

Using GPS in Domestic Violence Cases: Lessons from a Study of Pretrial Programs

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In November 2012 at the annual meeting of the American Society of Criminology, Drs. Edna Erez, Peter Ibarra, and Oren Gur presented the results of a national survey they had conducted under an NIJ Grant, on the use of GPS in enforcing orders of protection in domestic violence cases. Their study, which included interviews with victims and defendants, law enforcement and court officers, and social service providers, is the broadest attempt yet to understand how pretrial services are employing the unique capabilities of GPS tracking to create enforceable exclusion and inclusion zones. In this article, the authors update and summarize the main findings of their study—how programs vary in goals and emphasis, how defendants view the experience of EM, how victims feel about the level of security this new technology provides, and how professionals in the field are expanding their use of GPS as they learn from experience what it can and cannot do.

Research and practice have shown that women in abusive relationships are persistently at risk of encountering violence from their intimate partners (legally defined as domestic violence, hereafter DV). Official notification may precipitate retaliatory intimidation and harassment, renewed or escalated violence, as well as other efforts to persuade the victim to recant her complaint, and hence the risk of violence is heightened when a woman complains to the police about being abused (or when others complain on her behalf). In response, the criminal justice system has developed the practice of issuing a court-mandated protection order (PO), which prohibits an alleged batterer from approaching the victim or contacting her, directly or indirectly (e.g., through proxies). Although POs can be effective at dissuading offenders from contacting abused intimate partners, it is a mere “piece of paper” (Erez, Ibarra &

Lurie, 2004: 16) for a subgroup of defendants who are determined to contact the victim. Judges presiding over DV cases are also apt to encounter reciprocal allegations from the various parties about who is contacting whom, resulting in frustration and difficulties in sorting out who is the primary aggressor or related questions (often described by court personnel as “he said, she said” scenarios).

around the victim’s home. To detect contact attempts, RF-based monitoring entailed the use of a bilateral strategy that augmented a traditional home detention strategy through placement of a second receiver in the victim’s residence (“bilateral RF”). This second receiver detected the presence of the defendant wearing a synchronized transmitter (typically on his ankle), within a range of approximately

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To address these matters, a majority of states have either passed legislation or are considering legislation that requires or urges jurisdictions to employ electronic monitoring (EM) technology to deter and document abuse in the post-arrest (hereafter pretrial) period (Gur, Erez, Ibarra, & Bales, 2012).

Beginning in the 1990s, criminal justice agencies employed radio frequency (RF) equipment capable of warning victims or alerting law enforcement if the defendant has breached the area marked

500 feet. By synchronizing the second receiver to the defendant’s transmitter, authorities were alerted if the defendant had entered the perimeter of the victim’s residence (assuming he had not removed the anklet), and could document when he left and returned to his own residence. In cases where the defendant and victim had been living together at the time of the arrest, the defendant was usually required to find a new residence for the duration of

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his time enrolled in the program (a practice that was continued with the move to GPS-based technology).¹

Bilateral RF technology was limited in that it did not monitor the defendant's whereabouts when he was away from his or the victim's residence, a limitation that Global Positioning System (GPS) technologies improve upon: GPS tracking potentially allows the offender to be geolocated in real time, and its programming capabilities enable the creation of exclusion and inclusion zones beyond the dwellings of both victims and defendants. The superiority of GPS technology is credited to its tracking capabilities, broadened detection range (beyond the 500 feet limitation of RF) and capacity for programming of multiple exclusion and inclusion zones (i.e., areas where the alleged abuser may not enter, or is required to remain,

The Present Study

This article reports on findings from an NIJ-funded study that examined the operation and impact of GPS for DV programs from the perspectives of people who have personal and/or professional experience with the application of GPS technologies in DV cases. The article draws from in-depth individual and group interviews with parties directly or indirectly involved with programs at six agencies located in different geographical areas of the country, each of which adopts different approaches to the use of GPS in response to DV. Interviews with victims, offenders, justice personnel, and social service providers (N=210) are complemented with findings from a national web-based survey of pretrial service agencies in the United States about the patterns of use and concerns in the application of electronic monitoring (EM) technologies in their operations, with a specific emphasis on

