Ministry of Justice

Assessing the effectiveness of Radio Frequency Electronic Monitoring for Community and Suspended Sentence Orders

PNC-based proven reoffending analysis

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1. Summary

Electronic Monitoring (EM) has been widely used internationally since the 1990s. It was first employed as an alternative to remand and supervision of parolees (Killias et al., 2010), and then as an alternative sanction for a range of different community sentences (Renzema, 2003; Whitfield, 2001).

In England and Wales, Radio Frequency (RF) EM was introduced in 1999 to monitor compliance with curfew orders, with usage later expanded from 2018 onwards to include Global Positioning System (GPS) monitoring of individuals' movements 24 hours a day.[1] Alcohol monitoring was introduced across all of England and Wales in 2021. The total number of individuals fitted with an EM device (including GPS and alcohol monitoring) was around 20,900 as at 30 June 2024 (Ministry of Justice, 2024a).

Originally envisioned as a tool to facilitate rehabilitation (Renzema, 2003), EM has subsequently been positioned in certain cases as a viable alternative to custody that places liberty restrictions on offenders whilst also enabling them to remain in the community (Hucklesby and Holdsworth, 2016). This has many potential benefits, including: acting as a habit-breaking tool to change offending behaviour; reducing offenders links with people and places associated with offending; enabling offenders to remain more closely integrated with family members; and avoiding some of the costs associated with incarceration (Hucklesby, 2008). However, a number of problems resulting from the use of EM have also been identified such as: restricting offenders' abilities to secure and maintain employment; and raising tensions with co-habitants.

There now exists a wide variety of EM use cases, not least within England and Wales. EM is still frequently used to enforce curfew conditions of a community or suspended sentence order. Here EM is typically in place for the first part of the sentence (for an average of around three months for offenders serving community orders, and four months for

[1] Importantly, whilst data is collected in real-time, it is still typically viewed retrospectively.

offenders serving suspended orders), although the total disposal period may be much longer. Curfews could be for a maximum of 12 hours a day for 6 months.

EM is also regularly used as a bail alternative for offenders on remand and in support of prisoner release as part of a Home Detention Curfew. Technological advances including GPS and alcohol monitoring via skin sensors have further enhanced the EM toolkit (Hucklesby and Holdsworth, 2020).

In addition, the Ministry of Justice in England and Wales has been conducting pilots of the additional use of EM among various cohorts of prison leavers released on licence since 2021.[2,3] The goal of these interventions is to strengthen the effect of prison leavers' licence conditions.

However, despite its widespread use in a range of jurisdictions, existing research evidence suggests that the impact of EM in general on reoffending is modest at best and that this impact may vary depending on the circumstances of use.

A total of four meta-analyses have been conducted to date, summarising the results from a total of 24 studies[4] undertaken between 1991 and 2018 that were judged to be of sufficient quality for inclusion. Collectively, these studies have failed to identify consistent evidence that EM is effective.

In particular, the most recently updated meta-analysis (Belur et al., 2020) found no significant reduction in offending, although they did observe a modest (and statistically significant) *delay* in offending amongst the five studies that looked at time to reoffence.[5]

However, despite summarising the results from the highest quality studies to date, in scope studies tended to be small scale (only four studies had sample sizes greater than 1,000) limiting their capacity to identify more modest effects of EM. Studies were also

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2 https://www.gov.uk/government/publications/electronic-monitoring-of-domestic-abuse-perpetrators-on-licence-process-evaluation

3 https://www.gov.uk/government/news/tens-of-thousands-more-criminals-to-be-tagged-to-cut-crime-and-protect-victims

4 Gendreau et al. (2000) do not include specific details on the six studies included in their evaluation, but it is assumed that this includes the two studies featured in Mackenzie (1997).

5 The three earlier meta-analyses were similarly critical of the evidence base, failing to identify a significant effect of EM on recidivism (Gendreau et al., 2000; Mackenzie, 1997; Renzema and Mayo-Wilson, 2005).

concentrated in North America (10 in the US and three in Canada) and were often focussed on specific cohorts of high-risk offenders. Just three studies were based on data from the UK and only one of these examined curfew requirements with EM.

Existing studies also tend to assume a general effect of EM, although there is good reason to anticipate that EM effectiveness would differ (at least in part) depending on the type of offender – specifically in terms of the sentenced offence (Renzema and Mayo-Wilson, 2005), as well the length of time EM is in place, and the type of EM technology used (Hucklesby, Beyens and Boone, 2021). For example, Bales et al (2010) found that EM supervision has less of an impact on violent offenders than on sex, drug, property and other types of offenders. This heterogeneous effect may be a product of policy goals, given the targeted use of GPS EM for theft and domestic abuse offenders and of alcohol abstinence monitors.

1.1 Project aims and methodology

This study compares 12 month proven reoffending rates for a cohort of offenders subject to a curfew requirement with RF EM to a group of offenders whose sentence did not include RF EM in England and Wales. Offenders were matched by sentence type with 10,169 offenders who received a community order with RF EM matched to 9,932 offenders on a community order without RF EM, and 5,944 offenders who received a suspended sentence order with RF EM matched to 5,743 offenders on a suspended sentence order without RF EM. Offenders started their probationary requirements between April 2016 and March 2017 and may have received a single or multiple requirement order.[6]

The study adopts a quasi-experimental approach that applies propensity score matching (PSM). This is a matching approach to causal estimation where the main aim is to identify a plausible match for each offender completing a curfew requirement with RF EM that looks ‘similar’ on all included covariates, but was not in receipt of RF EM. Having identified

[6] April 2016 to March 2017 covers the first full financial year of data following a change in methodology used to calculate PNC-based reoffending (for a full explanation on the changes see http://www.gov.uk/government/statistics/proven-reoffending-statistics-october-2015-to-december-2015).

a plausible match for each offender subject to RF EM, differences in reoffending rates between the groups can be used to identify the effectiveness of EM.[7]

Focusing solely on RF technology and taking a retrospective approach, the study considers whether offenders whose sentence includes EM have lower levels of proven reoffending that a matched control that were not subject to EM. The study considers RF EM when used to enforce compliance with a curfew requirement of (i) a community order, and (ii) a suspended sentence order.[8]

1.2 Data

Data on offender and offence characteristics, requirement details and disposal duration were extracted from the probation information management system (nDelius) and linked with EM service user records for disposals from April 2016 to March 2017. Additional data on previous court convictions and custodial sentences from January 2011 was drawn from magistrates' and Crown Court databases.

A total of 16,133 offenders were identified who received a curfew requirement with RF EM as part of either a community order (n = 10,169) or suspended sentence order (n = 5,944). Offenders in receipt of a community order were subject to RF EM for an average of 81 days and offenders completing a suspended sentence order were subject to RF EM for an average of 122 days. Offenders could have been completing either a single or multiple requirement order as part of their community sentence.

Proven reoffending data from the Police National Computer (PNC) was linked to each selected probation record to determine whether 12 month reoffending rates were lower for offenders whose sentence included a curfew requirement with RF EM.

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7 Whilst quasi-experimental approaches to casual estimation can provide important evidence about the effectiveness of RF EM, results can be biased if there are unmeasured confounding variables that are causally related to whether or not someone is in receipt of RF EM and reoffending.

8 This evaluation was developed as part of a recent collaboration between the Ministry of Justice, the Economic and Social Research Council (ESRC) and the Cabinet Office Evaluation Accelerator Fund (EAF) to explore the feasibility of using administrative data to evaluate policy and practice interventions in the justice system. The statistics reported here (and in Brunton-Smith, 2025a) should therefore be considered as experimental.

