers
- ECG
- Monitors
- Falls Monitors
- Sat's Machines
- Bed frames.....

Active RFID Tagging lessons

- Tagging Labour intensive as we were against a project clock.
- Essential that data was correct at entry as mistakes caused a few problems.
- Enabled our F2 database records to be audited at same time.
- **USE BAR CODE READERS** to scan Tags in
- Photograph and document tag location on specific medical devices for standardisation

William Harvey Library



Discovery Integration

- Initial setting up of the integration of the 2 databases was intensive
- Getting The Fixed readers on to the Hospitals IT Network was sometimes a challenge
- Essential to have named contacts in IT

Then It started to all work....

- Trust very quickly saw the benefits of have the Medical Equipment Library's with the ability to RFID Track devices
- Using the Hand Held PDA's any staff member can scan wards and area looking for devices that are out of service date or are becoming due for annual service.
- Better use optimisation of devices

More advantages

- Better infection control.
- Smarter Purchasing of device numbers
- Shows areas where more equipment is needed
- Found we had excess of 96 Alaris GH pumps across sites
- Tracking of the decontamination of Dynamic mattresses

What the CQC Said at the next visit

“Our observations and discussions with staff indicated that access to equipment was good. The introduction of an equipment library (including the use of radio frequency identification tags) has been of benefit.”

The awards



Lord Carters recognition April 2017



Where we were in 2017

- Purchased additional 2000 tags to Tag all our bed frames as it is a struggle to locate them for maintenance
- Clinical Engineering have to date written 56 reports that can be run that show all aspects of the management of the devices and their locations via RFID

The future developments

- Display screen in Library's showing real time data in Equipment Buffer stores (A/E) giving a par of the devices so staff can be proactive.
- Purchase more Active RFID tags.
- Expand our network of fixed RFID Readers
- Add the cost of an Active RFID Tag to the cost of every Medical Device Purchase
- Allow over providers in the trust to use RFID Tagging & Discovery to track their assets.

.....Future

- Serious look into Passive RFID for Foam mattress management and the management of smaller items
- Look at the Harland & Simon solution to Theatre stock management
- Looking at work flow management making sure devices follow the correct work flow and alerted if not.

Reflection so far as a **MUST DO**

- Need IT on board 100%
- The RFID system needs to be driven by a systems manager as it needs to be managed constantly. As locations and asset integration is constantly changing
- Passive tags need model specific label location
- Integrations between Medical engineering database and RFID software have had their challenges to good relationships need to be formed

Where we are today 2019

- We have now moved to passive tagging and are currently 52% complete of our now 35000 as this is being rolled out with the GS1 requirements for device labelling
- Continued development of RFID software's with our supplier
- Starting to RFID Tag domestic equipment managed by out Soft/Hard FM teams
- Managing Patient transfer chairs so as always available at their storage points at the hospital receptions

- Integration of data to the Medical Engineering Department information screens
- Looking for novel opportunities for integration of Passive RFID

Passive Tags/GS1 labels

- Passive RFID Tags come in all shapes and sizes and so a selection is needed
- We use three sizes that are printed with the unique device number in GS1 format
- All these tags come with the RFID chip pre-programmed
- Range is dependent on physical size/ surroundings

