

Electronic monitoring for adult offenders

EVIDENCE BRIEF

Electronic Monitoring (EM) is used to support Community Detention and Home Detention sentences, electronic bail, extended supervision orders, parole, and temporary release from prison (including release to work). There is limited international evidence on Electronic Monitoring, but it suggests this approach can reduce reoffending for adult offenders.

OVERVIEW

- The use of Electronic Monitoring (EM) has increased significantly over the past 20-30 years. It is now used in over 30 countries; sometimes on a large scale (e.g. in England and Wales, the average monthly EM caseload in 2013-14 ranged between 23,000 and 25,000, with approximately 100,000 new cases annually).
- Two published meta-analyses have indicated that applying EM to a group of offenders with a base reoffending rate of 50% can result in a reduction of the reoffending rate to approximately 38%.
- The meta-analyses, however, provide limited information about post-EM reoffending (as compared with reoffending during EM imposition).
- The effectiveness of EM varies significantly depending on a range of factors, including technologies, seriousness of offences, and vulnerability of monitored people.
- In New Zealand, radio frequency technology (RF) is in use for more than 1,500 offenders as at June 2016. Global positioning systems (GPS) technology is in use for almost 2,200 offenders as at June 2016.

- The cost of EM depends on the type of monitoring used, so costs vary across different countries. It is usually more expensive than traditional probationary supervision but more cost-effective than imprisonment.
- There is inconsistent evidence regarding whether reduction in reoffending takes place after EM completion.
- More rigorous evaluations in the New Zealand context are required to increase the EM investment rating.

EVIDENCE BRIEF SUMMARY

Evidence rating	Fair
Unit cost (New Zealand, June 2016)	Varies by device type, monitoring regime and response framework. On average, for RF - \$14 per day, for GPS - \$20 per day.
Effect size (number needed to treat)	For every 8 offenders on EM, one less would re-offend on average ⁱ .
Current Justice Sector spend	\$24m (Department of Corrections)

WHAT IS ELECTRONIC MONITORING?

EM is an umbrella term that covers a range of sentences and orders using various forms of electronic technology in order to help enforce compliance with certain imposed conditions.

The main forms of technology are:

- continuous signalling bracelets using radio frequency (RF) and a base station to confirm whether an offender is in a certain location (typically home or work, but also inmate monitoring)
- global positioning systems (GPS), either portable or limited to the home
- remote alcohol monitoring (RAM) equipment, sometimes incorporated into the bracelet using sweat-based sensors.

The several uses of EM include:

- diversion from imprisonment
- as a means to enforce bail conditions, particularly curfew
- as a form of controlled reintegration or parole from prison
- as a means to enforce place-based restrictions on offender movement, particularly for sex offenders and offenders subject to protection orders
- victim protection (typically in cases of domestic violence).

DOES ELECTRONIC MONITORING REDUCE CRIME?

International evidence

Until 2006, reviews examining the effectiveness of EM consistently found that there was

insufficient high-quality evidence to indicate whether EM is either effective or ineffectiveⁱⁱ.

Since 2006 the evidence base concerning EM has improved with robust evaluations conducted in Floridaⁱⁱⁱ, Oregon^{iv}, Sweden^v, Switzerland^{vi} and Argentina^{vii}.

As outlined in Nellis et al (2013), the use of EM has increased significantly over the past 20-30 years. It is now used in over 30 countries, sometimes on a large scale. For example, in England and Wales, the estimated average monthly EM caseload in 2013-14 ranged from 23,000 – 25,000, with approximately 100,000 new cases annually^{viii}. However, the number of adults electronically monitored daily across other European countries is smaller and varies significantly – from about 1,700 in Belgium (2014) to 367 in Germany (2015)^{ix}.

Two relatively recent meta-analyses^x have found that, in general, EM does reduce reoffending whilst being monitored. These meta-analyses found that applying EM to a group of offenders with a base reoffending rate of 50% can result in a reduction of the reoffending rate to approximately 38%^{xi}.

The meta-analyses, however, provide limited information about post-EM reoffending (as compared to reoffending during EM imposition).

Each of these meta-analyses also conducted a cost-benefit analysis and found that EM produces a positive cost-benefit ratio. Benefits considered both changes in direct justice system costs and future crimes prevention. One of these meta-analyses by Roman et al (2012) found that a positive ratio was obtained for EM even when restricting the analysis to direct justice system costs.