1.3 Key findings

The study found lower levels of proven reoffending within 12 months for offenders who received a curfew requirement with EM when compared to the matched control groups.

With respect to community orders, approximately 40 per cent of offenders whose sentence included a curfew requirement with RF EM reoffended within 12 months, compared to 51 per cent of the matched group of offenders not subject to RF EM. The average number of reoffences was also lower (4.1 compared to 4.8) for RF EM offenders.

There was also evidence of a lower number of reoffences occurring within the first three months of the disposal start date for those offenders subject to completing a curfew requirement with RF EM.

Whilst it is possible that the proportionately higher number of reoffences in the control condition was the result of a small cohort of offenders in the control group who were committing a disproportionate number of new offences, the lower proportion amongst those subject to RF EM during the first three months was consistent with the average length of time that offenders were typically wearing an RF EM tag as part of their curfew requirement (median 81 days).

Modest differences in the relative contribution of different offence categories were also evident.

Offenders on suspended sentence orders were also less likely to reoffend within 12 months if their sentence included a curfew requirement with RF EM: 32 per cent of offenders subject to RF EM reoffended, compared to 40 per cent of offenders in the control group. Differences in the number of reoffences committed each month were most prominent in first five months after sentence, consistent with the median duration that offenders were wearing an RF EM tag (122 days). Small differences in the relative contribution of different offence categories was again present.

1.4 Implications

The results from this retrospective impact evaluation suggest that curfew requirements with RF EM enhanced the effect of existing community orders and suspended sentence

orders during the study period, with clear evidence of reduced reoffending amongst the group of offenders completing a curfew requirement with EM when compared to the matched control group.

Whilst it is not possible to directly attribute this to RF EM, the fact that for offenders on community orders with RF EM a lower proportion of proven reoffences were recorded in the initial three months of the disposal (a time that coincides with the median length of an EM order) was consistent with RF EM having a direct situational impact on reoffending. For offenders on suspended sentence orders the reduction in proven reoffences was concentrated in the first two months of the disposal, suggesting that RF EM effectiveness may start to decline with time (the median length of an EM order was closer to five months).

2. Background and project aims

2.1 Context

EM has been widely used internationally since the 1990s, first as an alternative to remand and supervision of parolees (Killias et al., 2010) and then as an alternative sanction for a range of different community sentences (Renzema, 2003; Whitfield, 2001).

Individuals are required to wear an electronic tag (normally fitted to a subject's ankle) which regularly communicates with a Home Monitoring Unit (HMU), collating information about compliance with an individual's sentencing order. This is intended to support the police, courts, probation, prisons and the wider justice system by remotely monitoring and recording information on an individual's whereabouts (Ministry of Justice, 2024a).

There are three main variants of EM: Radio Frequency (RF); geo-location supported technologies such as Global Positioning Schemes (GPS); and alcohol monitoring technologies.

RF EM is used to monitor whether a wearer is in a particular indoor location, most typically the home, with the electronic tag able to signal when the wearer leaves and returns to the specified address (Hucklesby and Holdsworth, 2020). It was introduced in England and Wales in 1999 to monitor compliance with curfew orders.

More advanced GPS supported EM was introduced in 2018 across England and Wales; rollout was fully completed in 2021. This form of EM technology is able to collect real-time (or close to real-time) information on offender locations, enabling more granular information of offender movements (Belur et al., 2020). Importantly, whilst data is collected in real-time, it is still typically viewed retrospectively. In England and Wales it is commonly used to monitor exclusion zones, which are areas that an offender is restricted from entering.

The use of alcohol monitoring tags began in the early 2020s across England and Wales.[9] Remote alcohol monitoring can detect alcohol from perspiration and is used where alcohol is considered a risk factor in a person's offending.[10]

In principle, all offenders sentenced to a community order that includes a curfew order or exclusion requirement are eligible for EM. However, the current official sentencing guidelines[11,12] include considerable latitude for sentencer discretion. In particular, sentencers may choose not to impose EM in situations where:

i) there is a person (other than the offender) without whose co-operation it would not be practicable to secure the monitoring and that person does not consent; and/or
ii) electronic monitoring is unavailable and/or impractical; and/or
iii) the particular circumstances of the case, lead the sentencer to consider it inappropriate to do so.

In practice, the number of cases in which EM would not be used for these reasons is likely to be low (Hucklesby and Holdsworth, 2016).

Official statistics[13] show that in England and Wales the total number of individuals who were actively monitored by an EM device (including GPS and alcohol monitoring) was around 20,900 as at 30 June 2024, which has risen from around 10,000 in early 2020 (Ministry of Justice, 2024a). However, community orders and suspended sentence orders accounted for 15 per cent of the total EM actively monitored caseload, which is a proportion that has fallen steadily since the period under study (from around 50% in mid-2017). The largest component of the total EM caseload at the end of June 2024 was court bail (35%), followed by post-release (28%) and immigration (21%).

The types of device being used has also changed, with RF EM no longer the main form of EM. At the end of June 2024 a total of about 7,300 individuals were monitored by RF EM

9 https://www.gov.uk/government/news/alcohol-tags-helping-thousands-of-offenders-stay-sober

10 Alcohol monitoring is used to support the community sentencing option, termed the Alcohol Abstinence and Monitoring Requirement (AAMR), and for offenders released from prison via Alcohol Monitoring on Licence (AML).

11 https://www.sentencingcouncil.org.uk/overarching-guides/magistrates-court/item/imposition-of-community-and-custodial-sentences/

12 These guidelines were effective from February 2017, so they were not in place for most of the 2016/17 study period in this report.

13 https://www.gov.uk/government/statistics/electronic-monitoring-statistics-publication-june-2024

(a decrease of 4% since June 2023), whilst about 10,800 individuals were monitored using GPS (an increase of 34% since June 2023) and some 3,200 individuals were fitted with an alcohol monitor (an increase of 38% since June 2023).

2.2 Evidence of effectiveness

The research evidence on the effectiveness of EM in general remains limited, both in terms of the measured impacts of EM on specific outcomes, and the scope of existing studies.

Four meta-analyses on the effectiveness of EM overall have been conducted to date (Belur et al., 2020; Gendreau et al., 2000; Mackenzie, 1997; Renzema and Mayo-Wilson, 2005). However, collectively they include only 24 unique studies that meet the robust evidence standards required to be able to say with any certainty that EM has a measurable effect on reoffending. This includes just four that have included the random allocation of EM (treatment) to offenders (Austin and Hardyman, 1991; Baumer and Mendelson, 1991; Killias et al, 2010; Lapham et al., 2007), with the remaining studies all relying on some form of quasi-experimental (statistical) adjustment to identify a causal estimate of EM effectiveness.[14] The studies were also generally based on small samples, and only three studies used data from the UK.

Collectively, these studies do not find in favour of the effectiveness of EM in general, although there are exceptions depending on the circumstances of use.

Mackenzie (1997) provides the first attempt to synthesise existing evidence, identifying two studies from an initial pool of more than 500 research articles on EM that tested its overall effectiveness using a randomized design. Comparing EM to a regular curfew order, neither of these studies identified a statistically significant effect of EM, a finding that they suggest may be because EM also increases the probability of detection. The focus on low risk offenders may also go some way to explaining the failure to identify a significant effect of

[14] Findings from studies adopting a full RCT design were generally no different to those using quasi-experimental approaches. For example, Killias et al (2010) reported a non-significant effect of EM, whilst Lapham et al., (2007) find a significant, but short-lived reduction in ‘drinking under the influence’ offences.

EM, limiting their power to reliably distinguish an effect because of the lower levels of offending overall (chapter 9, p.25).

