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Disclaimer

APPR developed this summary—using online searches of academic databases and publicly available information—to provide an overview of current research on this topic. The online search may not have identified every relevant resource, and new research will shed additional light on this topic. APPR will continue to monitor the research and will update this summary as needed. Due to the broad nature of this summary, readers are encouraged to identify areas to explore in depth and to consider the local implications of the research for future advancements related to pretrial goals, values, policies, and practices.

Pretrial Location Monitoring

The two main pretrial outcomes that jurisdictions seek—and the only two outcomes that can legally be considered when deciding whether to detain or release a person pretrial—are to maximize court appearance and maximize community well-being and safety (i.e., minimize the likelihood of a person's rearrest). This summary examines the current base of knowledge regarding the effectiveness of pretrial location monitoring in achieving these positive outcomes.

Pretrial research is always evolving. This research summary, which was updated in October 2023, includes findings from recently published studies that may change the interpretation of the takeaways and conclusions presented in the earlier document. In an effort to explain why these changes occurred or why there may not be a singular conclusion, greater detail is provided on research study methodology, and additional guidance is offered on how to interpret findings. Overall, the inclusion of more recent research and a closer critique of past studies has not significantly altered the key findings previously presented to the field.

Several updates have been made to this summary, including:

- outlines of different research designs and study limitations, corrected numbers, and an overview of factors to consider when examining changes in technical violations;
- a new section on collateral consequences and resources necessary to implement location monitoring;
- additional context for interpreting findings related to the use of location monitoring in domestic violence cases; and
- the exclusion of some analyses that were in the previous version because of their tenuous link with location monitoring (e.g., long-term association between pretrial location monitoring for domestic violence offenses and post-disposition outcomes).

It is hoped that this update equips readers with a greater understanding of what can and cannot be inferred as a result of a given research approach.

What Is Location Monitoring?

Technology-based location monitoring—often referred to as electronic monitoring or "EM"—monitors a person's compliance with geographical conditions of release. Location monitoring became commercially available in 1984 and was initially used as an alternative to detention almost exclusively for people convicted of a crime. Since then, it has been increasingly applied to the pretrial population. The first jurisdiction widely known to have included location monitoring technology as part of its pretrial services was Lake County, Illinois, in 1986.[1] Four decades later, nearly three out of four jurisdictions across the country have location monitoring as an option at pretrial release hearings.[2]

There are currently four approaches to location monitoring:[3]

1. ***Radio frequency* (RF)** monitoring sends a signal from the transmitter of the person being monitored to a receiver in the participant's residence. RF units do not monitor people once they are out of the tracking range. RF monitoring is generally used for house arrest.
2. ***Global positioning system* (GPS)** monitoring continually tracks a person's precise location using satellites and cellular towers. GPS provides comprehensive, real-time information and sends an alert if the person tries to tamper with or remove the device. GPS monitoring is more reliable and flexible than RF monitoring.
3. ***Voice recognition*** requires people to check in by telephone, and their unique voiceprint is used to verify their whereabouts.
4. ***Virtual monitoring*** uses a smartphone application and requires participants to provide access to their location and to use identity-confirming technology.

There are many studies on location monitoring in the context of probation and parole supervision; however, relatively little research has been conducted at the pretrial stage. This summary reviews key findings from research on the impact of location monitoring—compared to less restrictive forms of pretrial release, such as unsupervised pretrial release—on pretrial court appearance and arrest rates.

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This pretrial research summary was developed in partnership with the **Center for Justice Innovation**.

Center for Justice Innovation

There are two main challenges with evaluating the impact of location monitoring on pretrial outcomes. First, people assigned to more restrictive release options may have factors that are associated with higher rates of pretrial failure—that is, failing to appear for court, violations of release conditions, or being arrested while on pretrial release. For example, if judicial officers assign people with more significant factors to location monitoring, it is difficult to disentangle whether differences in pretrial outcomes are a result of location monitoring or these factors. Some studies do control for a host of such factors, but if the set of controls is not exhaustive, it becomes more difficult to attribute any differences in outcomes to location monitoring. Second, system responses can impact individual behavior in a way that leads to an unintentional decrease in pretrial success. People under location monitoring face more scrutiny than individuals released under less restrictive options. Location monitoring increases the level of surveillance and requires people to comply with more rules, which gives supervising agents more scenarios where they can petition the court for technical revocations. Thus, location monitoring could increase the likelihood of pretrial sanctions, such as revocation of release or a formal hearing, which can overshadow changes in individual behavior or deterrence effects. These challenges can lead to overestimates of pretrial failure for people assigned to location monitoring.

