——————— Research Report ———————

An Overview of Electronic Monitoring in Corrections: The Issues and Implications

Ce rapport est également disponible en français. This report is also available in French. Pour obtenir des exemplaires supplémentaires, veuillez vous adresser à la Direction de la recherche, Service correctionnel du Canada, 340, avenue Laurier ouest, Ottawa (Ontario) K1A 0P9. Should additional copies be required, they can be obtained from the Research Branch, Correctional Service of Canada, 340 Laurier Ave., West, Ottawa, Ontario, K1A 0P9.

2008 N° R-182

An Overview of Electronic Monitoring in Corrections:

The Issues and Implications

Shauna Bottos

Research Branch
Correctional Service Canada

April 2007

ACKNOWLEDGEMENTS

The author would like to thank Dr. Christa Gillis and Dr. Brian Grant for their editorial work on this project, as well as the insightful comments they provided throughout its completion. Additionally, the background information on electronic monitoring provided by Kristi Squires was greatly appreciated.

EXECUTIVE SUMMARY

The past two decades have borne witness to substantial advances in the technology sector that have since been incorporated into contemporary correctional practices. The increasingly widespread use of electronic monitoring (EM) to enhance supervision of offenders in the community is particularly noteworthy in this regard. The present literature review provides an overview of the emergence of EM in corrections, the types of equipment used, and their relative strengths and weaknesses. Controversial issues surrounding the implementation of EM programs are also highlighted. This paper concludes with a number of recommendations for agencies interested in implementing EM programs, as well as important directions for future research to explore. The need for greater inter-disciplinary collaboration is underscored in this process.

Despite having been in place since the 1980s, the utility of EM programs in meeting such objectives as reducing prison populations, providing a cost-effective alternative to incarceration or other community-based programs, and successfully rehabilitating and re-integrating offenders into society, has been the subject of considerable debate. Early outcome evaluations of EM programs produced largely dismal results (Rogers & Jolin, 1989). However, the evidence that has frequently been reviewed has been plagued by several methodological shortcomings (Bonta, Rooney, & Wallace-Capretta, 1999; Rogers & Jolin, 1989). In particular, small sample sizes characterize much of the research to date, as does the failure to include any or adequate comparison groups (Bonta et al., 1999), factors that will make finding any significant effects difficult and hamper the interpretation of results, respectively. Moreover, even when comparison groups have been included, the failure to randomly assign participants to experimental and control groups creates uncertainty as to whether any observed differences between the groups are due to the program itself or are simply reflective of differences in sample characteristics (Rogers & Jolin, 1989). Since many of the early studies were conducted on offenders who were at a low risk to re-offend, regardless of whether they were being monitored, this has also raised scepticism that any lower recidivism rates noted for such individuals were actually attributable to the EM practices as opposed to offenders' initial risk level (e.g., Bonta et al., 1999).

More recently, larger-scale evaluations that have taken into account offenders' risk level, and which have employed greater methodological rigor and superior data analytic techniques, have begun to emerge, and provide a number of encouraging results. In these studies, EM is reported to result in lower recidivism, technical violation, and revocation rates for the duration of its use (Florida Department of Corrections [FDOC], 2003; Padgett, Bales, & Blomberg, 2006). At present, it remains too early to address whether these programs will lead to long-term behavioural change, and a similar argument can be made concerning their relative cost savings.

Thus, the results on the effectiveness of EM programs in meeting their stated objectives have been equivocal and mixed. While it is unlikely that EM will ever come to replace the direct human contact characteristic of traditional probation or parole, or ever negate the need for other correctional programs, it may very well prove to be a useful aid in community supervision, and may demonstrate merit when used as one component of a multi-need, individualized rehabilitation program. It is concluded that further research addressing these issues is needed in a Canadian context.

TABLE OF CONTENTS

INTRODUCTION

Over the past two decades, the exponential growth of prison populations worldwide has brought about a renewed interest in community-based programs that could serve to divert offenders from prison while simultaneously ensuring that the public is protected from further harm. Research in the technology sector has capitalized on this growing need, and has led to the development of electronic monitoring (EM) equipment as a viable alternative to incarceration for several subgroups of offenders, as well as an adjunct to traditional community supervision practices. Now widely implemented in several jurisdictions in the United States, the United Kingdom, Europe and, increasingly, in Canada, there are still a number of legal and ethical issues regarding the implementation of EM programs (Black & Smith, 2003; John Howard Society of Alberta [JHSA], 2000, 2006). Also, the practical merits of these programs in terms of their rehabilitative efficacy and ability to reduce criminal behaviour following their completion remain unclear (Bonta et al., 1999; Renzema & Mayo-Wilson, 2005). This review begins with a brief overview of the history of EM practices and technology, the rationale underlying their use, and contemporary applications of these developments. The thrust of this paper, however, is directed towards highlighting the advantages and disadvantages of EM, the dominant issues surrounding its implementation, and the results of the outcome evaluations conducted to date. This literature review will clearly indicate that the results surrounding the utility of EM programs have been inconsistent, but that there is enough support for it to merit further study into how such programs might work in a Canadian context.