Gendreau, et al., (2000) identified six studies with EM covering (1,414 offenders) but reported no significant effect on reoffending, which was actually found to be higher amongst the EM groups (6% compared to 4%).

Renzema and Mayo-Wilson (2005), focused specifically on high-risk offenders (those they expect to plausibly benefit most), finding just three studies that included a robust control. But like the earlier studies, they also failed to detect a clear effect of EM.

Belur et al., (2020) provide the most extensive (and recent) assessment of EM effectiveness, identifying a total of 18 in-scope quantitative studies.[15] This included two randomised control trials, and a total of 15 high/medium quality studies, with three studies judged of lower quality. Collectively, they identify a modest reduction in reoffending for particular groups of offenders, although Belur et al also note considerable heterogeneity across studies and that the overall effect was non-significant.

In fact, only four studies showed statistically significant decreases in reoffending, whilst two of the 18 studies showed statistically significant increases in reoffending among those participants on EM. They also failed to identify statistically significant differences in effects across control groups (e.g., against specific types of community sentence), type of EM technology (RF, GPS) or whether EM was used in isolation or as part of a set of requirements.

The one exception is their comparison of EM against a custody control group, where a significant overall reduction in reoffending for the EM treatment group was identified (although this was limited to data from just five studies).

However, despite summarising the results from the highest quality studies to date, there are important limitations with the existing evidence base. First, the majority of these studies were based on data from small samples, leaving open the possibility that the

[15] Three of these studies (Finn and Muirhead-Steves, 2002; Bonta, Wallace-Capretta and Rooney, 2000; and Sugg, Moore and Howard, 2001) were also included in the meta-analysis of Renzema and Mayo-Wilson (2005).

failure to identify a consistent effect of EM is the result of a lack of statistical power. The three existing studies based on larger samples all looked at the use of EM on release from prison, saying nothing about the effectiveness of EM as part of a community order (Di-Tella and Schargrodsky, 2013; Marie, Moreton and Goncalves, 2011; Marie, 2011).

Second, most studies (n=13) were conducted in North America where uses of EM are often different from the UK. Only three studies were based on data from the UK and two of these were focused on the effectiveness of EM in support of Home Detention Curfew (Marie, Moreton and Goncalves, 2011; Marie, 2011). The third study by Sugg, Moore and Howard, (2001) did examine EM in support of curfew orders, but was based on a sample of just 261 offenders subject to EM.

2.3 Research questions

This study compares proven reoffending rates for a cohort of 16,113 offenders who received a curfew requirement with RF EM as part of a community order or suspended order to a matched group of offenders (n=15,675) not subject to RF EM in England and Wales. Offenders may have started their probationary requirements at any time between April 2016 and March 2017 and could have sentenced to a single or multiple requirement order.

This retrospective evaluation of the effectiveness of RF EM addressed the following research questions.

1. Does receipt of a curfew requirement with RF EM as part of a community order reduce reoffending?

2. Does receipt of a curfew requirement with RF EM as part of a suspended sentence order reduce reoffending?

3. Data and method

The current evaluation used data extracted from the probation service management information system, nDelius, covering probation requirements that commenced between April 2016 and March 2017 for offenders aged 18-90.

Data were also extracted from magistrates' courts and Crown Court records (Libra and Xhibit) to provide a complete picture of CJS journeys for those subject to any form of probationary supervision. EM service provider data were used to identify the cohort of offenders who were completing a curfew requirement with EM as part of their sentence and matched with offenders sharing similar characteristics, but whose sentence did not include EM. Offenders could be completing a single or multiple requirement order within a community sentence.

Offenders who committed another proven offence within 12 months of the start of the disposal were identified using the PNC.

Linkage between databases was probabilistic using the MoJ's Splink package (Ministry of Justice, 2021), with records connected to the same offender based on similarity of names (forename, surnames, other names), date of birth, and location.

Full technical details about the data and methodological approach are reported in Brunton-Smith (2025b).

3.1 Measuring Electronic Monitoring (EM)

The cohort of EM treated offenders was identified using direct source data from EM service providers. It is important to note that all of these records involved the use of Radio Frequency (RF) EM as opposed to other forms of EM (e.g., GPS enabled or alcohol monitors).

These data were linked to individual offenders. Offenders were classified as having a sentence including EM if the start date recorded by the EM service provider was the same (or up to seven days later) as the curfew requirement start date recorded in the probation

database, or if the start date for any requirement was the same as the EM start date. The seven-day window between curfew start date and EM start date allows for possible delays in EM installation, but leaves open the possibility that some curfew requirements may erroneously be flagged as involving EM (for example, if an offender was sentenced to a community order with no EM within seven days of them being granted bail with EM for another offence). The impact of this is likely to be small, with the majority of linked records (95%) sharing an identical order date across both databases. Approximately 75 per cent of EM records were directly matched to probation records.[16]

Offenders who received a curfew requirement with EM as part of a community order were monitored for approximately three months (median 81 days). For offenders completing a curfew requirement with EM as part of a suspended sentence order, offenders were monitored for approximately four months (median 122 days).

3.2 Proven reoffending

Reoffending was measured using data extracted from the PNC. In line with MoJ proven reoffending statistics, a proven reoffence was defined as "any [new] offence committed in a one-year follow up period that resulted in a court conviction or caution in this time frame or a further six-month waiting period (to allow time for cases to progress through the courts)" (Ministry of Justice, 2024b: 5). The follow up period was measured from the date of court conviction of the offence identified in the probation data.[17]

Using proven reoffending will inevitably be an underestimate of the true level of reoffending, with some offences failing to be reported or detected by the police, and some of those offences that are identified not resulting in a police caution or conviction. There will also be offences that are not included in the official measure of reoffending because the court proceedings are not completed within 18 months. As a result, the offenders

[16] Match rates were slightly lower for community orders (73%) than suspended sentence orders (80%). If reoffending rates (and related outcomes) for these unlinked records are systematically different, it is possible that the estimates of the effectiveness of RF EM would be biased.

[17] Thirteen per cent of offenders could not be linked to the PNC and are excluded from the offender cohort. Linkage rates were similar for offenders subject to EM and those in the control group, so this is unlikely to bias results.

whose proven offending behaviour is presented here are a subset of the true population of offenders (Ministry of Justice, 2024b).

Importantly, in most instances offenders subject to RF EM will not have been monitored for the full duration of the follow up period. As a result, any estimated reductions in reoffending may be the result of changes in behaviour that occurred after the EM tag was removed, or the result of other concurrent sentence requirements.

3.3 Statistical matching and causal estimation

The current evaluation used a quasi-experimental study design – i.e., propensity score matching (PSM) – to identify a control group of offenders who were not subject to RF EM, but who looked 'similar' to offenders in receipt of EM across a range of offender characteristics.[18] Assuming the list of offender characteristics effectively captures the range of potential determinants of an offender's sentence including RF EM that are also correlated with the reoffending, this approach can approximate the conditions of a randomised experiment and enable correct identification of the causal effect of RF EM on reoffending.

Estimation was undertaken in two steps. First, a model was estimated that predicted whether or not an offender's sentence included RF EM. This was used to identify probation records where the sentence did not include RF EM, but which looked statistically similar on all included covariates to those that did (determined based on the similarity of the model propensity score). Second, the 12 month proven reoffending rates of the two groups were compared. Full details on the assumptions that underpin the causal estimation strategy, the rationale for selecting these variables and post-match balance are available in (Brunton-Smith, 2025b).