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respectively). As the victim is presumed likely to be found in the exclusion zone from which the defendant is prohibited, the GPS technology allows for any defendant incursion into the exclusion zone to be registered as a contact attempt. Other types of contact attempts – such as telephone, email, social media postings, SMS (i.e., text messages), chance encounters outside monitored areas, or contacts initiated by the victim (e.g., when the victim enters areas where the defendant is present) – are not documented via GPS. While GPS has many advantages relative to bilateral RF, it also has drawbacks. The latter include greater cost, increased workload demands on staff owing to a more extensive information stream, and reliability and accuracy concerns (e.g., regarding signal continuity while the offender goes underground, enters buildings that are tall or have thick walls; and because of technical problems associated with “drift”).

applications of GPS to address DV cases.² Individuals who responded to the survey (N=616) represented agencies in 43 states, the District of Columbia, and Puerto Rico, 149 of whom reported using GPS for DV.

The perspectives of personnel who either administer or influence the operations of GPS for DV programs, as well as those enrolled as participants (i.e., victims and defendants), are an important consideration in evaluating these initiatives. Valuable insight into the benefits and drawbacks associated with technology-based programs emerges from a consideration of the perspectives of involved parties regarding questions of implementation, program operation, and the impact of the programs' services or supervision regime(s).

Findings

A. Variations in GPS program orientations and practices

Agencies differ in their approaches to operating GPS for DV programs. First,

GPS for DV programs vary in the kind and degree of *restrictions* that they impose on defendants, including the number of hours defendants are free to leave their residence, whether or not defendants are subject to surprise home and workplace visits, and the degree of flexibility and leniency that programs show toward accommodating clients' needs and activities. Thus, a less restrictive program might be willing to draw irregularly shaped exclusion zones so as to ease the defendant's commute path, while an inflexible program will insist on the defendant making alternative arrangements in order to preserve the integrity of a two mile radius. Variations in program restrictiveness are related to differences among the agencies in (a) levels of staffing and resources, (b) philosophy regarding due process and the types of constraints that can be placed on non-convicted persons, and (c) the risk category of the offender population that is typically handled by a given program.

Second, GPS for DV programs vary in the extent to which they are victim-oriented. Agencies with a more intensive victim-orientation will have staff dedicated to working with victims, a philosophy of helping victims cope with or transition out of an abusive relationship, and are likelier to maintain contact with victims during their involvement with the program. Questions of restrictiveness and degree of victim orientation influence the experiences that defendants and victims are likely to have during their involvement with a GPS for DV program. Although there are exceptions, more restrictive programs tend to result in greater peace of mind for victims, while more lenient programs are associated with greater victim uncertainty regarding their safety.

B. Defendants' experiences and perspectives

Defendants participating in GPS programs across the six study sites described their experiences as a “mixed bag,” having encountered both positive and negative experiences during their time on GPS. Most defendants felt it was far preferable to “sitting in jail” and they

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were grateful that participation enabled them to maintain their employment. Defendants at a less restrictive site spoke of being thankful for the kinds of assistance they received from supervising officers. Defendants also spoke about using their time in the program, and away from the alleged victim, as an opportunity to engage in constructive pursuits, including rebuilding relations with family members, looking for work, returning to school, and re-imagining their lives without the victim having a part in it. Some defendants mentioned that participation in a GPS program discouraged friends with whom they might otherwise get into trouble from visiting with them in their homes. Defendants also appreciated the fact that GPS shielded them from false accusations that could be made by an estranged partner.