ELECTRONIC MONITORING

The Emergence and Role of Electronic Monitoring in Corrections

Although the concept of electronically monitoring offenders in the community was conceived in the 1960s, its implementation in corrections did not become a reality until the 1980s (Nellis, 1991). Though initially intended to be a humane and inexpensive alternative to custody for some individuals, the motives underlying the use of EM vary widely, and many other functions of such programs have since been realized (Black & Smith, 2003; Martinovic, 2002; Payne & Gainey, 2004; Renzema & Mayo-Wilson, 2005). In particular, EM has been used for detention, restriction, and surveillance purposes by ensuring that offenders are in a designated place, that they do not enter proscribed areas or contact prohibited individuals, and that their

movements may be continuously tracked, respectively (Black & Smith, 2003). Such practices underline the potential for EM to achieve an intricate balance between being punitive, thus satisfying the public's desire for retribution, and facilitating behavioural change by encouraging more socially responsible behaviour (i.e., rehabilitating the offender) (Gainey & Payne, 2000; Gainey, Payne, & O'Toole, 2000; White, 2001). Martinovic (2002) cited several additional aims of EM programs, such as reducing the public's tax burden by avoiding the prohibitive costs associated with incarceration, as well as protecting the offender from the corrupting and stigmatizing effects of institutional confinement, and the need to maintain family and community ties. Ultimately, all EM programs have the objective of suppressing criminal behaviour through increased accountability and monitoring, thereby enhancing public safety beyond that achieved by the more traditional community supervision practices of probation and parole, and it is hoped that recidivism rates are reduced in the long-term (Renzema & Mayo-Wilson, 2003). As technological advances continue to be made, new and improved forms of EM have emerged, many of which may prove valuable in achieving these goals.

Electronic Monitoring Technology

Various types of EM devices have been developed over the years, with each successive generation improving upon its predecessors, both in terms of their functionality and portability. Today, EM equipment comes in two general forms: continuously signalling or "active" systems and programmed contact or "passive" systems (JHSA, 2000). In essence, active systems require the individual to wear a transmitter, usually in the form of an ankle bracelet, which continuously emits a signal to a receiver unit connected to his or her landline telephone (Rondinelli, 1997). The receiver unit then relays the signal to a computer at the monitoring centre, where any signal interruptions with the offender's schedule, or any attempts to tamper with the equipment, can be detected and reported to the appropriate authorities. During their initial use, though called "continuous signalling" technology, the devices were typically used only to monitor an offender's presence or absence at a single location, most commonly his or her place of residence (Renzema & Mayo-Wilson, 2005). Over time, their application expanded to areas outside the home, such as work and treatment programs. Variations were also developed that utilized mobile equipment allowing for the detection of the individual's device, enabling authorities to conduct drive-bys of where the person should or should not be (Mukherjee, 1999). Therefore, active

systems quickly came to be recognized as an important supervisory tool that could be used to enhance traditional community supervision practices.

In contrast to active systems that continuously emit a signal to a receiver, passive systems use a computer to call the offender at random or specified times to ensure the wearer is where he or she is supposed to be (Crowe, 2002). As such, they are "passive" in that the offender's presence is only noted when the computer calls. While a variety of different techniques have been used to confirm an offender's presence with these systems, one of the more common means of achieving this goal requires the offender to wear a device strapped to his or her wrist which is inserted into a verifier box connected to the telephone when the computer calls (Schmidt, 1998). Voice verification, which analyzes the offender's voice when he or she answers a call, and biometric fingerprint and retinal scans have likewise been employed (Mukherjee, 1999), as have systems that require the offender to respond to a pager, with caller-ID technology verifying the individual's location (JHSA, 2000). In comparison to its active counterpart, passive systems are limited by the fact that they do not provide immediate notification of location or condition violations during the intervals between calls.

In general, the first generation of EM technology relied on radio frequency (RF) transmissions, and such systems continue to be the dominant form of surveillance equipment utilized (Lilly, 2006). RF systems are based on the principle of maintaining an electronic tether between the device (i.e., bracelet) worn by the offender and the receiver unit, with the status of the offender reported by a conventional telephone line. However, as many have noted, such systems are unable to track an offender's movements, and are instead limited to verifying whether the individual is at an approved location at a specified point in time (Black & Smith, 2003; JHS, 2000). Hence, they serve primarily detention purposes (Black & Smith, 2003). As a result of this limitation, there has been growing interest in the application of the more advanced Global Positioning Satellite (GPS) technology as an alternative tool to enhance the supervision of offenders in the community (Lilly, 2006). Available in both active and passive formats, compared to RF systems, GPS technology has the added advantage of being able to continuously track an offender's movement 24 hours a day in "real time" when active systems are used. In addition, inclusion and exclusion zones can be programmed designating the geographic locations an individual is and is not permitted to enter, respectively. Passive GPS operates in a similar manner, but the location and movement data are downloaded, usually once a day, when the