[18] Quasi-experimental designs are intended to statistically approximate a randomised control trial. Randomisation is generally accepted as the gold standard for identification of the causal effect of a selected criminal justice intervention, with randomization used to allocate offenders to the intervention or control group in a way that ensures any effects of the intervention are not confounded with other potential causes of a change in behaviour. Where randomisation is not possible, statistical controls can be used to try and account for the other potential causes of a change in behaviour.

A total of 51 control variables were used to account for those offender features that were plausibly correlated with whether an offender's sentence included an RF EM component, as well as correlated with future reoffending.

The selected variables covered: basic demographic information (gender, age at offence, ethnicity), details of the sentenced offence (covering 14 Home Office offence groups), prior court convictions (numeric and separated into the same offence types), disposal length, year and number of probationary requirements.

Importantly, whilst all offenders sentenced to a community order or suspended order that included a curfew order or exclusion order were eligible for EM, there is room for sentencer discretion on whether to impose EM. No data were available on exactly why sentencers choose not to impose EM, and it remains possible that other unmeasured determinants of whether an offender's sentence included RF EM were missing. However, in practice, the number of cases in which EM would not be used for these reasons is likely to be low.

The final matched groups satisfied all standard criteria for similarity, achieving a close match in both comparisons: community orders (a standardised mean difference (SMD) of 0.011); and suspended sentence orders (SMD of 0.007).[19] Match rates were high, with fewer than one per cent of RF EM records unmatched.

Full descriptive statistics are reported in appendix table A.1 and A.2.

3.4 Limitations

This evaluation is subject to a number of important limitations and the conclusions of this study should be read with these in mind.

First, it was not possible reliably to isolate the effect of RF EM from the wider potential impact of the curfew requirement that EM was used alongside.

[19] Balance was assessed by examining standardised mean differences in the proportion of records in each variable category between treated and control groups (with a 0.05 difference or less considered optimal), variance ratios (where values should be, at a minimum, between 0.5 and 2, but ideally between 0.8 and 1.25) and overlap statistics (values should ideally be lower than 0.1) (Greifer, 2023; Rubin, 2001).

Second, differences in reoffending for those individuals subject to a single requirement order were not examined separately from multiple requirement orders. The number of requirements included in sentences for those in the EM and control groups were similar (the groups were matched on this variable), but it remains possible that the effectiveness of EM is different when it is used in isolation (as part of a single requirement order) or in combination with other requirements.

Third, not all EM records could be successfully linked to probation data (approximately 25% of records were not linked) and not all of the selected cohort of offenders could be successfully linked to PNC (approximately 13% of records were not linked). If reoffending rates for these unlinked records were systematically different, it is possible that the estimates of the effectiveness of RF ME would be biased.

Fourth, the research is based on data from a cohort of offenders who began their disposals between April 2016 and March 2017. It remains possible that the effectiveness of RF EM may vary over time.

There are also inherent limitations with the use of PSM to approximate a randomised control design.

First, the research is reliant on the assumption that there are no unobserved confounders that are associated with treatment and associated with reoffending. This assumption is untestable and it remains possible that important confounders are missing.

Second, the results may also be susceptible to selection bias. In particular, current official sentencing guidelines identify a number of factors that may lead an individual to be considered ineligible for EM: a lack of consent from someone (other than the offender) required for EM to be installed; a lack of availability of EM; particular case circumstances. No relevant information was available about these factors to enable records to be excluded from the control group prior to estimation. It therefore remains possible that some offenders deemed ineligible for EM are being included in the comparison and as result, the effectiveness of EM is being under (or over) estimated.

Third, the results may be susceptible to researcher dependency effects. Throughout the analysis a range of important decisions have been required – in relation to offender cohort

identification, selection of confounders, matching methodology and closeness of matches. Different choices could plausibly have resulted in different conclusions.

Finally, all analysis must assume that records are an accurate reflection of the true underlying processes being measured. In some instances, data inaccuracies can be identified and corrected prior to analysis, and a careful process of data screening was undertaken to minimise the impact of measurement error. But the potential impact of any remaining errors on the conclusions cannot be known *a priori*. The results are therefore only valid under the assumption that any remaining errors are uncorrelated with the treatment and included outcomes.

4. Findings

4.1 Effectiveness of RF EM when used in conjunction with a curfew requirement as part of a community order

There was clear evidence of reduced reoffending for those offenders receiving a curfew with RF EM when compared to the control group during 2016/17, as set out in table 4.1.

Approximately 40 per cent of offenders subject to RF EM reoffended within 12 months of the start of the disposal, compared to 51 per cent of those not monitored. The percentage point difference was similar when considering quarterly returns. The annual and quarterly differences were all statistically significant ($p<0.01$).[20]

Table 4.1. Adult 12 month proven reoffending for offenders who received a curfew requirement with RF EM and a matched control group not subject to RF EM as part of a community order

Electronic Monitoring

	Apr - Jun 2016	Jul - Sep 2016	Oct - Dec 2016	Jan - Mar 2017	Apr 2016 - Mar 2017
Proportion of offenders who reoffend (%)	**40.7**	**39.8**	**40.5**	**37.7**	**39.7**
Average number of reoffences per reoffender	4.12	4.01	3.94	4.31	4.10
Number of reoffences	4,388	3,936	3,937	4,266	16,527
Number of reoffenders	1,065	981	998	989	4,033
Number of offenders in cohort	2,615	2,462	2,466	2,626	10,169

[20] On the basis of a two proportion Z-test.

Community Order

	Apr - Jun 2016	Jul - Sep 2016	Oct - Dec 2016	Jan - Mar 2017	Apr 2016 - Mar 2017
Proportion of offenders who reoffend (%)	**52.6**	**50.4**	**50.3**	**49.7**	**50.8**
Average number of reoffences per reoffender	4.75	4.74	4.92	4.97	4.84
Number of reoffences	6,490	5,797	5,591	6,525	24,403
Number of reoffenders	1,367	1,224	1,136	1,314	5,041
Number of offenders in cohort	2,598	2,428	2,260	2,646	9,932

The average number of reoffences per reoffender was also lower for those individuals who received a curfew order with RF EM (4.1 offences compared to 4.8), and they committed 22 per cent fewer reoffences overall. Offenders who received a curfew with RF EM committed 32 per cent fewer reoffences during the 12 month evaluation window than the control group (16,527 reoffences compared to 24,403).

Importantly, offenders who received a curfew requirement with RF EM were not monitored for the full 12 month evaluation window used to calculate reoffending rates. In the current analysis, the median length of time that offenders were subject to RF EM was approximately 81 days.

Offenders who received a curfew with RF EM committed fewer reoffences each month than the control group, as shown in table 4.2. The relative reduction in reoffences was largest in the first three months of the evaluation window, with reoffenders subject to RF EM committing approximately 45 per cent fewer reoffences in the first month after disposal start, 44 per cent in month two and 37 per cent in month three. This is consistent with the median length of time that offenders were monitored, with approximately 33 per cent of all reoffences committed by offenders who received a curfew order with RF EM were committed in the first three months after starting their disposal, compared to 39 per cent in the control group.

Of course, it may be the case that this is the result of a small number of reoffenders committing multiple reoffences (offenders in the RF EM group tended to commit fewer reoffences on average). The relative difference was also still substantial, albeit

comparatively smaller, in months four to six (33, 29 and 34 per cent). From the seventh month the relative differences in reoffending were somewhat smaller (between 13 and 26 per cent fewer reoffences per month).

The results were therefore consistent with, but not conclusive of, RF EM acting as a situational barrier to reoffending.