On the other hand, defendants enrolled in the more rigorous programs found them to be overly demanding and the personnel inflexible. For example, inflexibility was observed around issues related to changes in work schedules or designated “out hours” (i.e., the specific periods that defendants are given to conduct “personal business”), and in accommodations of their commuting situation, particularly when reliant on public transportation. For the defendants, GPS is associated with heightened legal jeopardy due to the transparency of their movement and the net-widening effects that commonly occur with the introduction of new sanctions or measures (e.g., judges’ tendency to impose these measures in cases that previously did not warrant such treatment). The technology and equipment prompted a number of practical and logistical concerns, such as difficulty with maintaining an active signal while at work and inadvertently disclosing one’s status as a monitored subject. Concerns were also raised that GPS participation could damage or undermine their employment situation or chances of being hired. Defendants enrolled in programs that had per diem fees tended to resent having to pay to participate, despite the use of sliding scale fee structures in many locations. They viewed these fees as onerous, especially considering the fact

that they were also facing legal fees, the costs of maintaining a new and separate residence, diminished work hours (when the agency did not permit the defendant to add overtime on an ad hoc basis), and continued primary household and child/spousal support expenses.

C. Victims’ experiences and perspectives

Placing the defendant on GPS provided victims with benefits, but also created new problems and raised concerns. Generally, the defendant’s enrollment in a GPS-based pretrial supervision program seemed to affect the women’s emotional and psychological well-being. Many women reported having peace of mind and expressed appreciation for the relief from abuse and manipulation that accompanied their estranged partner’s remote supervision. In programs that provided such an option, victims liked having recourse to a supervising officer in

settings beyond the exclusion zone(s), or upon hearing of defendant sightings through friends. Consequently, some women described remaining within the exclusion zone as much as possible, to the point where some became fixated on determining the exact boundaries the defendant was required to observe. Given their acquaintance with the defendant’s history, a lingering uncertainty for many of the women was that their estranged partners would be able to manipulate the technology or the supervising officer, and hence subvert the technology’s capacities and undermine the program’s rules and restrictions. Although “no news” may be “good news,” for many victims the lack of any alerts regarding defendants who were compliant and observed exclusion zone boundaries could be unsettling, as some started to wonder whether their estranged partner was being monitored at all.

The study found that placing the defendant on GPS provided victims with a sense of safety and security, but also created new problems—some women described becoming fixated on determining the exact boundaries of the exclusion zone the defendant was required to observe.

the event that the defendant tried to contact them or for other questions that might arise. Victims appreciated having input into the determination of the exclusion zones. The idea of being able to resume a “normal life” was also commonly mentioned. For example, victims recounted being able to visit friends, entertain family members, pursue employment and career opportunities, and feel undisturbed while at home.

Despite a provisional sense of relief among the women while the defendant was being tracked, some uncertainties lingered. Victims typically did not understand how GPS technology works, but most admitted they understood that it could not guarantee their safety. Victims who were not informed about how the supervision program was structured (e.g., the rules by which defendants must abide), could become anxious when they saw their alleged abuser moving about freely in

Another set of concerns is encountered by victims because of the justice process that is initiated with the defendant’s arrest and admission into the program. First, some victims were discomfited to learn while in court that they were required to divulge confidential or sensitive information (e.g., the victim’s new address or the identity of a child’s babysitter) – *in the presence of the defendant*. Second, the drawing of exclusion zones was itself problematic in that it effectively disclosed to the defendant the general area to which a victim had relocated; from this information, victims feared, the defendant could ascertain their actual location. In sending alerts to defendants to stay away from specific areas, the monitoring agency furnished clues pointing to the victim’s new residence (in cases where she relocated after he was arrested). In response

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to victims' requests that the defendant not be told a general area into which he could not enter, several agencies developed the practice of creating "unknown zones," i.e., perimeters that were monitored for defendants' incursions, but which did not result in an automatic violation by the defendant (since the incursion was unwitting). Instead, only the victim was informed of the incursion. However, unknown zones create their own uncertainties for victims (and agencies), as it is not necessarily evident whether an unknown zone incursion is by chance or deliberate. Third, victims who relied on the income stream provided by their estranged partner felt obligated in some cases to post his bail or pay his program fees so that he could continue to work and provide for the family/household.

Finally, a sub-group of victims treated the GPS program in a very distinctive

perspectives on program restrictions and services. It highlights the scope of participating agencies' monitoring activities, available resources and enduring constraints, as well as the views and experiences of personnel involved with the application or administration of GPS for DV programs (see Erez, Ibarra, Bales, & Gur, 2012: 29).

