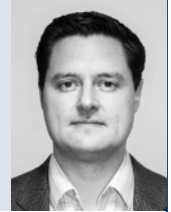


Editorial

Can electronic monitoring (GPS 'tracking')
enhance risk management in psychiatry?

John Tully, Dave Hearn and Thomas Fahy

**Summary**

Electronic monitoring has been used in criminal justice and some health settings for three decades. Technological interventions are becoming more common in psychiatry, but may be a cause for ethical concerns and controversy. We discuss electronic monitoring as an aid to security and public safety in a forensic setting.

Declaration of interest

The authors are all employees of the forensic psychiatry service at South London and Maudsley Foundation Trust, where electronic monitoring has been introduced for monitoring of patients on leave. They confirm that they have not received fees or benefits from the developers of the electronic monitoring devices.

John Tully (pictured) is Academic Clinical Fellow and Specialist Registrar in Forensic Psychiatry at South London and Maudsley Foundation Trust and Institute of Psychiatry, London. Dave Hearn is Security Team Leader for Forensic Mental Health at South London and Maudsley NHS Foundation Trust. Thomas Fahy is Professor of Forensic Mental Health and Clinical Director (Forensic) at Behavioural and Developmental Clinical Academic Group, King's Health Partnership, London. All have an interest in evaluation of treatment interventions for mentally disordered offenders.

Decision to introduce electronic monitoring

Following a series of high-profile incidents related to absconding by patients on leave from our medium secure forensic service, one of which had a tragic outcome,¹ we reviewed the possible role of new technologies in increasing safety. We introduced a secure 'tracking' device using Global Positioning System (GPS) technology for electronic monitoring of patients on leave from the service as part of a comprehensive protocol for risk management and recovery.

The device was used for patients in the initial stages of taking leave as part of their clinical pathway towards discharge into the community. It was envisioned that public protection could be enhanced by introducing a facility that would notify clinical staff immediately should any patient violate their leave conditions or if patients were not returning from leave at the agreed time. The device also provided the facility to identify the patient's location if they failed to return from leave or if they absconded from escorting staff. No patient was obliged to wear the device without consent, with the exception of high-risk patients requiring emergency hospital or court transfer. The introduction of this technology nonetheless proved controversial at local and national levels.²

**GPS and other technologies
used in electronic monitoring**

Two location-based technologies have been employed for electronic monitoring since its inception: radio frequency and GPS. The distinctions between these are outlined in Table 1.

The early years of electronic monitoring relied on radio frequency technology. Since 1997, devices using GPS technology have gradually begun to replace radio frequency devices. Although more expensive than conventional radio frequency curfew-based

tags, US criminal justice studies have shown that GPS devices reduce the likelihood of and increase the time until breach, thereby aiding compliance.^{3,4} A 2010 quantitative analysis⁴ determined that GPS-based electronic monitoring had 6% fewer supervision failures than radio frequency-based electronic monitoring.

The GPS project was developed in 1973 by the US Department of Defence and became fully operational in 1994, with initial uses primarily in the development of military technology. Since then, GPS technology has become ubiquitous through use in mobile telephones, laptop computers and Sat Nav devices. A GPS tracking device determines the precise location of a vehicle, person or other asset to which it is attached, and tracks mobile assets.

Some GPS systems store data within the GPS device for future review, known as 'passive' tracking, whereas others send information on a regular basis to a centralised database via a modem within the device, known as 'active' tracking. The 'Buddi' tracker used in our forensic service is an active tracking device. A security version of the device is attached to the patient's ankle with an individually measured lockable strap. The strap incorporates cabling to make the device non-removable and optic fibres to provide anti-tamper alarms. Each patient using the system has their own allocated device. It can be set with geographical parameters – known as 'geo-fences' – enabling the creation of exclusion and inclusion zones, a common sanction in forensic patients. Information from each device is monitored by a security company and breaches in agreed terms and conditions trigger a predetermined alert to relevant parties and a risk management plan.

**Where has electronic monitoring been used
to date and is it effective?****Criminal justice system**

Electronic monitoring has been used for over three decades in criminal justice systems. Initially, agencies adopted 'home curfews' using radio frequency technology as a punishment and to reduce demand on prison places, rather than a means of preventing crime or aiding the rehabilitation of offenders.³ These priorities have shifted to reducing recidivism and non-compliance of paroled and other offenders.³

Use of electronic monitoring is on the increase, with more than 80 000 'tagging' orders made in the UK in 2010–2011, as both a community penalty and to monitor prisoners released early on home detention curfews.⁵ A recent comprehensive report was

Table 1 Comparison of radio frequency and Global Positioning System technology

Technology	How it works	First operational	Advantages	Disadvantages	Examples of use
Radio frequency (RF)	Uses RF electromagnetic fields to transfer data from a 'tag' attached to an object, for the purposes of automatic identification. In conjunction with wireless systems, allows for contactless reading of RF-enabled tags.	1983	Strong signals for providing information on a small scale	Does not allow for 'tracking'. Requires specialised scanners to read and transmit data. Systems may be of great cost on a large scale.	Motorway/toll systems for cars. Identification of animals. 'Home detention' systems. Identification of humans by passport.
Global Positioning System (GPS)	A worldwide satellite-based navigation system that can calculate position in three dimensions. Radio waves sent out from satellites transmit data to receivers, which can then triangulate their position relative to the satellites, and thus on the Earth's surface.	1994	Suited for tracking anywhere in the world	Individual devices may be more expensive than RF. Signal may be weaker than RF (depending on device). Some models are not as accurate in certain situations, (e.g. underground in thick-walled buildings).	Sat Nav devices. Mobile telephone technology (e.g. Google maps). Modern tracking devices in criminal justice and healthcare systems.