Table 4.2. Adult 12 month proven reoffending for offenders who received a curfew requirement with RF EM and a matched control group not subject to RF EM as part of a community order (by month of offence)

Electronic monitoring

Apr 2016 - Mar 2017	RF EM	non-RF EM	Relative difference
Total reoffences	**16,527**	**24,403**	**-32%**
Reoffence within month 1	2,110	3,870	-45%
Reoffence within month 2	1,698	3,048	-44%
Reoffence within month 3	1,647	2,623	-37%
Reoffence within month 4	1,495	2,236	-33%
Reoffence within month 5	1,436	2,028	-29%
Reoffence within month 6	1,301	1,974	-34%
Reoffence within month 7	1,395	1,841	-24%
Reoffence within month 8	1,204	1,533	-21%
Reoffence within month 9	1,214	1,394	-13%
Reoffence within month 10	1,040	1,409	-26%
Reoffence within month 11	1,013	1,296	-22%
Reoffence within month 12	974	1,151	-15%

Proportion of reoffences

Apr 2016 - Mar 2017	RF EM	non-RF EM	Relative difference
Reoffence within month 1	12.8	15.9	
Reoffence within month 2	10.3	12.5	
Reoffence within month 3	10.0	10.7	
Reoffence within month 4	9.0	9.2	
Reoffence within month 5	8.7	8.3	
Reoffence within month 6	7.9	8.1	

Apr 2016 - Mar 2017	RF EM	non-RF EM	Relative difference
Reoffence within month 7	8.4	7.5	
Reoffence within month 8	7.3	6.3	
Reoffence within month 9	7.3	5.7	
Reoffence within month 10	6.3	5.8	
Reoffence within month 11	6.1	5.3	
Reoffence within month 12	5.9	4.7	

There was also some heterogeneity in the impact of RF EM across reoffence types in table 4.3. However, some of the larger relative differences in the number of reoffences were for offence types with lower baselines, notably criminal damage/arson (-66%) and robbery (+33%). The overall distribution of the number of reoffences by reoffence type remained broadly similar between those individuals with RF EM and those without.

Table 4.3. Adult 12 month proven reoffending for offenders who received a curfew requirement with RF EM and a matched control group not subject to RF EM as part of a community order (by offence type)

Apr 2016 - Mar 2017	RF EM	non-RF EM	Relative difference
Total reoffences	**16,527**	**24,403**	**-32%**
Criminal Damage and Arson	55	160	-66%
Drug	890	929	-4%
Fraud	143	172	-17%
Miscellaneous Crimes Against Society	1,065	1,095	-3%
Possession of Weapons	317	344	-8%
Public Order	870	1,167	-25%
Robbery	4	3	33%
Sexual	90	108	-17%
Summary Motoring	768	877	-12%
Summary Non-motoring	3,508	6,026	-42%
Theft	8,077	12,634	-36%
Violence Against the Person	736	882	-17%
Other	4	6	-33%

Proportion of reoffences

Apr 2016 - Mar 2017	RF EM	non-RF EM	Relative difference
Criminal Damage and Arson	0.3	0.7	
Drug	5.4	3.8	
Fraud	0.9	0.7	
Miscellaneous Crimes Against Society	6.4	4.5	
Possession of Weapons	1.9	1.4	
Public Order	5.3	4.8	
Robbery	0.0	0.0	
Sexual	0.5	0.4	
Summary Motoring	4.6	3.6	
Summary Non-motoring	21.2	24.7	
Theft	48.9	51.8	
Violence Against the Person	4.5	3.6	
Other	0.0	0.0	

4.2 Effectiveness of RF EM when used in conjunction with a curfew requirement as part of a suspended sentence

There was also evidence of reduced reoffending for those offenders who received a curfew requirement with RF EM as part of a suspended sentence order during 2016/17, as set out in table 4.4.

Approximately 32 per cent of monitored offenders reoffended within 12 months of the start of the disposal, compared to 40 per cent of those not monitored. The percentage point difference was variable when considering the quarterly returns. The annual difference and all but one of the quarterly differences were statistically significant ($p<0.01$).[21]

[21] On the basis of a two proportion Z-test.

Table 4.4. Adult 12 month proven reoffending for offenders who received a curfew requirement with RF EM and a matched control group not subject to RF EM as part of a suspended sentence order

Electronic Monitoring

	Apr - Jun 2016	Jul - Sep 2016	Oct - Dec 2016	Jan - Mar 2017	Apr 2016 - Mar 2017
Proportion of offenders who reoffend (%)	**35.2**	**31.9**	**30.4**	**31.5**	**32.2**
Average number of reoffences per reoffender	3.81	3.69	3.94	3.15	3.65
Number of reoffences	1,966	1,699	1,779	1,534	6,978
Number of reoffenders	516	460	451	487	1,914
Number of offenders in cohort	1,467	1,444	1,485	1,548	5,944

Suspended Sentence Order

	Apr - Jun 2016	Jul - Sep 2016	Oct - Dec 2016	Jan - Mar 2017	Apr 2016 - Mar 2017
Proportion of offenders who reoffend (%)	**38.6**	**37.7**	**41.7**	**40.6**	**39.6**
Average number of reoffences per reoffender	3.84	3.99	3.90	4.00	3.93
Number of reoffences	2,240	2,159	2,106	2,435	8,940
Number of reoffenders	583	541	540	609	2,273
Number of offenders in cohort	1,511	1,435	1,296	1,501	5,743

The average number of reoffences per reoffender was also marginally lower for those offenders with an RF EM order (3.7 offences compared to 3.9). Offenders subject to RF EM as part of their sentence committed approximately 22 percent fewer reoffences during the evaluation period (6,978 reoffences compared to 8,940).

In common with the impact evaluation of community orders, fewer average reoffences per reoffender were committed by individuals who received a curfew requirement with RF EM in each month of the study period, as shown in table 4.5. Offenders subject to RF EM committed 36 per cent fewer reoffences in the first month after the start of the disposal, 38 per cent fewer reoffences in month two and 21 per cent fewer reoffences in month three. The number of reoffences was still notably lower by the fifth month after the disposal (-27%). However, from the sixth month onwards the number of reoffences committed by

each group was more similar: offenders who received a curfew requirement with RF EM committed between six per cent and 20 per cent fewer reoffences per month.

This was consistent with a direct effect of monitoring on reoffending, with offenders typically monitored for up to four months (the median length of time an offender was monitored was 122 days). However, it may also be the result of a small number of offenders in the matched control group committing a disproportionate number of offences in the first few months of a disposal.

Table 4.5. Adult 12 month proven reoffending for offenders who received a curfew requirement with RF EM and a matched control group not subject to RF EM as part of a suspended sentence order (by month of offence)

Electronic monitoring

Apr 2016 - Mar 2017	RF EM	non-RF EM	Relative difference
Total reoffences	**6,978**	**8,940**	**-22%**
Reoffence within month 1	885	1,376	-36%
Reoffence within month 2	592	957	-38%
Reoffence within month 3	654	833	-21%
Reoffence within month 4	615	797	-23%
Reoffence within month 5	585	800	-27%
Reoffence within month 6	598	633	-6%
Reoffence within month 7	584	693	-16%
Reoffence within month 8	554	667	-17%
Reoffence within month 9	526	591	-11%
Reoffence within month 10	507	632	-20%
Reoffence within month 11	461	528	-13%
Reoffence within month 12	417	433	-4%

Proportion of reoffences

Apr 2016 - Mar 2017	RF EM	non-RF EM	Relative difference
Reoffence within month 1	12.7	15.4	
Reoffence within month 2	8.5	10.7	
Reoffence within month 3	9.4	9.3	
Reoffence within month 4	8.8	8.9	

Apr 2016 - Mar 2017	RF EM	non-RF EM	Relative difference
Reoffence within month 5	8.4	8.9	
Reoffence within month 6	8.6	7.1	
Reoffence within month 7	8.4	7.8	
Reoffence within month 8	7.9	7.5	
Reoffence within month 9	7.5	6.6	
Reoffence within month 10	7.3	7.1	
Reoffence within month 11	6.6	5.9	
Reoffence within month 12	6.0	4.8	

There was also evidence of heterogeneity in the effect of RF EM across offence types, as shown in table 4.6. However, this did not result in a large change in the distribution of reoffences because the larger changes were generally concentrated in offence types with lower baselines – e.g., sexual offences (-55%) and fraud (-39%).