However, there are limitations with this research that should be acknowledged when interpreting the results of these meta-analyses.

First, studies either do not distinguish (or only provide combined results) between the effects of EM on offending during and after monitoring. This is a serious limitation because even if EM reduces offending during the period of supervision, it may not have a positive overall effect on crime if reoffending occurs following the completion of the sentence or order.

Second, these meta-analyses do not distinguish (or only provide combined results) between studies that used prisoners as a control group and studies that used individuals in the community as a control group. This poses a significant limitation, as showing that EM performs better than a community sentence is quite different to showing that it performs better than a prison sentence. Therefore, collapsing together studies that use different control groups provides a somewhat ambiguous and misleading result.

Third, these meta-analyses investigate EM approaches in general (i.e. combine different forms of EM in one large group) despite the fact that different forms of EM are used in different situations and their effect may be quite different. It is not clear, for example, how Home Detention EM using RF technology compares with EM of sex offenders with GPS technology. Therefore, it is uncertain whether findings for the combined effects of both these various EM types are meaningful or relevant when considering one particular type of EM.

There is also some evidence to suggest that EM outcomes vary across different regions. For example, many empirical studies in North America and the UK found only a modest reduction in reoffending after EM was concluded. In contrast, research from Scandinavian and some European countries indicates greater effectiveness and positive impact in relation to reoffending post-EM completion.^{xii}

Finally, some reports indicate that EM outcomes depend on the level of seriousness of the offence. When applied to offenders who have committed more serious crimes, EM is seen to be less effective in reducing recidivism^{xiii}.

Given the evidence and limitations, we only have limited confidence in translating the results of these meta-analyses to the application of EM. Therefore, *'more rigorous research is required before we can safely recommend electronic monitoring as an effective measure of control.'*^{xiv}

New Zealand evidence

EM was first piloted in 1995 in New Zealand with a two-year trial of home detention for high-risk parolees. This pilot programme used basic technology that involved random dial-ins from a central controller and voice-recognition software.

The pilot was extensively evaluated using qualitative methods^{xv}. While the research was unable to determine whether Home Detention had any effect on reoffending, it reported that "Home Detention has been found to be of variable value as a reintegrative programme". In particular, it found that restrictions in activities outside the home, incompatibility with some jobs and lack of constructive activities for some detainees detracted them from successful reintegration in the community.

In 2000 EM (RF technology) was implemented as part of the newly introduced sentence of Home Detention^{xvi}. As at June 2016, RF was in use for 1,513 offenders on Community Detention. Typically, RF devices are installed at the offender's address and communicate with the device attached to an offender's ankle.

Throughout 2017/2018, the Department of Corrections electronically monitored over 14,000 people.^{xvii}

Currently in New Zealand EM is used in the following ways:

- in all Community Detention (CD) sentences
- in all Home Detention (HD) sentences
- in all Electronic Bail (EM Bail)
- in some Extended Supervision Orders (ESO)
- in some parole cases
- in temporary release including release-to-work, and
- in some Intensive Supervision sentences.

Originally, EM could not be used as a condition of a sentence of Supervision or Intensive Supervision, release from a sentence of two years or less, or following a sentence of Home Detention. However, new legislation was passed in 2016 which removed legislative barriers to the use of EM among offenders released from a sentence of imprisonment of 2 years or less, and offenders sentenced to Intensive Supervision^{xviii}.

WHEN IS ELECTRONIC MONITORING MOST EFFECTIVE?

In theory, there are many reasons why EM might affect reoffending levels^{xix}. These theories include deterrence and routine activity theory, which suggest that –

- by removing an offender from locations where offending might take place, and increasing the expected penalty for the offender by raising detection rates, monitoring could reduce offending
- increasing the certainty of punishment tends to reduce offending^{xx}. Therefore, ongoing surveillance may reduce crime, at least for the period of surveillance
- EM facilitates pre-emptive actions at the offence build-up stage which prevent offending from occurring.

The potential effect of EM on reoffending after the completion of surveillance is explained by the social learning theory. This theory suggests that enforced pro-social living away from anti-social peers should create positive habits that flow through to the period following surveillance. In contrast, labelling and defiance theory suggests that efforts to control offenders could lead them to adopt a ‘criminal identity’ and offend.

The possible motivational effect of EM is another factor of reducing reoffending noted in the literature. Those under monitoring might be encouraged to comply in order to reduce curfew time as a form of recognition and reward. Long-term this may positively affect their perception of the benefits of pro-social behaviour. More research in this area is needed.