While there is no research comparing the efficacy of location monitoring to pretrial detention, research documenting the adverse effects of detention suggests that location monitoring should continue to be considered as a pretrial alternative for people assessed as having a lower likelihood of pretrial success.

Key Finding #1: There Is No Clear Association Between Location Monitoring and Improved Pretrial Outcomes

This section synthesizes the findings from five studies that compare location monitoring to less restrictive release options but focuses on three of the more rigorous studies. The results of these studies are mixed. Depending on the study, people on location monitoring are more, less, or equally likely to appear for court and/or remain arrest-free than people not on location monitoring. In other words, the research is ambiguous as to the effects of location monitoring on pretrial outcomes.

One of the earliest evaluations of pretrial location monitoring was conducted in Lake County, Illinois. The study examined 553 people accused of a felony crime and found that, compared to 334 who were released without location

monitoring, the 219 people released on RF monitoring were rearrested at a lower rate (4% vs. 5%), failed to appear at similar rate (7%), and received technical violations at a higher rate (8% vs. 1%).[4] Another study examining 17 federal districts found that those assigned to RF monitoring showed higher failure to appear rates (5.4% vs. 3.0%) and rearrest rates (3.6% vs. 2.1% for felonies; 2.4% vs. 1.0% for misdemeanors).[5]

A couple of challenges make it difficult to draw reliable conclusions from these two studies. First, the studies did not use statistical tests, which would have helped gauge whether differences in pretrial outcomes were driven by the effect of location monitoring or due to chance. Second, those assigned to location monitoring in both studies were charged with more serious offenses or had more prior convictions, which suggests a lower likelihood of pretrial success than the group released without location monitoring. Despite not using similar comparison groups, both studies contended that location monitoring was effective because it allowed people who were less likely to succeed pretrial to be released and have similar pretrial outcomes as those released without location monitoring.

For the three more rigorous studies that assessed the relationship between location monitoring and pretrial outcomes, the results were still mixed. In each of the following studies, a similar comparison group was constructed through a process called matching, where individuals assigned to location monitoring are paired with individuals released on less restrictive conditions who have similar case attributes and demographics.

- In a New Jersey federal district, 620 people were matched on meaningful characteristics (i.e., demographics, offense type, immigration/citizenship status, pretrial supervision conditions, length of time on pretrial supervision, and likelihood of success as determined by a statistically validated assessment). Researchers found that people on GPS or RF monitoring were *equally likely* to appear for court as people not on location monitoring (96.8% appearance rate) and were significantly *less likely* to be arrested (6.8% vs. 10.6%). Further analyses indicated that lower arrest rates were specifically among people who were less likely to succeed pretrial. This suggests that, to the extent location monitoring is used, it should be reserved for those who are determined, through use of an assessment tool or other means, to be most likely to be rearrested. The study also found that people on GPS or RF monitoring were significantly *more likely* to receive a technical violation (44.8% vs. 32.6%), mainly driven by location monitoring violations.[6]

- In Santa Clara County, California, 416 people accused of a crime were matched on demographics, criminal background, current offense, and conditions of supervision. According to the study, those on GPS monitoring were significantly *more likely* to appear for court than those not on location monitoring (91.8% vs. 77.4%), were significantly *more likely* to be revoked for a technical violation (16.8% vs. 4.3%), but were *no more or less likely* to be arrested (4.8% vs. 4.3%).[7]
- More recently, a study by MDRC compared people released on electronic monitoring to similarly situated people without location monitoring across four jurisdictions between 2017 and 2019. People on monitoring made all court appearances at a similar rate to those without location monitoring (86.7% vs. 86.2%) but showed significantly lower rates of remaining arrest-free (67.4% vs. 76.1%).[8] The study noted that the difference in rearrest rates could have been driven by the more intensive monitoring.

Improvements associated with location monitoring vary, with some studies demonstrating very little difference between groups and others a wider gap. Given the wide diversity of current research findings, differences in program processes, and research design limitations across studies, more rigorous research is needed to determine exactly what, if any, effects location monitoring has on pretrial outcomes.

Comparison of Pretrial Outcomes of People on and Not on Location Monitoring*

Studies Referenced	Controls	Appearance Rate	Arrest Rate	Violations Rate
Lake County, Illinois	No	Equal	Lower	Higher
17 Federal Districts	No	Lower	Higher	–
New Jersey	Yes	Equal	Lower	Higher
California	Yes	Higher	Equal	Higher
MDRC	Yes	Equal	Higher	–

* Green shading indicates positive outcomes, orange shading represents negative outcomes, and blue shading indicates neutral outcomes.