Table 4.6. Adult 12 month proven reoffending for offenders who received a curfew requirement with RF EM and a matched control group not subject to RF EM as part of a suspended sentence order (by offence type)

Apr 2016 - Mar 2017	RF EM	non-RF EM	Relative difference
Total reoffences	**6,978**	**8,940**	**-22%**
Criminal Damage and Arson	55	45	22%
Drug	386	492	-22%
Fraud	84	138	-39%
Miscellaneous Crimes Against Society	593	523	13%
Possession of Weapons	382	403	-5%
Public Order	407	397	3%
Robbery	39	44	-11%
Sexual	23	51	-55%
Summary Motoring	379	519	-27%
Summary Non-motoring	1,259	1,622	-22%
Theft	2,756	3,957	-30%
Violence Against the Person	615	749	-18%
Other	0	0	

Proportion of reoffences

Apr 2016 - Mar 2017	RF EM	non-RF EM	Relative difference
Criminal Damage and Arson	0.8	0.5	
Drug	5.5	5.5	
Fraud	1.2	1.5	
Miscellaneous Crimes Against Society	8.5	5.9	
Possession of Weapons	5.5	4.5	
Public Order	5.8	4.4	
Robbery	0.6	0.5	
Sexual	0.3	0.6	
Summary Motoring	5.4	5.8	
Summary Non-motoring	18.0	18.1	
Theft	39.5	44.3	
Violence Against the Person	8.8	8.4	
Other	0.0	0.0	

5. Conclusions and implications

5.1 Conclusions

This retrospective impact evaluation assessed the extent to which offenders completing curfew orders with RF EM had lower rates of reoffending than offenders not subject to RF EM. The impact of RF EM was considered across two distinct scenarios among individuals who were disposed during 2016/17: as part of a community sentence; and as a supplement to a suspended sentence order.

The study has shown a statistically significant effect across both settings, with offenders subject to RF EM less likely to reoffend within 12 months than the corresponding matched control group among recipients of community sentences.

Approximately 40 per cent of offenders serving a community order that included a curfew requirement with RF EM reoffended within 12 months of the start of the disposal, compared to 51 per cent of offenders where the community order did not include RF EM. Those offenders who did reoffend also committed fewer reoffences on average (4.1 compared to 4.8).

Offenders on suspended sentence orders were also less likely to reoffend and commit fewer offences if their sentence included an RF EM order (32% compared to 40% within 12 months of the start of the disposal).

It was not possible conclusively to disentangle the impact of RF EM from the broader potential effects of the curfew requirement of which it was part. However, the relative reduction in number of reoffences per month was greatest in the initial months of the disposal period – namely, the first three months for community orders and first five months for suspended sentence orders. This corresponds to the median period of time that offenders were monitored as part of their curfew requirement (i.e., 81 days for community orders and 122 days for suspended sentence orders).

The results were therefore consistent with RF EM tags acting as a situational barrier to offending whilst being worn by individuals.

References

Austin, J. and Hardyman, P. (1991) The Use of Early Parole with Electronic Monitoring to Control Prison Crowding: Evaluation of the Oklahoma Department of Corrections Pre-Parole Supervised Release with Electronic Monitoring, unpublished report to the National Institute of Justice.

Bales, W., Mann, K., Blomberg, T., Gaes, G., Barrick, K., Dhungana, K., and McManus, B. (2010) A Quantitative and Qualitative Assessment of Electronic Monitoring. Florida: Florida State University.

Baumer, T. L., Mendelsohn, R. I., and Rhine, C. (1990) Executive Summary: The Electronic Monitoring of Non-Violent Convicted Felons: An Experiment in Home Detention. Indianapolis, School of Public and Environmental Affairs: 48.

Belur, J., Thornton, A., Tompson. L., Manning, M., Sidebottom, A., and Bowers, K. (2020) 'A systematic review of the effectiveness of the electronic monitoring of offenders. Journal of Criminal Justice. 68:101686.

Bonta, J., Wallace-Capretta, S., and Rooney, J. (2000) Can electronic monitoring make a difference? An evaluation of three Canadian programs. Crime & Delinquency, 46(1): 61–75.

Brunton-Smith (2025a) Assessing the effectiveness of Radio Frequency Electronic Monitoring for Community and Suspended Sentence Orders: Court reconvictions during and after a community sentence, breaches and warnings.

Brunton-Smith (2025b) Assessing the effectiveness of Radio Frequency Electronic Monitoring for Community and Suspended Sentence Orders: Technical report.

Di-Tella, R., and Schargrodsky, E. (2013) Criminal recidivism after prison and electronic monitoring. Journal of Political Economy,121(1): 28–73.

Finn, M. A., and Muirhead-Steves, S. (2002) The effectiveness of electronic monitoring with violent male parolees. Justice Quarterly, 19(2): 293–312.

Gendreau, P. L., Goggin, G., Cullen, F. T., and Andrews, D. A. (2000) The Effects of Community Sanctions and Incarceration on Recidivism. Forum on Corrections Research 12(2): 10–13.

Greifer, N. (2023) Assessing Balance. Available at: https://cran.r-project.org/web/packages/MatchIt/vignettes/assessing-balance.html

Hucklesby, A. (2008) Vehicles of desistance? The impact of electronically monitored curfew orders. Criminology and Criminal Justice, 8(1): 51–71.

Hucklesby, A. and Holdsworth, E. (2016) Electronic Monitoring in England and Wales. Centre for Criminal Justice Studies, University of Leeds. http://www.antoniocasella.eu/nume/Hucklesby_Holdsworth_2016.pdf

Hucklesby, A. and Holdsworth, E. (2020) Electronic Monitoring in probation practice, HM Inspectorate of Probation Academic Insights 2020/08. Manchester: HM Inspectorate of Probation.

Hucklesby, A., Beyens, K. and Boone, M. (2021) Comparing electronic monitoring regimes: length, breadth, depth, weight equals tightness. Punishment and Society, 23(1): 88–106

Killias, M. Gillieron, G. Kissling, I. and Villettaz, P. (2010) Community service versus electronic monitoring – What works better? Results of a Randomized Trial, British Journal of Criminology, 50(6), pp. 1155–1170.

Lapham, S. C., C'de Baca, J., Lapidus, J., and McMillan, G. (2007) Randomized sanctions to reduce re-offense among repeat impaired-driving offenders. Addiction, 102(10): 1618–1625.

MacKenzie, D. L. (1997) Chapter 9: Criminal Justice and Crime Prevention. in Sherman, L., Gottfredson, D., MacKenzie, D., Eck, J., Reuter, P., and Bushway, S. (Eds). Preventing

Crime: What Works, What Doesn't, What's Promising. Washington, D.C., U.S. Department of Justice, National Institute of Justice: 9–1 to 9–83.

Marie, O. (2009) The best ones come out first! Early release from prison and recidivism: A regression discontinuity approach. http://www.coll.mpg.de/economix/2009/Marie.pdf.

Marie, O., Moreton ,K., & Goncalves , M. (2011) The effect of early release of prisoners on Home Detention Curfew (HDC) on recidivism. Ministry of Justice.