Finally, this research is complicated by the issue of measurement error. Even if EM did not affect an offender’s behaviour, monitoring is likely to increase the likelihood of reoffending being detected, thus increasing the proportion of measured reoffending in comparison to comparable but unmonitored offenders. Interpretation of any difference in reoffending between electronically monitored and non-electronically monitored offenders should therefore be done with caution.

Overall, the literature does not produce a strong conclusion regarding the potential effects of EM on reoffending.

Effectiveness in reducing reoffending

Research findings from the literature are summarised as follows:

- the effectiveness of EM sentencing must be understood as contingent and complex
- EM is more effective when integrated with the use of other supervision and rehabilitation and support services

- flexibility and graduated changes to EM orders can be used to motivate compliance
- the use of EM should be tailored depending on the unique circumstances and risks presented by monitored individuals.

Further methodologically strong empirical research is needed to inform more detailed policy and practice design, and to ensure that investment in EM is done in the most effective way.

Cost-effectiveness

The key elements driving EM cost are purchasing and maintaining equipment, installation, monitoring, responding to EM notifications and staff training.

Recently published research has provided an indication of the cost-effectiveness of EM across different countries.

For example, the UK Government (2018) assessed the daily cost of GPS tags as between £12 - £13 per offender (\$22-24). This compares to around £90 (\$167) per day per prisoner^{xxi}.

The Florida EM evaluation (2007-8) found that the cost of one inmate in prison was comparable to six offenders being monitored per year by GPS and 28 by RF^{xxii}. There is an increasingly supported view that EM may be considered as a significantly more cost-effective alternative to short-term imprisonment.

At the same time, EM is typically more expensive than traditional probationary supervision. For example, in California (2006-2009) the cost of GPS monitoring of high-risk sex offenders per day was estimated at US\$36 (approx. \$50) compared with US\$27.5 (approx. \$38.5) for traditional supervision. However, GPS

delivered a 12% reduction in arrests (14% vs. 26%)^{xxiii}.

The cost of EM in European countries (2012) varies widely from \$5 per offender per day in Sweden to \$150 in the Netherlands^{xxiv}. It is difficult, however, to compare these numbers directly due to potential inconsistencies in the cost calculation methodology.

In New Zealand (June 2016), the cost of EM using GPS technology is approximately \$20 per day and using RF technology – approximately \$14 per day¹. Home detention with EM, instead of prison, can save up to 75-80% of cost.^{xxv}

New Zealand has comparatively high rates of using EM. In 2017, New Zealand had 4,021 offenders on EM with the prison population at 9,914. As a ratio to the prison population New Zealand had 40.5% on EM, England and Wales had 15.2%, USA had 5.7%, and Australia had 2.5%. New Zealand's use is also growing with 963 more people in 2017/2018 being monitored by EM when compared to 2016/2017.

WHAT OTHER BENEFITS OR RISKS DOES ELECTRONIC MONITORING HAVE?

Limitations on employment

One of the key benefits of EM is enabling offenders to continue in employment. However, in some circumstances, EM can limit employment options, particularly where the job requires physical activity that might damage the bracelet or where the hours are casual.

These concerns were raised in the initial (1997) NZ pilot study^{xxvi}. This in turn can make

¹ Department of Corrections, internal communication.

reoffending more likely, given engagement in employment reduces the risk of reoffending^{xxvii}.

More recent research suggests that it is difficult to generalise the effects of EM on employment. For example, the expansion of monitoring to sex offenders in Florida has reportedly made it more difficult for non-sex offenders under EM to find work, as the public perception of EM has changed^{xxviii}.

While EM can place restrictions on some offenders' employment prospects, effective management can mitigate or negate many of these restrictions in most cases^{xxix}.

Effects on offenders' families

Qualitative research from New Zealand^{xxx} and the UK^{xxxi} noted that in some cases, a home detention sentence can place additional pressures on family members or housemates of an offender.

Families can feel at least partly responsible for ensuring the offender's compliance with the requirements of the sentence or order. However, in some cases EM can also cause some disruption for other residents in the offender's house. For example, the random calling technology they evaluated led to sleep disruption for family members^{xxxii}.

Net widening

There is some risk that EM may be used where mere suspension or probation would have been used previously. This may lead to a widening of the net of social control and to an unwarranted escalation of penalties on lower-risk offenders who would otherwise have been given a less intensive sentence.