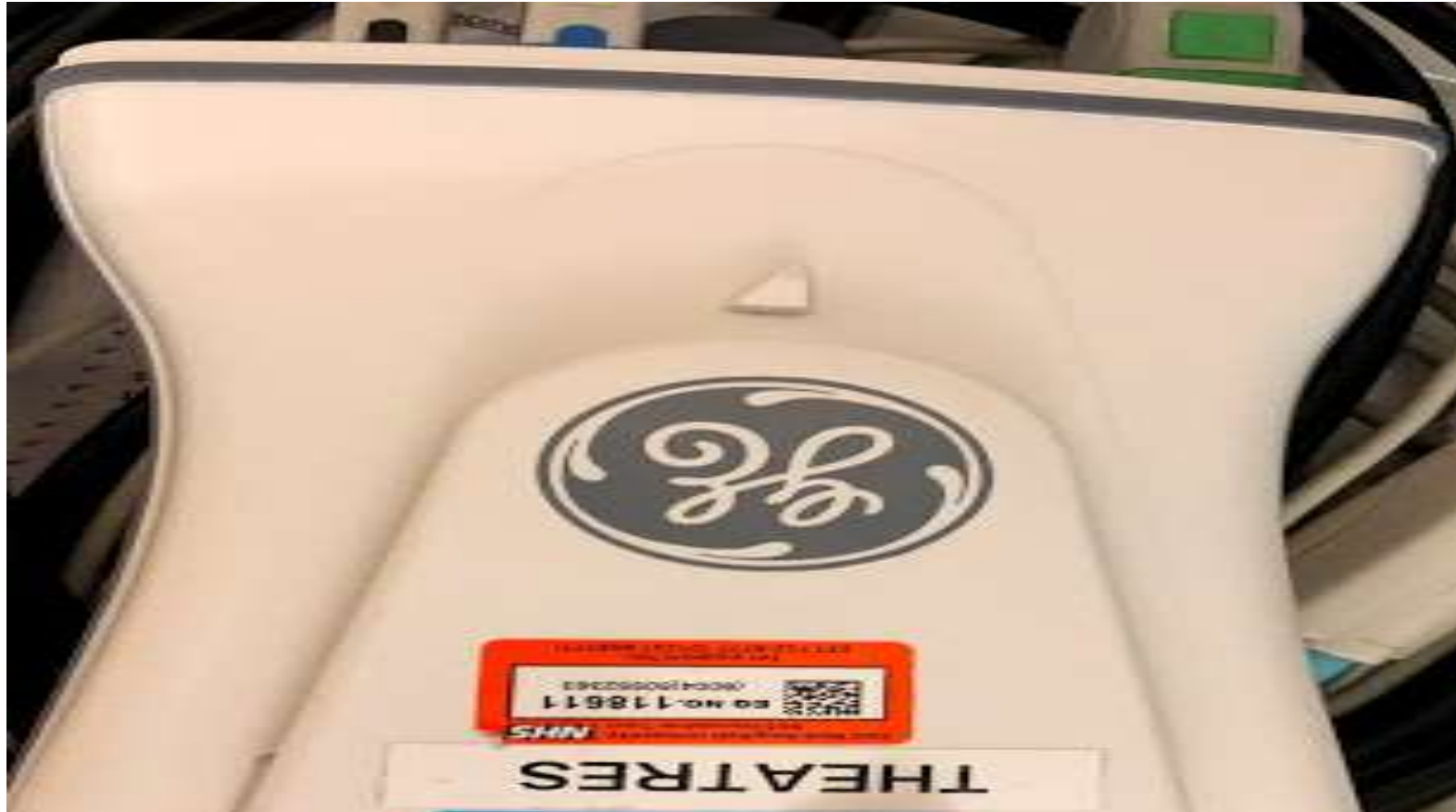
Largest size RFID Tag (Range 10m line of sight)



Medium Size Passive Tag (5m – 7m)



Smallest Size Passive RFID Tag (Found not very effective)



Passive Tagging Challenges

- Tag positioning need to be tested for every model and then tagged in the same place all the time for that model
- May I suggest photos in a shared file
- Correct label size selection
- Staff do need training/understanding
- Understanding the Limits of RFID Technology
- The most important thing to remember is that RFID technology is only as useful as the people using it.

Passive Tagging Practicalities

- Depending on what you are attaching the label to will depend on its effectiveness and range of the RFID tag
- If the substrate is plastic it may well have a sprayed EMS coating on the inside reducing its range



Passive tag Peeling issues

- Peeling of labels
- Surface preparation/de-greasing



Additional Programmable Passive Tags that will add range to an existing label (at a cost).



**Additional Tag configurations are
numerous
Issues on minimum order numbers
usually circa 1000 +**



Sew in Passive RFID tags



O2 flow meters/suction regulators now so easy to audit



Device tagging examples





377 PPT-UM6

377 PPT-UM6
377 PPT-UM6
377 PPT-UM6

377 PPT-UM6
377 PPT-UM6



Limitations of Passive RFID vs Storage



Passive/active RFID tag reader



Hand held Passive only scanners



Limitations of passive scanning through metal door furniture



Lead lined X-ray areas



Poorly organised storage areas



Trolley Scanning data

The image shows a screenshot of a software interface for trolley scanning. At the top, there are status indicators: 'Items Detected', 'Items: 11', 'Time Remaining: 1:04', 'Barcode', 'Items: 11', and 'View Items: 11'. Below this is a table with two columns: 'Name' and 'Type'. The table lists various items with their corresponding types. The first three rows are highlighted in orange.

Name	Type
...	...
...	...
...	...
...	...
110001	...
110002	...
110003	...
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110008	...
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110097	...
110098	...
110099	...
110100	...