Ministry of Justice (2021) Splink: MoJ's Open Source Library for Probabilistic Record Linkage at Scale. Available at: https://www.gov.uk/government/publications/joined-up-data-in-government-the-future-of-data-linking-methods/splink-mojs-open-source-library-for-probabilistic-record-linkage-at-scale

Ministry of Justice (2024a) Electronic Monitoring Statistics Publication, England and Wales: June 2024. Available at: https://www.gov.uk/government/statistics/electronic-monitoring-statistics-publication-june-2024

Ministry of Justice (2024b) Guide to proven reoffending statistics.

Renzema, M. (2003). Electronic Monitoring's Impact on Reoffending, Revised March 24, 2003. Campbell Collaboration Report.

Renzema and Mayo-Wilson (2005) Can electronic monitoring reduce crime for moderate high-risk offenders? Journal of Experimental Criminology 1. 215–237.

Rubin, D. B. (2001) "Using Propensity Scores to Help Design Observational Studies: Application to the Tobacco Litigation." Health Services and Outcomes Research Methodology 2 (3–4): 169–88. https://doi.org/10.1023/A:1020363010465.

Sugg, D., Moore, L., and Howard, P. (2001) Electronic monitoring and offending behaviour – Reconviction results for the second year of trials of curfew orders. Home Office Research Findings, 141.

Whitfield, D. (2001). The Magic Bracelet. Winchester, UK, Waterside Press.

Appendix A
Supplementary tables

Table A.1. Descriptive statistics for community orders (PNC cohort), April 2016 – March 2017[22]

	non-RF EM	RF EM	Total
	(N=67,680)	(N=12,137)	(N=79,817)
Age (at offence)	32.99 (10.67) 31: 18.00-82.00	33.18 (10.81) 31 18.00-85.00	33.02 (10.69) 31: 18.00-85.00

Gender

	non-RF EM	RF EM	Total
	(N=67,680)	(N=12,137)	(N=79,817)
Female (reference)	11,046 (16.3%)	2,116 (17.4%)	13,162 (16.5%)
Male	56,634 (83.7%)	10,021 (82.6%)	66,655 (83.5%)

Ethnicity

	non-RF EM	RF EM	Total
	(N=67,680)	(N=12,137)	(N=79,817)
Asian Indian	979 (1.4%)	119 (1.0%)	1,098 (1.4%)
Asian Pakistani	1,396 (2.1%)	244 (2.0%)	1,640 (2.1%)
Asian Bangladeshi	523 (0.8%)	74 (0.6%)	597 (0.7%)
Asian Chinese	54 (0.1%)	3 (0.0%)	57 (0.1%)
Asian Other	675 (1.0%)	71 (0.6%)	746 (0.9%)
Black Caribbean	1,971 (2.9%)	370 (3.0%)	2,341 (2.9%)
Black African	1,757 (2.6%)	257 (2.1%)	2,014 (2.5%)
Black Other	574 (0.8%)	88 (0.7%)	662 (0.8%)
White and Black Caribbean	1,256 (1.9%)	256 (2.1%)	1,512 (1.9%)
White and Black African	289 (0.4%)	54 (0.4%)	343 (0.4%)
White and Asian	258 (0.4%)	45 (0.4%)	303 (0.4%)
Mixed Other	421 (0.6%)	69 (0.6%)	490 (0.6%)
Arab	152 (0.2%)	19 (0.2%)	171 (0.2%)
Other ethnicity	739 (1.1%)	89 (0.7%)	828 (1.0%)

[22] Numeric variables report: mean, (sd), median, min-max. Qualitative variables report N (%)

	non-RF EM	RF EM	Total
	(N=67,680)	(N=12,137)	(N=79,817)
White British	51,518 (76.1%)	9,754 (80.4%)	61,272 (76.8%)
White Irish	528 (0.8%)	125 (1.0%)	653 (0.8%)
White Roma	378 (0.6%)	67 (0.6%)	445 (0.6%)
White Other	4,212 (6.2%)	433 (3.6%)	4,645 (5.8%)

Index offence

	non-RF EM	RF EM	Total
	(N=67,680)	(N=12,137)	(N=79,817)
Criminal damage	311 (0.5%)	58 (0.5%)	369 (0.5%)
Drugs	3,229 (4.8%)	705 (5.8%)	3,934 (4.9%)
Fraud	2,237 (3.3%)	367 (3.0%)	2,604 (3.3%)
Miscellaneous	2,802 (4.1%)	456 (3.8%)	3,258 (4.1%)
Weapons	110 (0.2%)	21 (0.2%)	131 (0.2%)
Public order	1,997 (3.0%)	391 (3.2%)	2,388 (3.0%)
Robbery	24 (0.0%)	5 (0.0%)	29 (0.0%)
Sex offences	619 (0.9%)	72 (0.6%)	691 (0.9%)
Summary	11,006 (16.3%)	2,147 (17.7%)	13,153 (16.5%)
Summary (motoring)	8,903 (13.2%)	1,384 (11.4%)	10,287 (12.9%)
Theft	13,326 (19.7%)	2,970 (24.5%)	16,296 (20.4%)
Violence	22,940 (33.9%)	3,504 (28.9%)	26,444 (33.1%)
Other (Breach)	111 (0.2%)	48 (0.4%)	159 (0.2%)
Other (Child offence)	65 (0.1%)	9 (0.1%)	74 (0.1%)

	non-RF EM	RF EM	Total
	(N=67,680)	(N=12,137)	(N=79,817)
History of drug offences (N)	0.13 (0.61) 0: 0.00-21.00	0.16 (0.70) 0: 0.00-18.00	0.13 (0.63) 0: 0.00-21.00
History of weapons offences (N)	0.01 (0.10) 0: 0.00-4.00	0.01 (0.10) 0: 0.00-4.00	0.01 (0.10) 0: 0.00-4.00
History of public order offences (N)	0.01 (0.18) 0: 0.00-12.00	0.02 (0.24) 0: 0.00-10.00	0.01 (0.19) 0: 0.00-12.00
History of robbery (N)	(0.12) 0: 0.00-6.00	0.01 (0.14) 0: 0.00-6.00	0.01 (0.13) 0: 0.00-6.00

	non-RF EM	RF EM	Total
	(N=67,680)	(N=12,137)	(N=79,817)
History of theft (N)	1.04 (3.02) 0: 0.00-66.00	1.36 (3.36) 0: 0.00-53.00	1.09 (3.08) 0: 0.00-66.00
History of Violence (N)	0.04 (0.29) 0: 0.00-15.00	0.05 (0.32) 0: 0.00-8.00	0.04 (0.29) 0: 0.00-15.00
History of summary offences (N)	1.30 (2.54) 0: 0.00-129.00	1.55 (2.83) 1: 0.00-61.00	1.34 (2.59) 0: 0.00-129.00
Other history (N)	0.11 (0.47) 0: 0.00-12.00	0.14 (0.53) 0: 0.00-10.00	0.12 (0.48) 0: 0.00-12.00
Prior prison sentences (N)	0.27 (1.38) 0: 0.00-36.00	0.38 (1.69) 0: 0.00-43.00	0.29 (1.43) 0: 0.00-43.00

	non-RF EM	RF EM	Total
	(N=67,680)	(N=12,137)	(N=79,817)
Number of offences in probation disposal	0.56 (1.03) 0: 0.00-18.00	0.50 (0.97) 0: 0.00-10.00	0.55 (1.02) 0: 0.00-18.00
Number of requirements	1.60 (0.77) 1: 1.00-8.00	1.64 (0.85) 1: 1.00-9.00	1.60 (0.78) 1: 1.00-9.00
Disposal length	339.81 (219.49) 364: 0.00-2,619.00	180.27 (177.39) 91: 0.00-1,793.00	315.55 (221.17) 364: 0.00-2,619.00
Electronic monitoring period		95.26 (81.65) 81: 0.00-1,456.00	