As a relevant example, introduction of Home Detention in New Zealand in 2007, which was explicitly designated in the legislation as an alternative to imprisonment, resulted rapidly in

3,500 new Home Detention sentences per year, but the corresponding fall in the number of new prison sentences was only 750.

The above situation can become even more problematic if EM is ineffective for low-risk offenders, or if the added cost of the monitoring is not matched with an associated further reduction in reoffending.

The issue, however, might depend on the type of offending. For example, evidence of net widening has been identified for drug offenders but not property or violent offenders^{xxxiii}.

Effect diversity

It is likely that the various types of electronically monitored sentences and orders differ in their effect.

There is some emerging evidence on the effectiveness of EM for sex offenders, but currently there has only been one robust (see Evidence Briefs' methodology page) study examining this^{xxxiv}. The study found that EM did not reduce reoffending and was not cost-effective as compared with non-EM supervision.

We are not yet at a stage where the evidence can support strong conclusions about the offender sub-groups for whom EM is and is not effective.

In the meantime, we can draw on indirect evidence to inform policy decisions about using EM for particular types of sentences.

For example, one indirect study supports the view that EM is less effective if not supported by rehabilitative or reintegrative services^{xxxv}.

The use of remote alcohol testing, which is currently being implemented in NZ^{xxxvi}, is an area worth considering in its own right. This EM technology allows remote monitoring of the alcohol usage by offenders through special

ankle bracelets. Recent evidence from the United States has indicated that regular testing for drug and alcohol use combined with swift, certain sanctions can reduce reoffending^{xxxvii}.

Technical limitations

Modern EM technology allows increasingly sophisticated use. But as with any technology, it has some technical limitations that affect the reliability of EM in particular situations.

For instance, more frequent (ideally real-time) communication between the electronic anklet and a central portal significantly reduces the battery life of a device so it needs more frequent recharging. This, in turn, requires the offender to be near a charging socket if the battery runs low.

Further, although the accuracy of GPS data is greatly improved, the signal can significantly vary depending on the distance to the nearest satellite and presence of objects which block or interfere with the signal (this is similar to smart phones). In some locations it results in possible errors when a weak signal makes it difficult to monitor and clearly interpret offender’s movements.

The EM Bail smartphone app, a technological advancement created in 2018, allows defendants to obtain direct access to support services, receive reminders about judicial events such as court cases related to their case, and request permission to attend events outside of the standard conditions of their bail.^{xxxviii}

CURRENT INVESTMENT IN NEW ZEALAND

There are approximately 4,500 offenders being electronically monitored in New Zealand at any one time.

From 2015 EM services have been provided by a single service provider. The contract covers different sentence types as shown below:

Sentence type	Technology used	Muster (average)
Home Detention	GPS	~1500
Community Detention	RF	~1600
ESO and Parole	GPS	~270
EM bail	GPS	~510
Temporary Release, Release on Conditions and Release to Work	GPS	~440

RF monitoring and response services are outsourced, while GPS monitoring is carried out by an in-house monitoring centre in Wellington.

The term ‘unmet demand’ perhaps is less relevant for this type of investment. However, there is room for expansion provided that further research demonstrated it to be a cost-effective approach to reducing reoffending. Currently, only a small proportion of offenders on community sentences and orders are subject to EM.

The Corrections, Parole, and Sentencing (Electronic Monitoring of Offenders) Amendment Acts 2016 created legislature that aimed to expand the number of people who are placed on EM. In the 2018 budget, Corrections received an extra \$8.6 million to increase the number of defendants that could be placed on electronic monitoring to 1,000 as an alternative to being remanded in custody.^{xxxix}

EVIDENCE RATING

Each Evidence Brief provides an evidence rating between Harmful and Strong.

Harmful	Robust evidence that intervention increases crime
Poor	Robust evidence that intervention tends to have no effect
Inconclusive	Conflicting evidence that intervention can reduce crime
Fair	Some evidence that intervention can reduce crime
Promising	Robust international <i>or</i> local evidence that intervention tends to reduce crime
Strong	Robust international <i>and</i> local evidence that intervention tends to reduce crime

According to the standard criteria for all Evidence Briefs², the appropriate evidence rating for Electronic Monitoring for adult offenders is **Fair**.