Depending on the study, people on location monitoring are more, less, or equally likely to appear for court and/or remain arrest free than people not on location monitoring. More rigorous research is needed to determine exactly what effects location monitoring has on pretrial outcomes.

Key Finding #2: Location Monitoring Is More Effective for People Who Are Less Likely to Succeed Pretrial

The efficacy of location monitoring varies based on a person's assessed likelihood of pretrial success. In the New Jersey study, people were categorized into five levels based on their criminal history, current offense, age, education, employment status, residential ownership, substance use disorders, and citizenship status. Among those categorized as being at a moderate or high likelihood of missing court appearances or being rearrested during the pretrial phase, location monitoring was associated with significantly lower rates of rearrest. However, people categorized as being at a low likelihood of missing court appearances or being arrested during the pretrial phase were significantly more likely to receive technical violations compared to those released without location monitoring. Once location monitoring violations were removed, the differences between those on and not on location monitoring were no longer present.[9] These findings indicate that location monitoring is more effective when reserved for people at a lower likelihood of pretrial success. Assigning location monitoring to people who are likely to succeed without it can be counterproductive if it only increases technical violation rates with no benefit to rearrest or court appearance rates.

> *Location monitoring should be reserved for people at a lower likelihood of pretrial success. Assigning location monitoring to people who are more likely to succeed pretrial can be counterproductive if it only increases technical violation rates with no benefit to rearrest or court appearance rates.*

Key Finding #3: Location Monitoring Can Lead to Increases in Technical Violations

Location monitoring is among the most restrictive pretrial release conditions, which can provide expanded grounds for technical violations, as highlighted in the three aforementioned studies. In California, the technical revocation rate was almost four times higher for the location-monitored group than for the non-location-monitored group.[10] In New Jersey, the EM group's higher technical violations were driven by monitoring violations. When restricted to non-location monitoring violations, the EM group actually exhibited lower violation rates compared to the non-monitored group.[11] In a study examining the impact of different technical violations on revocations in Texas, GPS violations

were associated with a four-fold increase in the likelihood of revocations of release, suggesting that the system's response to GPS violations may be more severe (up to and including incarceration) than its response to other technical violations such as drug test violations or failures to pay.[12] The combination of greater surveillance and stricter rules increases the likelihood of technical violations. If location monitoring aims to reduce law violations in the pretrial period and to improve court appearance rates, practitioners need to ask whether technical violations further either of those goals.

While location monitoring has been found to produce mixed findings on court appearances or remaining arrest-free, it can lead to higher rates of technical violations due to stricter pretrial conditions and increased surveillance.

Key Finding #4: Location Monitoring Can Impose Collateral Consequences on Individuals and Requires Substantial System Resources

Failure to appear, pretrial rearrest, and technical violation rates are important measures for evaluating location monitoring, but they do not account for the collateral consequences imposed on people or the use of system resources that might be more impactful elsewhere. Location monitoring places geographic and timing restrictions, making it difficult for some people to maintain employment.[13] For instance, people with temporary and service sector employment must frequently change locations, shifts, and companies; location monitoring may make this more challenging, if not impossible. People may be required to pay the cost of electronic monitoring, which may be a significant financial burden, and they can face housing instability if residential properties prohibit people on electronic monitoring. Location monitoring can also prevent people from engaging in prosocial activities, such as school or family events; this can strain relationships with family and friends.[14] These collateral consequences compound and pose additional considerations beyond public safety and the efficiency of the court system.

The efficiency of the court system may itself be impacted by using location monitoring:

- Operating an electronic monitoring program requires substantial resources. For example, in Chicago, the 2021 budget of the electronic monitoring program exceeded $35 million, with 276 staff for over 3,500 people being monitored.[15] Technical issues, such as the loss of

coverage around large buildings, cost officers time and resources.[16] One study estimates that the per diem cost of electronic monitoring is about 3.6 times the cost of traditional supervision.[17]

- Location monitoring programs can require coordination between different agencies.[18]
- Qualitative interviews with agents piloting a location monitoring program found that officers training to use location monitoring faced a steep learning curve and dealt with various workload concerns.[19]
- Managing a GPS caseload led to less face-to-face contact and delays in community contact.[20]

This research demonstrates that the full costs of location monitoring—including the collateral consequences to individuals and the costs to the system—should be considered when determining which population to target and the scale of the program.