Financial quarter

	non-RF EM	RF EM	Total
	(N=67,680)	(N=12,137)	(N=79,817)
April 16	17,833 (26.3%)	3,137 (25.8%)	20,970 (26.3%)
July 16	16,732 (24.7%)	2,952 (24.3%)	19,684 (24.7%)
October 16	15,496 (22.9%)	2,901 (23.9%)	18,397 (23.0%)
January 17	17,619 (26.0%)	3,147 (25.9%)	20,766 (26.0%)

Table A.2. Descriptive statistics for suspended sentence orders (PNC cohort), April 2016 – March 2017[23]

	non-RF EM	RF EM	Total
	(N=34,707)	(N=6,598)	(N=41,305)
Age (at offence)	32.86 (10.79) 31: 18.00-88.00	31.55 (10.96) 29: 18.00-80.00	32.65 (10.83) 31: 18.00-88.00

Gender

	non-RF EM	RF EM	Total
	(N=34,707)	(N=6,598)	(N=41,305)
Female (reference)	4,765 (13.7%)	918 (13.9%)	5,683 (13.8%)
Male	29,942 (86.3%)	5,680 (86.1%)	35,622 (86.2%)

Ethnicity

	non-RF EM	RF EM	Total
	(N=34,707)	(N=6,598)	(N=41,305)
Asian Indian	503 (1.4%)	81 (1.2%)	584 (1.4%)
Asian Pakistani	915 (2.6%)	169 (2.6%)	1084 (2.6%)
Asian Bangladeshi	331 (1.0%)	59 (0.9%)	390 (0.9%)
Asian Chinese	39 (0.1%)	6 (0.1%)	45 (0.1%)
Asian Other	388 (1.1%)	52 (0.8%)	440 (1.1%)
Black Caribbean	1,113 (3.2%)	227 (3.4%)	1,340 (3.2%)
Black African	1,032 (3.0%)	175 (2.7%)	1,207 (2.9%)
Black Other	316 (0.9%)	52 (0.8%)	368 (0.9%)
White and Black Caribbean	748 (2.2%)	161 (2.4%)	909 (2.2%)
White and Black African	154 (0.4%)	28 (0.4%)	182 (0.4%)
White and Asian	143 (0.4%)	28 (0.4%)	171 (0.4%)
Mixed Other	238 (0.7%)	44 (0.7%)	282 (0.7%)
Arab	68 (0.2%)	21 (0.3%)	89 (0.2%)
Other ethnicity	394 (1.1%)	56 (0.8%)	450 (1.1%)
White British	25,879 (74.6%)	5,118 (77.6%)	30,997 (75.0%)
White Irish	308 (0.9%)	73 (1.1%)	381 (0.9%)
White Roma	220 (0.6%)	40 (0.6%)	260 (0.6%)
White Other	1,918 (5.5%)	208 (3.2%)	2,126 (5.1%)

[23] Numeric variables report: mean, (sd), median, min-max. Qualitative variables report N (%)

Index offence

	non-RF EM	RF EM	Total
	(N=34,707)	(N=6,598)	(N=41,305)
Criminal damage	198 (0.6%)	44 (0.7%)	242 (0.6%)
Drugs	3,167 (9.1%)	756 (11.5%)	3,923 (9.5%)
Fraud	1,585 (4.6%)	314 (4.8%)	1,899 (4.6%)
Miscellaneous	2,688 (7.7%)	374 (5.7%)	3,062 (7.4%)
Weapons	151 (0.4%)	28 (0.4%)	179 (0.4%)
Public order	1,429 (4.1%)	323 (4.9%)	1,752 (4.2%)
Robbery	199 (0.6%)	60 (0.9%)	259 (0.6%)
Sex offences	618 (1.8%)	82 (1.2%)	700 (1.7%)
Summary	3,000 (8.6%)	527 (8.0%)	3,527 (8.5%)
Summary (motoring)	4,077 (11.7%)	815 (12.4%)	4,892 (11.8%)
Theft	5,902 (17.0%)	1,183 (17.9%)	7,085 (17.2%)
Violence	11,517 (33.2%)	2,056 (31.2%)	13,573 (32.9%)
Other (Breach)	62 (0.2%)	21 (0.3%)	83 (0.2%)
Other (Child offence)	114 (0.3%)	15 (0.2%)	129 (0.3%)

	non-RF EM	RF EM	Total
	(N=34,707)	(N=6,598)	(N=41,305)
History of drug offences (N)	0.14 (0.60) 0: 0.00-17.00	0.16 (0.65) 0: 0.00-9.00	0.14 (0.61) 0: 0.00-17.00
History of weapons offences (N)	0.01 (0.14) 0: 0.00-12.00	0.01 (0.11) 0: 0.00-2.00	0.01 (0.13) 0: 0.00-12.00
History of public order offences (N)	0.01 (0.14) 0: 0.00-7.00	0.01 (0.14) 0: 0.00-6.00	0.01 (0.14) 0: 0.00-7.00
History of robbery (N)	0.01 (0.14) 0: 0.00-5.00	0.01 (0.17) 0: 0.00-4.00	0.01 (0.14) 0: 0.00-5.00
History of theft (N)	1.02 (3.03) 0: 0.00-67.00	1.02 (3.02) 0: 0.00-40.00	1.02 (3.03) 0: 0.00-67.00
History of Violence (N)	0.06 (0.33) 0: 0.00-8.00	0.06 (0.32) 0: 0.00-5.00	0.06 (0.33) 0: 0.00-8.00
History of summary offences (N)	1.24 (2.54) 0: 0.00-129.00	1.29 (2.55) 0: 0.00-56.00	1.24 (2.54) 0: 0.00-129.00
Other history (N)	0.14 (0.54) 0: 0.00-14.00	0.14 (0.53) 0: 0.00-9.00	0.14 (0.54) 0: 0.00-14.00

	non-RF EM	RF EM	Total
	(N=34,707)	(N=6,598)	(N=41,305)
Prior prison sentences (N)	0.34 (1.53) 0: 0.00-31.00	0.37 (1.67) 0: 0.00-27.00	0.35 (1.55) 0: 0.00-31.00

	non-RF EM	RF EM	Total
	(N=34,707)	(N=6,598)	(N=41,305)
Number of offences in probation disposal	0.80 (1.35) 0: 0.00-30.00	0.76 (1.34) 0: 0.00-19.00	0.79 (1.35) 0: 0.00-30.00
Number of requirements	1.70 (0.81) 2: 1.00-8.00	2.17 (1.02) 2: 1.00-8.00	1.77 (0.86) 2: 1.00-8.00
Disposal length	425.15 (227.80) 364: 0.00-2,392.00	367.57 (262.83) 364: 0.00-1,301.00	415.95 (234.70) 364: 0.00-2,392.00
Electronic monitoring period		169.46 (142.05) 122: 0.00-1,460.00	

Financial quarter

	non-RF EM	RF EM	Total
	(N=34,707)	(N=6,598)	(N=41,305)
April 16	9,182 (26.5%)	1,629 (24.7%)	10,811 (26.2%)
July 16	8,622 (24.8%)	1,598 (24.2%)	10,220 (24.7%)
October 16	7,985 (23.0%)	1,620 (24.6%)	9,605 (23.3%)
January 17	8,918 (25.7%)	1,751 (26.5%)	10,669 (25.8%)