offender returns home and places the device in a cradle that connects to the monitoring agency. In both its active and passive forms, GPS technology essentially operates by receiving signals from a constellation of satellites which triangulate a position, and store or communicate that location to a monitoring centre. To accomplish this feat, the individual must wear an ankle or wrist bracelet and carry a transmitter, the latter of which relays a signal indicating the offender's position to the agency tracking him or her. The monitoring centre is alerted to any program or boundary violations either immediately (in the case of an active system), or on a delayed basis (in the case of a passive system), and these violations are subsequently relayed to the probation officer and, if the victim chooses to be notified, he or she is alerted by a beeper (Office of Program Policy Analysis and Government Accountability [OPPAGA], 2005). Tampering with the equipment also results in an immediate notification being sent to the call centre. Thus, GPS technology, particularly in its active form, represents a significant evolution in offender monitoring practices. Not only is such technology able to ensure that an offender is in a designated location at a specific time, but it is also able to restrict the areas an offender can and cannot enter, and track his or her movements in real time (Black & Smith, 2003). As will become evident in the following sections, while such advantages hold considerable promise for enhancing community management practices, the continuous surveillance associated with their use raises human rights concerns.

Applications

Since its emergence in community corrections, EM has been used on a variety of offender groups and at different phases of the justice process (Black & Smith, 2003; Maxfield & Baumer, 1990). For instance, many EM programs are comprised of property or drug-related offenders, and the utility of applying this technology to high-risk sexual and habitual offenders is increasingly being realized (Courtright, Berg, & Mutchnick, 2000; FDOC, 2003; Minnesota Department of Corrections, 2006; OPPAGA, 2005; Roy, 1997). Even though EM has been implemented in similar ways worldwide, the manner in which EM is applied tends to vary according to the risk level of the offender (Renzema & Mayo-Wilson, 2005). With low-risk offenders, for example, EM is generally used either by itself or in conjunction with other forms of low-contact monitoring, whereas with moderate- and high-risk offenders, EM is more commonly only one component of a multi-faceted program that is combined with more extensive

human contact or supervision (Renzema & Mayo-Wilson, 2005). The present section underscores the further versatility of EM programs by addressing the three stages of the criminal justice process within which EM may be employed: the pre-trial phase, at sentencing, and following a period of incarceration. Although the primary objectives of such programs may differ in emphasis according to the stage in question, all seek to control offender risk and ensure public safety (Albrecht, 2005).

During the pre-trial stage, EM may be used as a condition of being granted bail or when a judge elects to release the accused on a recognizance bond (Black & Smith, 2003; JHSA, 2006; Maxfield & Baumer, 1990). In the case of a recognizance bond, which does not require financial remuneration as a condition of release, EM enables offenders with limited financial resources to return to their homes to await trail, rather than spending this time in custody (JHSA, 2006). EM during this stage can be used as a form of surveillance to reduce flight risk, to ensure that any conditions imposed are followed, and to minimize the likelihood that other offences will be committed (Black & Smith, 2003). When used prior to trial, EM has generally been shown to be an effective strategy for achieving these goals (Altman, Murray, & Wooten, 1997; Cooprider & Kerby, 1990), and it has the added benefits of being cost-effective relative to incarceration and allowing suspects to avoid the criminogenic environment characteristic of custodial settings (Payne & Gainey, 2004).

In addition to its use during the pre-trial phase, EM may also be employed as a primary sentencing option as a means of enforcing certain restrictions on the liberty of an offender (Black & Smith, 2003; JHSA, 2006). This application of EM lies at the core of home detention schemes which seek to keep the offender confined to his or her place of residence during curfew hours. Unlike pre-trial arrangements, EM in this context is utilized by the court system as a form of punishment through its home detention capacity, though its restrictive and surveillance capabilities are likewise realized (Black & Smith, 2003). EM is currently available as a primary sentence in the United States, and tends to be viewed as being somewhat more lenient than incarceration, but harsher than probation (Black & Smith, 2003). Importantly, there is some evidence suggesting that EM as a sanction may be punitive while simultaneously having rehabilitative qualities, and that it may also increase public safety by reducing the likelihood that new offences will be committed (Bonta, Wallace-Capretta, & Rooney, 2000a; Courtright et al., 2000; Payne & Gainey, 2000).