Updating of last inventory dates & Locations

Location: ITU, WHH
Location Found: ITU2

EKHUFT,WHH,ITU
 WHH, ITU2

Customer/Owner
Work Request History
Maintenance Contract Details
Scheduled Maintenance Details
Documents
Technical Comments
Financial Ownership Details
Management Information

Management Information

Latest Inventory Date:	<input type="text"/>		Replacement Planning:	<input type="text" value="No"/>
Ward In-Service Date:	<input type="text"/>		Portability:	<input type="text"/>
Est.Retirement Date:	<input type="text"/>		Manuf. Utilisation Rate:	<input type="text" value="0.00"/>
Actual Retirement Date:	<input type="text"/>		Down Time:	<input type="text" value="0.00"/> (Days)
Actual Replacement Cost:	<input type="text" value="0.00"/>	(£)	Training Required:	<input type="text" value="No"/>

Updates all our systems and info screens with last seen location and date

Bed Frames and Patient Trollys Due PPM

Red is the last PPM that was over 12 Months ago
Yellow is the last PPM that was over 12 Months ago

Device No	Serial No	Model	Last PPM	Last Scheduled Date	Next Scheduled Date	Device Location	RFID Location Found	RFID Tag ID	Last RFID Scanned Date
21402	910009	ENTERPRISE 5000			17060012	WARD01, WHH			
21441		ENTERPRISE 5000	16020012		18100012	WARD01, WHH			
14875	9125831	ENTERPRISE 5000	15020012		15020014	WARD01, WHH			
21403	855507	Check77	14020013		14020014	WARD01, WHH			
44326	720077	CONTOURA 580	26130013	26130015	26130016	WARD01, WHH			
48250	849711	CONTOURA 580	09050018	10060015	09050017	WARD01, WHH	BED STORE, WHH EM DEPARTMENT	1542180134	16010018 10:01
57296	848744	CONTOURA 580	30050018	30050019	30050017	WARD01, WHH	KINGS D HALL KINGS WARD	1542180134	24030018 11:38
21141	850274	CONTOURA 580					BED STORE, WHH EM DEPARTMENT	1542180134	14010018 06:02
97478	1211054211	1125 PRIME SERIES 8TH WHEEL STRETCHER	14070018	14070018	14070017	ACCIDENT & EMERGENCY (A&E), WHH	BED STORE, WHH EM DEPARTMENT	1542180134	11010019 20:58
57444	752332	CONTOURA 580	13060018	13060018	13060017	WARD01, WHH	PLASTER ROOM, WHH PLASTER ROOM	150778810134	04060018 11:14
27421	1410104478	1125 PRIME WITH ZOOM DRIVE	18060018	18060018	18060017	ACCIDENT & EMERGENCY (A&E), WHH	PADIA WARD PADIA WARD	150778810134	28020018 15:28
43006	9113448	ENTERPRISE 5000	09090018	10110018	09090017	WARD01, WHH	BED STORE, WHH EM DEPARTMENT	154017145734	09010018 10:03
MAD002Q	P032405	ENTERPRISE 5000			13050017	WARD01, WHH			
MAD006S	P032120	ENTERPRISE 5000			10060017	WARD01, WHH			
MAD006V	P04032	ENTERPRISE 5000			15060017	WARD01, WHH			
MAD006T	P013480	ENTERPRISE 5000			15050017	WARD01, WHH			
MAD007X	P050834	ENTERPRISE 5000			15040017	WARD01, WHH			
46507	729968	CONTOURA 580	27080013	27080013	25050017	WARD01, WHH		14274320134	
47290	012618	CONTOURA 113000A	06050015	06050015	06050017	PADIA WARD			
100032	871016	CONTOURA 113000A	06090015	06090015	06090017	PADIA WARD			
47288	012622	CONTOURA 113000A	06060015	06060015	06060017	PADIA WARD			
25881	1110005488	1125 PRIME WITH ZOOM DRIVE			06060017	ACCIDENT & EMERGENCY (A&E), WHH			
47285	012624	CONTOURA 113000A	06090015	01090015	06090017	PADIA WARD			
77776	30041010181011	INNOV8 LOW	17010014		15080017	WARD01, WHH			
77739	P032206	Check77			06090017	WARD01, WHH			
21371	1408131831	PRIME SERIES X BIG WHEEL			06090017	CLINICAL DECISION UNIT (CDU), WHH			
MAD001A	P032398	ENTERPRISE 5000			20090017	WARD01, WHH			
47286	012623	CONTOURA 113000A	06090015	06090015	06090017	PADIA WARD			
13022	110001008	1125 PRIME WITH ZOOM DRIVE			26060017	ACCIDENT & EMERGENCY (A&E), WHH			
14934	729967	CONTOURA 580	09060014		06060017	WARD01, WHH			
58181	1505109068	1115 PRIME SERIES BIG WHEEL			06060017	PADIA WARD			

Reports

Hospital: WHH Department: ACCIDENT & EMERGENCY Location: ACCIDENT & EMERGENCY (A&E) [View Report](#)

1 of 2 ? 100% Find | Next

Department Device Register

Red is the last PPM was over 13 Months ago.
Yellow is the last PPM was over 11 Months ago.

