

Tag Team Care: five ways to get the best from RFID

This information sheet supplements our talk: *Tag Team Care: five ways RFID Could Transform Healthcare*. In it you will find:

- A summary of the characteristics of RFID;
- Five tips for getting the best from RFID; and
- Some useful websites.

RFID characteristics

Tag size increases at lower frequencies, owing to antenna size. For LF the antenna is made of wire; for HF conductive ink can be used. In general, higher frequencies give faster response times.

Operating frequencies

- Low: 125 to 134 kHz. Standard for tagging livestock.
- High: 13.56 MHz. Can be read through clothing. Less interference by fluids.
- UHF: 868-956 MHz. Use increasing as standards develop.
- Microwave: 2.45 GHz. Same as Bluetooth and WiFi. Better for long range management of perimeters and toll collection.

Range

Range depends on:

- Frequency;
- Power of reader;
- Environment;
- Intervening material.

In general, passive tags have a shorter range. They do not transmit unless they are interrogated by a reader. However, they are smaller and cheaper and do not rely on a power source. Active tags can transmit continually or at a reader's request.

Passive tags have an approximate range of 10mm to 6 metres, active tags of 50 metres or more.

HF tags may be better for patient ID, as they are less affected by clothing and fluids. Microwave tags may be better for management of perimeters, such as maternity applications.

Tag	Size	Range	Power	Comments
Passive	Smallest tag (0.4mm ²). Thinner than paper. In USA approved for subcutaneous use in humans.	10mm to 6 metres. UHF: 3m or more.	Reader output	In general, range depends on frequency, reader and environment. 868-915 MHz same frequency as mobile phone, so interference with equipment is possible.
Active	Size varies, but about 2-3 cm ² .	UHF: up to 50m.	Battery	More expensive and larger than passive tags.
WiFi	Depends on supplier; about 5x5x2cm.	Up to 100m but shorter in closed space.	Battery	Using standard 802.11b and d. Better for locating and tracking.

Five ways to get the best from RFID

1. *Revise processes*

RFID should not be treated as a replacement barcode as that may over emphasise its technical characteristics. Look at work processes and see how they can be redesigned by using RFID. Tagging objects and people is easy; changing processes and jobs is difficult.

You may identify individual areas where RFID could be effective, such as confirming patient ID but seek to integrate rather than settle for isolated applications

2. Start with pilots—learn and expand

RFID needs tuning; for example, when using tags with metal objects it is useful to leave an air gap between the tag and object. Lower frequencies may be better for tagging metal, as they generate fewer eddy currents.

Watch out for interference from other RF equipment: cordless phones, wireless computers—even electronic fly zappers.

Aerials and power outputs need to be adjusted to the best orientation in relation to the tag.

3. Assess the full costs

The main costs will probably not be tags, readers and antennae. Here are others to watch out for:

- Middleware and systems integration
- Installation and cabling
- Implementation and training
- Extra storage and data management
- Consultancy and project management
- Staff training.

4. Establish a data management policy

RFID data are available in huge quantities:

- What real-time information do you need and what can be stored in a warehouse?
- What information is local and what needs to be shared?
- What transient information can be deleted?

5. Deal with concerns about privacy and confidentiality

RFID could transmit confidential information inadvertently, even after a completed spell of care if a tag data are not erased.

Deal with the concerns of staff and the public. Implement secure systems and processes. Take professional advice on human rights and data protection. Patients and staff will probably need to be informed of the purpose of tags and will need to consent to their use.

Useful websites

RFID Journal: <http://www.rfidjournal.com/>

AIM RFID: <http://www.aimglobal.org/technologies/rfid/>

EPCglobal: <http://www.epcglobalinc.org/>

EAN International: <http://www.ean-int.org/>

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Colin was a founder member of an IT innovation unit for a major consultancy and played a leading role in designing, and writing articles for, a prize-winning innovation magazine.

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