The interpretation of this evidence rating is that:

- there is some evidence that investment can reduce crime
- it is uncertain whether investment will generate return even if implemented well
- may be unproven in New Zealand or be subject to conflicting research
- review may benefit from trial approaches with a research and development focus
- robust evaluation needed to confirm investment is delivering a positive return and to aid in detailed service design.

Further research is required to understand which kinds of EM are more or less effective, in which

contexts, and for which types of offenders. We cannot rule out that EM could be counter-productive for certain groups of offenders.

Some international research has found that EM produces a large effect on reoffending, suggesting EM could, if designed and implemented well, be an effective investment option in particular situations.

Given the increasing growth in the use of EM over the past 10 years, and indications to suggest EM is effective in some circumstances, this would seem an important area for robust evaluation prior to further expansion.

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Primary author: Michael Slyuzberg

FIND OUT MORE

Go to the website

www.justice.govt.nz/justice-sector/what-works-to-reduce-crime/

Email

whatworks@justice.govt.nz

Recommended reading

Aos, S., Lee, S., Drake, E., Pennucci, A., Klima, T., Miller, M., Anderson, L., Mayfield, J. & Burley, M. (2012). *Return on Investment:*

² Available at www.justice.govt.nz/justice-sector/what-works-to-reduce-crime/

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Roman, J., Liberman, A., Taxy, S. & Downey, P. (2012). *The Costs and Benefits of Electronic Monitoring for Washington, D.C.* Washington: Urban Institute.

Citations

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- ⁱ Aos et al (2012); Roman et al (2012)
- ⁱⁱ MacKenzie (1997), Schmidt (1998), Gendreau et al (2000), MacKenzie (2002), MacKenzie (2006), Renzema & Mayo-Wilson (2005)
- ⁱⁱⁱ Padgett et al (2006), Bales et al (2010)
- ^{iv} Lapham et al (2007)
- ^v Marklund & Holmberg (2009)
- ^{vi} Killias et al (2010)
- ^{vii} Di Tella Schardgrotsky (2013)
- ^{viii} Lockhart-Miramis et al (2015)
- ^{ix} Hucklesby et al (2016)
- ^x Aos et al (2012); Roman et al (2012)
- ^{xi} Lipsey (2009)
- ^{xii} Graham & Mclvor (2015)
- ^{xiii} Henneguella et al (2016)
- ^{xiv} Taylor & Ariel (2012)
- ^{xv} Church & Dunstan (1997)
- ^{xvi} Nellis et al (2013)
- ^{xvii} Department of Corrections (2018)
- ^{xviii} New Zealand Parliament (2015)
- ^{xix} Renzema (2013)
- ^{xx} Nagin (2013)
- ^{xxi} House of Commons Committee of Public Accounts (2018)
- ^{xxii} Bales et al (2010)
- ^{xxiii} Gies et al (2012).
- ^{xxiv} Graham & Mclvor (2015)
- ^{xxv} Martinovic (2017)
- ^{xxvi} Church & Dunstan (1997)
- ^{xxvii} Uggen (2000)
- ^{xxviii} Bales et al (2010)
- ^{xxix} Renzema (2013)
- ^{xxx} Church & Dunstan (1997), King & Gibbs (2003)
- ^{xxxi} NAO (2006)
- ^{xxxii} Church & Dunstan (1997)
- ^{xxxiii} Padgett et al (2006)
- ^{xxxiv} Omori & Turner (2012)
- ^{xxxv} Drake (2011)
- ^{xxxvi} Litmus (2014)
- ^{xxxvii} Drake (2012), Kilmer et al (2013), Hawken & Kleiman (2009)
- ^{xxxviii} Department of Corrections (2018)
- ^{xxxix} Department of Corrections (2018)

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SUMMARY OF EFFECT SIZES FROM META-ANALYSES

Meta-analysis	Reported average effect size on crime	Number of estimates meta-analysis based on	Assuming 50% untreated recidivism		Assuming 20% untreated recidivism	
			Percentage point reduction in offending	Number needed to treat	Percentage point reduction in offending (to prevent one person from reoffending)	Number needed to treat (to prevent one person from reoffending)
Aos et al 2012	d=0.27*	16	.12	8	0.07	15
Roman et al 2012	RR=76%	7	.12	8	0.05	21
<i>Earlier meta-analyses conclude that there is insufficient evidence to estimate an effect size</i>						

* Statistically significant at a 95% threshold

RR=Relative risk

d=Cohen's d or variant (standardised mean difference)