Among all of its applications, the most common use of EM programs is their use following a period of incarceration as a condition of early release (i.e., parole) (JHSA, 2006). Here, the objectives of EM programs are primarily re-integrative and rehabilitative in nature (Black & Smith, 2003; Payne & Gainey, 2004). More specifically, by providing a gradual transition from completely externalized control over offenders' behaviour while incarcerated, these programs seek to internalize a sense of personal accountability through the shaping techniques (i.e., positive and negative reinforcements) made possible by continued vigilance over offenders' behaviour in the community. It is hoped that such monitoring will encourage more socially responsible behaviour and that this behavioural change will be maintained in the long-term. As will be further elaborated upon below, evaluations of the effectiveness of EM programs in achieving such goals have provided mixed results, with some studies showing lower recidivism and revocation rates among program participants relative to offenders released into the community who are not monitored electronically (FDOC, 2003; OPPAGA, 2005; Padgett et al., 2006), and others reporting no differences between the groups (Bonta et al., 2000a, 2000b; Renzema & Mayo-Wilson, 2005).

Advantages and Disadvantages of EM Programs

Similar to any type of correctional program, EM has both advantages and disadvantages associated with its use. In this section, any beneficial effects of EM programs compared to traditional community supervision practices (i.e., probation and parole) are underscored, as are their limitations. The relative merits of GPS technology over RF equipment, in both their active and passive formats, will also be highlighted.

Electronic Monitoring vs. Traditional Community Supervision

Undoubtedly, the most salient and important advantages associated with EM programs lie in their ability to aid probation and parole officers in monitoring and managing offenders' behaviour in the community. Indeed, the use of EM changes the nature of the supervisor-participant relationship, and provides an objective, reliable basis upon which sanctions (e.g., tightened curfew) and rewards (e.g., less restrictive curfew) can be based. Moreover, the enhanced level of supervisory control, beyond that afforded by direct human contact alone, augments offender accountability and ultimately has the potential to reduce their likelihood of re-offending (FDOC, 2003; Padgett et al., 2006). As mentioned previously, another advantage of

EM programs is their versatility with diverse offender groups and across various stages of the criminal justice process (Black & Smith, 2003; Payne & Gainey, 2004). Allowing offenders to serve all or part of their sentence in the community as opposed to prison also has the potential to reduce prison populations and the need to build more correctional facilities, both of which can lead to increased cost savings for taxpayers (Black & Smith, 2003; Boelens, Jonsson, & Whitfield, 2003). Such savings, however, are only likely to be realized when EM is used as an alternative to incarceration, as opposed to in addition to already existing non-custodial orders (Black & Smith, 2003; Clear, White, & Presnell, 1998). However, EM appears to be predominantly used as an additional community supervision tool rather than as a diversion from custody (Bonta et al., 1999; OPPAGA, 2005). These practices will impact not only the cost-effectiveness of EM programs, but also supports concerns surrounding the "net-widening" effect to be described shortly.

Finally, and in accordance with one of the primary goals of all contemporary correctional programs (Andrews & Bonta, 2003), EM is put forward by some to be a major tool in offender rehabilitation and reintegration efforts (Boelens et al., 2003; Padgett et al., 2006). Offender rehabilitation, or the modification of antisocial behaviour, is suggested to result through the gradual shaping and internalization of behavioural control, largely as a consequence of being under constant supervision (Gainey & Payne, 2000). The re-integrative effects, on the other hand, are proposed to occur by diverting individuals from the highly criminogenic atmosphere characteristic of incarcerated settings, exerting greater control over their behaviour than standard probation or parole, and placing offenders in a better position to maintain employment and family and community ties (Black & Smith, 2003; Gainey & Payne, 2000). EM programs may also help to avoid the negative psychological effects associated with incarceration (Black & Smith, 2003).

Despite these advantages, several limitations of EM programs remain. Notwithstanding the improved ability to monitor offenders' actions, EM equipment does not guarantee that an offender will not behave unlawfully or that the authorities will be able to intervene before a victim is harmed. The system can only report what it knows, which is where the offender is or has been. At the same time, the less onerous conditions of EM relative to incarceration may be perceived by victims and the public as being too lenient a sentence with minimal retributive qualities (Black & Smith, 2003).

Other disadvantages lie in the technology itself. Problems with technology, particularly the equipment and monitoring capabilities, may include technical faults, poor monitoring coverage, equipment failure, and uncomfortable devices (Gibbs & King, 2003). Moreover, although safeguards have been put in place to detect tampering, none of the devices developed to date are tamperproof, and the destruction of the receiver or bracelet can lead to all information regarding the individual's whereabouts being lost (MDOC, 2006).

Another limitation characteristic of all forms of EM surrounds the issue of the rehabilitative capacity of equipment in the absence of a program addressing offenders' underlying criminal tendencies, a point which has been challenged by many of those working with offender populations (e.g., Bonta et al., 2000b; Renzema, 2003). Indeed, despite high EM program completion rates, the evidence in favour of its rehabilitative effects is tenuous at best (Bonta et al., 2000a).