GPS programs rely on the ability of their personnel to effectively supervise defendants; officers with a lower caseload have more time to scrutinize the information generated by advanced technologies, which in turn may affect how onerous the program feels to defendants. The survey results show that, on average, GPS officers monitor less than half as many clients as non-GPS officers,³ confirming that agencies appreciate the importance of close monitoring.

The length of time defendants spend on GPS programs may contribute to their perception that the program is

pay a higher percentage of the cost of monitoring for programs utilizing passive monitoring, and that the percentage that defendants pay is lower for programs utilizing active monitoring, this difference can be attributed to the lower cost of passive monitoring. Because active monitoring requires more resources (e.g., contract with 24/7 monitoring center), it is costlier on an absolute basis to defendants: on average, among respondents reporting that their programs utilized multiple levels of monitoring, defendants pay \$8.68 per day for active monitoring and \$6.79 for passive.⁴ Programs have a cost associated with supervision that they incur for each defendant per day, and programs expect defendants to pay for some percentage of the cost. Pilot- or grant-funded programs might not charge defendants at all, while in other programs the cost to defendants may be up to \$25.00 per day (for active monitoring) or percentages of gross salary, with a mean of \$9.80 cost to the agency per defendant per day (N=85, SD=3.8), of which defendants are expected to cover an average of \$8.80 per day (N=86; SD=5.1).⁵ These per diem amounts do not necessarily include the costs of personnel or program administration.

The program's orientation towards victims, including the objective of keeping victims safe, loomed large in how practitioners viewed their GPS for DV program. Respondents agreed that the main impetus for their program's creation was the desire to keep victims safe. However, few reported that their programs had objective features to actively engage victims in pursuing their own safety while their defendants were on GPS. Although about two thirds of programs contact victims regarding defendant participation in the program, only a fraction (10-15%) (a) use criteria to qualify victims (e.g., to address issues of compatibility between program rules and the victim's situation), (b) provide training to victims, (c) require victims to sign documentation acknowledging the capabilities and limitations of the GPS program, and (d) require victim participation as a condition of placing a defendant in

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way, using it as a way of controlling the terms under which the defendant could see them. Since the victims themselves were not being monitored, they could enter and leave the defendant's residence at will without discovery, with some even reporting that they stayed overnight. Agencies that conduct surprise home visits reported occasionally finding victims hiding on the premises; such findings are treated as serious violations on the part of the defendant and may result in the victim being viewed by personnel as uncooperative.

D. Practitioners views on GPS for DV programs in pretrial agencies: The online survey

Results from an online survey of practitioners who utilize GPS in domestic violence cases during pretrial complements findings from the qualitative interviews with victims and defendants. The online survey documents practitioner

onerous. According to survey results, defendants who participate in GPS programs are enrolled for an average of 99.5 days (N=84; SD=65.6 days), with wide variation across programs: a minimum of one day and maximum of 365 days. Individuals who do not have many out hours may experience subjection to a lengthy period of monitoring as onerous. For example, because they are unemployed, and hence perceived as posing a heightened risk, jobless defendants in more restrictive programs will often be required to remain at home for extended periods of time as a precaution.

Defendants' participation costs were often related to the type of GPS monitoring to which they were subject (e.g., active, hybrid, passive), suggesting differential burdens associated with the three technological platforms. Although results from the survey indicate that defendants

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a GPS program. In less than a third of programs (30%) victims receive text message notification when the defendant violates (Erez, Ibarra, Bales, & Gur, 2012: 44). These findings support experiences reported by victims about insufficient communication with program staff. It also may be the case that such channels of communication would obviate the need for disclosure of personal information during formal proceedings, which might compromise victim safety.