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Key Finding #5: Research Does Not Show Consistent Correlations Between the Use of GPS Monitoring in Domestic Violence Cases and Better or Worse Pretrial Outcomes

The use of location monitoring in domestic violence (DV) cases is complex. Because of the intimate nature of the relationships and high potential of lethality, an elevated danger to victims is often assumed, and more onerous conditions of supervision may be imposed. Thus, higher rearrest rates could be treated as a positive outcome if they deter or reduce future victimization. Unfortunately, rearrest measures are imperfect for capturing the impact of location monitoring on new DV offenses. If location monitoring is associated with *higher* rearrest rates, it could be interpreted in three substantially different ways:

1. More DV incidents are occurring.
2. More DV incidents are being detected.
3. More possible future incidents are being deterred.[21]

If location monitoring is associated with *lower* rearrest rates, the interpretation is more straightforward: location monitoring reduces and deters DV incidents.

A quasi-experimental study indicated that, after accounting for differences in case attributes (e.g., demographics, offense type, number of prior arrests, etc.), GPS monitoring of DV cases in the Midwest and South had an impact on justice-involved individuals before case disposition:[22]

- In the Midwest, GPS monitoring was compared to RF monitoring (being placed on house arrest for a specified curfew period) and being released on bond. GPS monitoring was associated with a significantly higher likelihood of arrest for *any offense* during the pretrial period.
- In the South, GPS monitoring was also compared to RF monitoring and being released on bond. GPS monitoring was found to have no statistically significant impact on arrest outcomes before trial. According to the authors, this may be due to underlying differences in case compositions, as the GPS group included people assessed as being less likely to succeed pretrial and those who were unable to pay bond.

The same study also surveyed survivors and people accused of domestic violence about the benefits and hardships associated with GPS monitoring. While some survivors reported feeling appreciative for the peace of mind they had knowing their estranged partner was being monitored via GPS, others described a greater sense of risk to their well-being. For example, survivors feared that their former partner might be more likely to retaliate because of the restrictions placed on them. People accused of DV reported that GPS monitoring had both advantages (e.g., protection from false claims, added structure to their lives) and disadvantages (e.g., living with restrictions, managing stigma). The study's authors ultimately cautioned against using GPS monitoring—despite its potential benefits to recidivism rates, survivors, and people accused—without first ensuring that certain conditions are in place. Conditions may include utilizing GPS monitoring for a particular purpose, such as protecting survivors and enforcing restraining orders; ensuring a match between a person's attributes and program details; and balancing survivor safety and due process for the person accused.

A more recent study matched people charged with DV on GPS monitoring to people charged with DV without location monitoring. The findings found no association between location monitoring and rearrests for any offenses, rearrest for DV offenses, or appearing for court hearings. GPS monitoring was associated only with a lower likelihood of people meeting with their pretrial officer.[23]

At this time, research findings on the issue are inconsistent and inconclusive. More study is needed to determine if GPS monitoring provides benefits in DV cases and if there are specific factors that make the practice more or less effective.

Research on GPS monitoring of domestic violence cases shows no clear relationship with pretrial outcomes. More research is needed in this area.

Best Practice Recommendations

The aforementioned research literature and the professional practice standards that follow offer mixed guidance regarding pretrial location monitoring.

1. American Bar Association (ABA)

Standard 10-5.2(a) in *ABA Standards for Criminal Justice: Pretrial Release* explains conditions of release such that: "If a defendant is not released on personal recognizance or detained pretrial, the court should impose conditional release, including, in all cases, a condition that the defendant attend all court proceedings as ordered and not commit any criminal offense. In addition, the court should impose the least restrictive of release conditions necessary reasonably to ensure the defendant's appearance in court, protect the safety of the community or any person, and to safeguard the integrity of the judicial process. The court may: (vi) require the defendant to be released on electronic monitoring…be placed under house arrest…as may be necessary reasonably to ensure attendance in court, prevent risk of crime and protect the community or any person during the pretrial period."[24]

2. The National Association of Pretrial Services Agencies (NAPSA)

Standard 3.2(b) in *Standards on Pretrial Release* explains: "At the initial bail hearing, the court should determine if there is probable cause to believe the defendant committed the crime charged before setting bail, ordering conditions of pretrial release or the defendant's temporary detention" (p. 40). According to the commentary: "This Standard assumes that any condition other than an order for the defendant to make all scheduled court appearances and refrain from criminal behavior pretrial would qualify as a 'significant restraint of liberty' within the meaning of the Gerstein decision. In particular, these Standards regard frequently-imposed conditions of pretrial supervision such as…electronic surveillance as significant restraints" (p. 40).[25]

3. National Institute of Corrections (NIC)

A Framework for Pretrial Justice: Essential Elements of an Effective Pretrial System and Agency specifically does not cite location monitoring as an essential element of an effective pretrial system, as the literature is unclear about which supervision conditions best assure pretrial outcomes.[26]

Notes

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