Device No	Manufacturer	Model	Model Description	Location	Next Scheduled Service Date	Has a Contract	Device Status
39323	COVIDIEN (UK) COMMERCIAL LTD	GENIUS 2	TYMPANIC THERMOMETER	ACCIDENT & EMERGENCY (A&E), WHH	03/06/2015	No	In Se
00459	SIEMENS PLC	CLINITEK STATUS PLUS	URINE ANALYSER	ACCIDENT & EMERGENCY PAEDIATRICS (A&E), WHH	08/02/2017	No	In Se
02694	KEELER	OPHTHALMOSCOPE/OTOSCOPE	OPHTHALMOSCOPE / OTOSCOPE	ACCIDENT & EMERGENCY (A&E), WHH	05/06/2015	No	In Se
03074	BELMONT INSTRUMENT CORPORATION	FMS2000 RAPID INFUSER	FMS2000 RAPID INFUSER	ACCIDENT & EMERGENCY (A&E), WHH	13/02/2017	No	In Se
05459	SIEMENS PLC	CLINITEK STATUS PLUS	URINE ANALYSER	ACCIDENT & EMERGENCY (A&E), WHH	08/02/2017	No	In Se
12226	WELCH ALLYN UK LTD	GS777 WALL MOUNT TRANSFORMER	OPHTHALMOSCOPE / OTOSCOPE	ACCIDENT & EMERGENCY (A&E), WHH	30/08/2016	No	In Se
12494	CAREFUSION (ALARIS)	ALARIS ASENA GH	SYRINGE DRIVER	ACCIDENT & EMERGENCY (A&E), WHH	07/01/2017	No	In Se
12856	COVIDIEN (UK) COMMERCIAL LTD	FILAC 3000AD	ELECTRONIC THERMOMETER	ACCIDENT & EMERGENCY (A&E), WHH	13/11/2016	No	In Se

Email post to department medical device manager

The CQC will love this

- Once scan has taken place the trolley software automatically post a email to all interested parties for that department stating the area was scanned and these are the devices that have been found to be out of date so arrangements can be made to make them available to Medical Engineering

Alert Email alert sent to all interested parties

Department/Ward RFID Scan action needed

Dear Colleague, your department/Ward was RFID scanned today and the devices below are over due a service. Please can you contact your local EME department to arrange a service as soon as possible.

Category	Asset Name	Asset ID
DIAMOND SINGLE OXYGEN (O2) FLOWMETER OXYGEN FLOWMETER	105469	F2 Inserted Asset
DIAMOND SINGLE OXYGEN (O2) FLOWMETER OXYGEN FLOWMETER	105471	F2 Inserted Asset
WALL OXYGEN FLOWMETER (O2) OXYGEN FLOWMETER	105654	F2 Inserted Asset
WALL OXYGEN FLOWMETER (O2) OXYGEN FLOWMETER	105655	F2 Inserted Asset
WALL OXYGEN FLOWMETER (O2) OXYGEN FLOWMETER	105657	F2 Inserted Asset

RFID Tagging of Reusable hoist slings for LOLER testing



Added washable Passive tag



So they are tracked not thrown away



The future of Passive RFID

- Better Passive readers are coming on line that are more reliable and cost effective
- Novel passive readers are becoming available
- Direction of travel
- Experts also anticipate rapid growth of RFID use in the pharmaceutical

So the benefits....

- Confidence to the trust & CQC that medical devices are serviced routinely and managed as well as can be
- Improved shared responsibilities (ward-eme)
- Medical devices database constantly kept up to date as of every trolley scan
- Ability to located devices out of sight for example drugs cabinets/behind curtains etc

- Track devices that are on loan/Trial
- Financial accountability via the data base being updated with the last inventory date
- Tracking devices that related to a FSN/MDA alert.
- Optimise Medical Equipment Library PPM functionality through tracking
- Unnecessary procurement of devices



Thank you to...

- The manufactures and suppliers of all the systems for all there site visits and help over the phone. Excellent support
- Addenbrooks Professor White & Simon Dawkins the then Equipment Library manager
- My staff who have put so much into getting the new systems up and running
- David Attwell head of clinical engineering

Are you still doing it manually?



**I'm happy for anybody to come down
to Kent for a site visit**

Andy.Barrow@NHS.Net

Any Questions?