The concern with victim safety was also reflected in survey results about the priority given to certain types of offenders or cases. The practitioners indicated that their programs were targeting primarily serious offenses for GPS supervision and cases for which the court had issued an order of protection. A victim request that a defendant be placed on GPS was also an important consideration for enrollment, as was the defendant's prior history of alcohol or drug use. However, although the majority of programs reported successfully enrolling all referred defendants, a quarter of the programs reported being able to hook up only half of those referred to GPS, and these defendants were not necessarily excluded for reasons related to the "type" of offender or risk that they represented. Reasons for exclusion from program participation included: the candidate not meeting program requirements (e.g., no independent dwelling, no landline telephone, poor satellite or cellular coverage), a lack of available GPS equipment, the absence of victim cooperation (when the latter's consent was required), and the defendants inability to pay program fee.

Indeed, despite surveyed practitioners' stated concern for victim safety, the results suggest that the overwhelming majority of GPS for DV programs lack victim-centric features. Programs tended to use a GPS system's capability to control more than its capability to communicate. For example, most programs utilize features such as the ability to map the defendant's movements in the community over time, determine a defendant's current location, send the defendant an alert, and establish inclusion and exclusion zones. Yet the capability to

send a victim a text message when a defendant violated zone restrictions was the function least utilized by survey respondents. Such an alert would allow victims to take their own precautions, with less reliance on a speedy law enforcement response, a vital option considering that fewer than half of the respondents report that law enforcement automatically responds to defendant violations or alerts.

The overwhelming majority of practitioners (80%) strongly agreed that GPS cannot prevent a defendant from committing a crime, which suggests the need to focus on victim safety measures. Practitioners thought that GPS is more punitive to defendants than empowering to victims. But according to the majority of the practitioners, victims misunderstand the capabilities of GPS tracking, and may develop a false sense of security. Nonetheless, the majority agreed that the use of GPS contributes to public safety, though only a minority (13%) of

supervision programs as a form of punishment without benefit of trial, as they have not been convicted. Indeed, the present study found – in the three sites for which data were available – that almost half of all GPS clients' cases were dismissed. Thus, given the continued growth in GPS programs for DV defendants, several criminal justice policy issues merit discussion. First, are GPS for DV programs appropriate for all of those who can technically be brought under their purview? Second, what is the optimal or suitable approach to take with those to be subjected to court-imposed liberty restrictions? Third, how should the program incorporate the victim in the definition of its overall mission and everyday operations? Ideally, deliberations about how to design pretrial GPS for DV programs will be undertaken with an understanding of the needs and situations of DV victims, on the one hand, and the rights and interests of defendants, on the other. A balanced approach would consider victims'

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programs had ever formally evaluated the effectiveness of GPS tracking for defendants, or employ special procedures (30%) to assess the risk of violent behavior by the defendant during the pretrial period.

Survey results suggest that while the role of victims in GPS for DV programs is being explored and aligned with technological innovations and efforts to enhance supervision, ensure client accountability, effectively protect the public, and deter additional crimes, there are many aspects of the pretrial intervention that require further consideration, such as assessing defendants for propensity for violence and evaluating program effectiveness within the larger criminal justice system.⁶

Conclusion

Considering that the technology is often applied as a condition of pretrial release, defendants often experience these

welfare, including their safety, as well as defendants' due process rights.

GPS for DV programs can be developed in numerous ways. For example, programs can utilize active, passive or hybrid platforms; they can be organized as more restrictive or more lenient regimes; and they can be more or less victim-focused. Each approach has its advantages and disadvantages and will likely reflect the kinds and amounts of resources at a given agency's disposal as well as the characteristics of the offender population under its supervision. Regardless of approach, however, there are general principles and practices that are likelier to enhance the experiences of victims and ease the burdens on non-convicted persons.