A final noteworthy limitation of EM is that, despite avoiding the adverse psychological effects associated with incarceration, these effects may still be experienced by some EM program participants. For example, the hardware the offenders are required to wear serves as a daily visible reminder that they are being monitored, which could conceivably be embarrassing for the individual. The stigmatizing effect of having a criminal history may also be compounded by having to wear an EM device, with many employers reluctant to hire individuals who are under such enhanced scrutiny (Mayer, 2004). Both of these factors may impede offender reintegration efforts.

Global Positioning Satellite (GPS) vs. Radio Frequency (RF) Technology

While any form of additional surveillance beyond traditional community supervision may be of value, the emergence of GPS technology provides information on offenders' movement not previously afforded by programs relying on RF signalling equipment. Indeed, as noted above, RF monitoring remains limited by the fact that it can only be used to *verify* an offender's location. GPS systems, on the other hand, allow for the continuous ability to *track* an offender's movement, and permit inclusion and exclusion zones to be specified (BI Incorporated, 2006; JHSA, 2006; Lilly, 2006). With active GPS, victims can also be notified when perimeter boundaries are violated via pager or text message, thereby promising an enhanced level of protection and increased feelings of security beyond that afforded by RF technology and passive GPS (BI Incorporated, 2006; Lilly, 2006; OPPAGA, 2005; Tewey, 2005). Although even

satellite monitoring is only able to report where the offender is or has been and is unable to prevent criminal behaviour, without it, this movement information would be considerably more difficult to obtain.

Even though GPS technology promises an improved ability to monitor offenders in the community relative to RF equipment, several limitations have impeded its more widespread application. One major consideration appears to be the expense associated with such equipment. Overall, both the costs associated with the hardware necessary and the added manpower needed for 24-hour monitoring seven days a week is greater for EM programs using active GPS systems compared to RF systems, and the cost associated with passive GPS use tends to fall in between these two extremes (OPPAGA, 2005; Tewey, 2005). Relative to active GPS, passive GPS tends to create a heavier workload for probation and parole officers since the latter software requires the officer to sift through each day's prior movement data in order to identify potential release violations (OPPAGA, 2005). In addition, jurisdictions that employ both active and passive satellite tracking technology have reported the passive systems to produce the highest number of incidents requiring officer follow-ups, many of which turn out to be false alarms (OPPAGA, 2005). As a result, after adjusting for the resultant greater workload required by the officer, the active system is actually reported to surpass its passive counterpart in the cost-effectiveness domain (OPPAGA, 2005). These findings suggest that the economical differences between active and passive technology may relate more to how the information is being processed and have less to do with the actual systems themselves.

Another limitation associated with satellite tracking technology is its reliance on wireless data service coverage (MDOC, 2006; Tewey, 2005). Similar to the "dead spots" commonly experienced by cell phone users, the cell phone included in the transmitter box may lose satellite signals when entering large structures or when moving between buildings, thus compromising the ability to know an offender's location (MDOC, 2006; Tewey, 2005). Such signal loss alerts the monitoring centre, and requires an immediate (for active systems) agent response, regardless of whether the offender has in fact violated a condition of his or her release (MDOC, 2006). On the other hand, with an active system, it is noteworthy that location data can still be stored in the personalized tracking device under such circumstances and retrieved when the device is once again within cellular range (Tewey, 2005).

In summary, the enhanced level of supervisory control associated with EM, and the potential for such control to increase public safety provide a sound rationale for further research on EM technology as an aid to the more traditional community supervision practices. The added merits associated with GPS equipment have only begun to be realized, yet this alternative to RF signalling devices is emerging as the monitoring tool of choice where budgets permit (Lilly, 2006). Presently, Nova Scotia is the only province in Canada utilizing GPS technology, with the remainder relying on RF-based systems. Limiting the use of GPS to higher-risk offenders may help serve to off-set any additional costs associated with its use, a sentiment echoed by many working within the field of corrections (OPPAGA, 2005; Tewey, 2005). Furthermore, as GPS system use becomes more widespread and technological advancements are made, the costs associated with their use can be expected to decline, making their implementation less restricted by financial considerations.

Issues Surrounding the EM of Offenders: The Debate Continues

Even with the increased use of EM with correctional populations worldwide, several legal, ethical, and practical issues surrounding its use remain. Since the initial implementation of these programs in the early 1980s, the focus among these issues has shifted from an emphasis on legal and moral concerns to those falling within the economic domain (Albrecht, 2005; JHSA, 2000, 2006). Systemic issues have likewise risen to the forefront (JHSA, 2006), and the social impact of EM on the offender and his or her family have increasingly become recognized (Gainey & Payne, 2000; Martinovic, 2002; Payne & Gainey, 2004). The expansion of EM programs has created a greater awareness of these issues, and conscious efforts directed towards minimizing their impact have ensured that such programs are delivered in a humane manner that protects both the offender and the community into which he or she is released.