critical of the lack of evidence from UK studies for use of electronic monitoring and for the slow progress made in converting to GPS-based systems.³

The evidence for electronic monitoring has failed to keep pace with increased use and development of technology. Most scientific literature is related to enforced use in offending populations in the USA. In 2010, however, a large-scale evaluation of use of electronic monitoring in a large population of offenders⁴ found that it reduced the likelihood of failure under community supervision by 31%, relative to offenders placed on other forms of community supervision. The outcomes were absconding from supervision and revocations for technical violations, misdemeanour or felony arrest. A national cost–benefit analysis in the USA⁶ estimated that use of electronic monitoring could yield a social value in the annual reduction in crime of \$481.1 billion, compared with an estimated cost of \$37.9 billion for implementation.

Sex offenders

In the USA, community notification of sex offenders is federally mandated and has been instituted in all 50 states, regulated by community notification laws. In 2005, Florida passed legislation requiring certain individuals who have committed sex offences against children to wear a GPS device for the rest of their lives. Considerable concern has been expressed about the dearth of evidence supporting electronic monitoring in sex offenders and outcomes remain unconvincing, with only one study showing a reduced rate of recidivism.⁷

Dementia

Although the use of a tracking device is a novel intervention in forensic psychiatry, there is a precedent for its use in mental health as a risk management strategy for wandering in people with dementia, where there have been some encouraging results on a small scale. One study⁸ tested electronic monitoring in a teaching hospital, a residential home and in patients' own homes. The system proved very reliable: two incidences of wandering were successfully detected and compliance was excellent. However, recent plans to introduce this on a wide scale met with criticism from elderly care campaigners.⁹ Further debate has highlighted ongoing concerns about disempowerment, labelling, imposition and stigmatisation of the elderly.¹⁰

Legal and ethical considerations

The introduction of electronic monitoring in a forensic service gave rise to considerable public debate regarding legal and ethical issues. A spokesperson for one service user group described electronic monitoring devices as '21st-century shackles' and warned that involvement of private security companies could deprive patients of the human aspects of care and supervision.² Others have stated that electronic monitoring is coercive and in violation of human rights and that visible ankle bracelets may reinforce stigma,² as a recent controversy in the USA indicated may be the case.¹¹ Equalities groups have voiced concern about the impact on Black patients who are overrepresented in secure settings.² And prominent mental health professionals have also raised objections – one described electronic monitoring as a 'brutalising treatment that should not be used on anyone who does not have a criminal record'.²

Our service was acutely aware of these important considerations and we sought legal and ethical advice. Use of electronic monitoring was found to be legal and not in violation of human rights, although this may well require 'stress testing' in a legal forum. The ethical controversies are complex, but must take account of possible benefits, including potential increases in patients' autonomy, acceleration of clinical progression through secure services and back to the community, as well as the cost-effectiveness of treatment programmes. It was concluded that ongoing use of electronic monitoring needs to be accompanied by quantitative and qualitative measures of effectiveness and patient experience.

Potential use of GPS-based electronic monitoring in other mental health settings

Novel technological interventions are increasingly used in mental health settings. Examples include mood monitoring by text messaging, cognitive–behavioural therapy by smartphone apps and telepsychiatry. GPS-based electronic monitoring may be viewed in this context as another technological tool. It is currently being used by two other medium secure forensic units and for some individuals with severe neurodevelopmental disorders. Several psychiatric intensive care units are also investigating its potential use.

Conclusions

Electronic monitoring is becoming increasingly prevalent and in 2010 was introduced for the first time in forensic psychiatry. Although there have been some promising recent outcomes in terms of its effectiveness, this remains under-evaluated and there is an ongoing need for robust, well-designed studies in this area. As significant ethical and legal questions remain about the use of electronic monitoring, data from such studies are paramount for a balanced and meaningful debate.

GPS-based electronic monitoring should be seen in the context of other novel technological developments used in mental health. Recent outcomes suggest that it is more likely to be effective as the technology behind devices improves and becomes more user-friendly for both the monitoring authority and the patient.

As novel technologies become more prominent, there is an implicit danger in perceiving any tool as a panacea. Although these developments will continue to offer benefits to patients and healthcare providers, it is essential that they are seen and used as part of comprehensive care packages rather than isolated interventions.

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Jealousy in *The Winter's Tale* (Shakespeare c.1611)

Trevor Turner

Polixenes, King of Bohemia, thought King Leontes of Sicily's magnificent hospitality reflected friendship 'as twinned lambs that frisk in the sun'. However, within the 462 lines of Act 1, Leontes' 'rooted [. . .] affection' is twisted into 'a sickness which puts some of us in distemper'. By line 44 Leontes draws apart 'to observe' Polixenes 'paddling palms', and by line 108 he is muttering 'too hot, too hot', as his heart 'dances but not for joy'. Polixenes, warned to flee ('he thinks you have touched his queen forbiddenly') accepts that 'tis safer to avoid what's grown than question how 'tis born'.

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