Victims benefit from a GPS program when they are informed about the program's capabilities and limitations;

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Victims benefit from a GPS program when they are informed about the program's capabilities and limitations; personnel take into consideration their views and concerns, particularly in drawing exclusion zones; and agency staff periodically check in with victims, including to convey to them major events related to the defendant (such as a successful motion to remove the equipment).

personnel take into consideration their views and concerns, particularly in drawing exclusion zones; and agency staff periodically check in with victims, including to convey to them major events related to the defendant (such as a successful motion to remove the equipment). Included in the latter category are calls to the victim alerting her to breaches of the exclusion zones. However, such calls should be handled sensitively and following appropriate investigative effort (e.g., guard against false alerts). As a general rule, maintaining channels of communication is key to understanding how victims perceive the program, and whether the program actually enhances their safety. Such knowledge can reveal possible discrepancies between victims' expectations (and corresponding behavioral changes) and the program's actual capabilities and practices. Absent such insight into victims' expectations for program performance, victims are likely to experience frustration, loss of confidence in the system, disappointment, fear, a false sense of security, and in the worst-case scenario, the victim's safety can be seriously compromised because she is taking risks by acting as if she is under the program's protective cover.⁷ Agencies should also remain mindful of the burdens that participation may entail for victims. For instance, having the defendant pay per diem fees may undermine his ability to contribute to family or household expenses.

Although defendants may never be content with their enrollment in a remote

supervision program, they may be less resentful about program restrictions and rules if they do not feel they are in place merely to punish them, or if they believe that the program is willing to accommodate particularities of their needs and unique situation. Showing flexibility in permitting a worker to schedule overtime hours can ease the burden of keeping up with program fees while also maintaining a provider role to the household/family he shares with his estranged partner. Conveying to the defendant that compliance with program rules and restrictions will only help his defense may help muster his enthusiasm for being in the program, as will an officer taking a neutral stance toward the pending legal case, rather than conveying to the defendant that he is "probably guilty of something." Finally, helping the defendant redefine his time in the program as something that might be beneficial to him – enabling a job search, the earning of a GED, or the resumption of a long-delayed home improvement project – may help soften the blow of living a temporarily restricted life.

GPS for DV programs should be based on an understanding of the dynamics of DV, rather than utilizing the GPS program as a way of handling non-DV related problems (e.g., jail overcrowding). Understanding these dynamics, and the risks they pose to victims, especially during the post-assault and separation phases, may enhance the program's objective of deterring contact between victims and defendants. Such a program identity would recognize the

importance of accrued expertise in the proper identification and management of risks associated with DV cases, whether or not the programs are victim-oriented.

References

- Gur, O. M., Erez, E., Ibarra, P. R., & Bales, W. (November 16, 2012). Programs utilizing GPS electronic monitoring technologies in cases of domestic violence during pretrial: Results from a national survey of practitioners. *Annual Meeting of the American Society of Criminology*, Chicago, IL.
- Erez, E., Ibarra, P. R., & Lurie, N. A. (2004). Applying electronic monitoring to domestic violence cases: A study of two bilateral programs. *Federal Probation* (June), 15-20.
- Erez, E., Ibarra, P. R., Bales, W., Gur, O. M. (2012). GPS technologies and domestic violence: An evaluation study. A report submitted to the National Institute of Justice, Washington D.C. Available: <https://www.ncjrs.gov/pdffiles1/nij/grants/238910.pdf>.

Endnotes

¹Current and previous research (Erez, Ibarra, & Lurie, 2004) has found that most DV victims who participate in GPS programs are women, and hence in this article the masculine pronoun is used in reference to the alleged abuser and the feminine gender case in relation to the alleged victim or prosecuting witness.

²A third component of the study consisted of a quantitative examination of the impact on offender behavior both during and after the pretrial period (See Erez, Ibarra, Bales, & Gur, 2012, for more information).

³Officers using GPS have an average caseload of 43.8 clients per month (N=96; SD=40.0); those not using GPS monitor an average of 91.8 clients per month (N=87; SD=65.1).

⁴Among respondents reporting that their programs utilized multiple levels of monitoring, the average per diem cost of GPS to the agency is \$11.18 for active monitoring, and \$6.84 for passive monitoring.

⁵16.3% of defendants cannot make payments and are exempted from having to do so, while another 16.3% pay \$10.00 per day

⁶A limitation of the survey is that it did not explore what respondents thought could be done to improve the experience for defendants, including how supervision of non-convicted parties could be pursued in a way that balanced victim welfare with defendants' due process rights.

⁷As it is not always possible to provide victims with the resources that they should optimally have, training victims on how to do safety planning is essential.



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