When EM first emerged as a means of monitoring offenders' activities, the primary concern was that the constitutional rights of offenders might be in jeopardy (Ingraham & Smith, 1972; JHSA, 2000; Lilly & Ball, 1987). Infringement of offenders' equality under the law and rights to privacy were key issues in this regard. Nevertheless, since the 1980s and early 1990s, the constitutionality of EM programs has been affirmed in the United States, where it is now generally conceded that offenders are not afforded the same degree of constitutional protection as other citizens (JHSA, 2000, 2006). As a result, such concerns have largely been allayed. The

proposed invasion of offenders' privacy has further been addressed through a rigorous selection process which entails the meeting of pre-defined eligibility criteria, full disclosure on the part of the administering correctional authorities of what participation entails, and these individuals' right to reject participation and opt instead for incarceration (JHSA, 2000, 2006).

In addition to invading offenders' privacy, it is recognized that the invasion of privacy also affects others residing with the offender through, for example, restraints on their phone line use or the potential adverse social effects associated with the visibility of both the body-worn and residential equipment. As such, consent is usually sought by the monitoring jurisdiction from both the offender and other adults residing in the household (Albrecht, 2005; Renzema, 2003). By obtaining consent from those being monitored, it is believed that any hardships entailed are accepted, including the imposed restrictions on freedom of movement and the continued monitoring of activities (Ingraham & Smith, 1972; Renzema, 2003). A similar argument could be made concerning the intrusiveness of EM. Even though the physical attachment of a device to a person can be both physically and psychologically invasive, fully informed consent can help negate this issue (Black & Smith, 2003). There is also an emerging body of evidence suggesting that offenders tend to perceive the equipment to be less restrictive than confinement, and wearing the equipment itself is seldom ranked high on their list of disadvantages (Albrecht, 2005; Beck, Klein-Saffran & Wooten, 1990; Gainey & Payne, 2000). While informed consent is similarly obtained from EM program participants in Canada, human rights issues continue to be a concern in the Canadian context.

Another issue frequently encountered in the EM debate is that many programs require participants to pay a fee towards the cost of the equipment and monitoring. Consequently, it is held that EM may not be equally afforded to all individuals. Concerns about discrimination against those lacking the financial resources have been raised in this regard (Black & Smith, 2003; JHSA, 2000, 2006). As noted by Black and Smith (2003), a justification for such practices is that these individuals are able to remain in the community and continue employment, thereby providing them with at least a modicum of disposable income that could be used for such purposes. The question then arises as to whether all offenders who take part in *any* type of community-based program should incur a fee. At the provincial level in Canada, the EM program administered by the Ministry of Community Safety and Correctional Services of Ontario (2004) charges employed offenders a fee for participation and gears the cost toward their

level of income. Even so, no offender is disqualified from this program in the event that he or she is unable to pay. Similar practices are in place elsewhere in Canada at both the provincial and federal levels. In order to promote research on EM, such fees could be waived for interested participants, consistent with the methodology commonly used in clinical trials.

Another key issue pertaining to EM programs rests on their actual cost-effectiveness relative to incarceration and traditional community supervision programs. Although an initial Ontario pilot program was abandoned in 1989 because it was found to exceed the cost of prison (Ministry of Correctional Services of Ontario, 1991), since this time, many jurisdictions in the United States and abroad have reported substantial cost savings associated with their use (Boelens et al., 2003; Jarred, 2000; Maxfield & Baumer, 1990; Richardson, 1999). For instance, many studies have found high successful program completion rates (Boelens et al., 2003; Bonta et al., 2000a; Jarred, 2000; Finn & Muirhead-Steves, 2002; Gibbs & King, 2003), and some have also noted lower recidivism rates amongst electronically monitored offenders (Jarred, 2000; Gibbs & King, 2003), thus reducing the costs associated with both re-arrest and re-incarceration. As well, there is evidence suggesting that EM may be a fiscally conservative approach to community reintegration compared to other transitional services offered to offenders, such as halfway house placements (Klein-Saffran, 1995), and that further cost savings may be attained through offenders' continued employment in the community, their ability to pay taxes, and their personal contribution to the costs associated with EM equipment and/or programming fees (JHSA, 2006; Mainprize, 1992; Nellis, 1991; Payne & Gainey, 1999). Even though the cost of EM programs vary according to the type of technology employed, improvements in the manufacturing of equipment and the increased volume of production has generally reduced the capital outlay required for their implementation (JHSA, 2006). It is noteworthy that recent cost estimates for implementing GPS programs are now comparable to the costs that were once associated with those relying on RF-based technology (National Law Enforcement Corrections Technology Center [NLECTC], 1999). The additional staffing resources required according to whether offenders are monitored on a 24-hour basis relative to intermittently will likewise be influenced by budget considerations, and will need to be weighed against the added benefits of offering such programs.

In spite of these encouraging reports, in order for EM programs to be a truly cost-effective alternative to incarceration, it has been argued that such programs must lead to a

reduction in the number of offenders incarcerated and the need to build new correctional facilities – the financial incentives initially driving the implementation of these programs (Lilly, 1992). At present, there is no consensus regarding the ability of EM programs to reduce prison populations (Bonta et al., 1999; Corbett & Marx, 1991; JHSA, 2006), and many contend that EM, as it is currently implemented, is not really being used as an alternative to incarceration, but rather as a new sentencing option (Bonta et al., 1999; Bonta et al., 2000a; JHSA, 2006; Mainprize, 1992; Renzema, 2003). This is referred to as the so-called widening of the "correctional net" in which EM is being applied to offenders who would not otherwise have received a prison sentence when such programs were not available as an alternative (Bonta et al., 1999; Bonta et al., 2000a; Clear & Cole, 2003; Mainprize, 1992; Renzema, 2003). In addition to this "front-end net-widening," some have also acknowledged that the net could be widened due to the increased likelihood of an eventual prison sentence for a technical violation among offenders subject to more intense monitoring practices (i.e., "back-end net-widening") (Tonry & Lynch, 1995). The consequence of both front- and back-end widening is that more offenders will be subjected to formal sanctions, and more staff will be required for supervision purposes. Even though there is some evidence in support of these consequences (e.g., Bonta et al., 2000a; Corbett & Marx, 1991), others have not found this to be the case (Boelens et al., 2003; Padgett et al., 2006). Bonta and colleagues (1999), for example, have purported that the eligibility criteria for most EM programs in Canada and elsewhere tend to include those offenders who are the least likely to re-offend, indicating that the programs are not being used as a true alternative to incarceration, but, instead, are engaging low-risk offenders who previously would not have had a sanction (or an additional sanction) imposed, and could function well without the additional controls imposed by EM.

On the other hand, Padgett and associates (2006), using the offence type of "violent" or "not violent" as a measure of offence seriousness, have found that offenders who had the additional sanction of being EM while under home confinement tended to be more serious offenders relative to those without EM, thus not supporting the "front-end" net-widening noted by Bonta and colleagues. As well, they did not find evidence suggesting that EM practices have a "back-end" net-widening effect, with EM actually found to decrease rather than increase the likelihood of revocation for a technical violation. However, hard data on the replacement of prison sentences by EM is difficult, if not impossible, to come by given the legal issues

concerning the random assignment of cases to control groups and exposure to EM (Albrecht, 2005). Consequently, conclusions tend to be made on the basis of qualitative data and perceptions of policy makers and program administrators. In order to reduce the likelihood of the correctional net being cast too far, reserving EM for higher-risk offenders would be the cautious approach for agencies seeking to offer EM as a true alternative to incarceration.

Concerns surrounding the relevant scope of applying EM technology in community corrections have likewise been raised in recent years and are, in many respects, related to concerns surrounding the net-widening effect (Black & Smith, 2003; JHSA, 2000). The versatility of EM across the various stages of the criminal justice process means that individuals awaiting trial, on probation, on temporary absences, on day or full parole, and those sentenced to home confinement could all be placed under this heightened form of surveillance (JHSA, 2000). Similarly, EM is presently applied to offenders of all risk levels, not just those at moderate to high risk of re-offending (Bonta et al., 1999; JHSA, 2000). This clearly runs contrary to the risk principle, which prescribes that the intensity of services and supervision should be matched to the level of offender risk (Andrews, Bonta, & Hoge, 1990), as well as the principle of proportionality, which states that the punishment should fit the crime committed and the offender's criminal history (JHSA, 2000). Such indiscriminate application of this technology, therefore, becomes an issue. The use of EM at the pre-trial stage, for example, raises the question of whether the "innocent until proven guilty" mandate is being followed, while its use after a period of incarceration has raised the question of the necessity of monitoring low-risk offenders.

Another issue to be addressed in the EM debate concerns the rehabilitative and re-integrative potential of such programs above and beyond the successes achieved through prolonged incarceration or other community-based programs. Although several studies have documented lower recidivism rates and high compliance and program completion rates among EM offenders, in many cases, no control groups have been included for comparison purposes (see review in Bonta et al., 1999). Some have also suggested that the beneficial effects associated with EM may be limited to the duration of the program as their ability to affect behavioural change in the long-term has still to be evaluated (Bonta et al., 1999; Gable & Gable, 2005; Renzema & Mayo-Wilson, 2005). There is some evidence, however, that EM programs may improve the likelihood of offenders successfully completing other rehabilitation programs, thereby allowing them to benefit from their participation (Bonta et al., 2000b).

A final concern surrounding EM programs lies in the potential adverse effects it has on the offender and other family members. As reviewed by Martinovic (2002), co-residents may find themselves indirectly punished as a result of being under constant surveillance, having their use of telephone lines and external social activities with the offender restricted, as well as through the creation of a more stressful home environment, and the stigma associated with living with a monitored offender. Yet, despite these stresses, most studies have generally reported that the benefits of EM for offenders and their families outweigh the negative consequences (Albrecht, 2005; Bonta et al., 1999; Rubin, 1990). In particular, both offenders and their spouses value the additional contact permitted through community monitoring, and offenders' continued ability to contribute to familial responsibilities, such as child care and finances (Bonta et al., 1999). Offenders themselves also tend to perceive EM to be less restrictive than incarceration (Albrecht, 2005; Beck et al., 1990; Gainey & Payne, 2000). Importantly, in a survey conducted by Rubin (1990), the author found that out of 186 offenders who had completed an EM program while under home confinement, all respondents reported that they were less likely to commit another crime after being monitored, and 70% indicated that it was very unlikely that they would become involved in criminal activity again. Gainey and Payne (2000) similarly noted offenders to report EM to have significant deterrent qualities, hence providing convergent evidence for the rehabilitative potential that monitoring practices hold.

In summary, while a number of issues about the use of EM programs continue to dominate correctional thought, efforts have been directed toward rectifying several of these concerns, and have resulted in EM being viewed by many as a humane, less restrictive alternative to incarceration. Several of the initial legal and ethical concerns have been adequately addressed through the implementation of strict guidelines documenting who is eligible to participate in EM programs, as well as clear provisions relating to program delivery and the attainment of voluntary and fully informed consent. Nevertheless, human rights issues continue to be a concern in Canada.

Though the cost-effectiveness of EM programs relative to incarceration and other community-based programs has been questioned, recent reports indicate that the costs entailed with EM are generally lower than those related to imprisonment (Albrecht, 2005). The evidence is less conclusive, however, with regards to alternative community sanctions (Albrecht, 2005).

With this line of inquiry still in its infancy, it is too early to accurately assess the long-term financial implications of EM.

At the present time, it is also difficult to determine the rehabilitative capacity of EM programs, particularly their ability to achieve long-term behavioural change. Qualitative research that has sought to address the experience of EM from the offenders' vantage point suggests reason for optimism in that offenders have been noted to report EM to have both punitive and deterrent qualities. Whether refraining from criminal behaviour extends beyond the duration of the program will continue to be a contentious issue until the results of long-term follow-up evaluations are reported.

Outcome Evaluations of EM Programs

The finding that many offenders report EM to significantly deter criminal behaviour is unquestionably noteworthy. Whether these self-proclamations translate into actual reductions in criminal conduct has yet to be reliably established. To date, the overwhelming majority of outcome evaluations are plagued by methodological limitations, thereby making any firm conclusions regarding their merits difficult to ascertain. Differences in outcome indices examined, risk levels of offenders included, supervision regimes and program components incorporated, also make comparisons across studies difficult, and will bear important implications for defining the relative "success" of EM programs. The review that follows focuses on the more commonly addressed outcome measures of recidivism and release violations. As will become apparent, the evidence compiled up until now has been equivocal and mixed.

Early reviews of empirically-based outcome evaluations that have used recidivism rates as the criterion of interest generally suggest that electronically monitored offenders fare no better or worse than similar offenders sentenced to more restrictive sanctions (e.g., Rogers & Jolin, 1989). Nonetheless, it is generally conceded that this conclusion is tentative at best given that most of the initial evaluations suffered from several methodological limitations, with particular reference being made to their small sample sizes, reliance on low-risk volunteers, and failure to use random assignment (see Bonta et al., 1999; Rogers & Jolin, 1989). Moreover, the differing definitions of recidivism employed may explain the contradictory results reported in the literature (Petersilia & Turner, 1990; Roger & Jolin, 1989). Unfortunately, many of the methodological problems that plagued these early evaluations continue to characterize outcome

studies nearly 20 years after the implementation of EM programs (Bonta et al., 1999), and some of the studies that have sought to address these inadequacies have revealed discouraging findings. In the widely cited Canadian study by Bonta and colleagues (2000a), for example, the authors found that once risk level was taken into consideration, EM offenders no longer showed significantly lower recidivism rates than the comparison groups of offenders who were on probation without EM and those released directly into the community with no such conditions imposed.

An uncritical eye examining more recent reviews of the literature on the effectiveness of EM on recidivism for moderate- and high-risk offenders might also lead one to conclude that EM practices do not hold any potential merit in improving outcomes. However, many of these summaries are inherently flawed. For instance, Renzema and Mayo-Wilson's review (2005), presents a flowchart illustrating the process by which 154 outcome evaluations of EM were reduced to only three that met their criteria for inclusion. The authors proceed to conclude that there is little evidence supporting that EM has an impact on recidivism. Clearly, scepticism is warranted when drawing such a broad conclusion given that very few studies actually qualified for inclusion in their review and, of those that were included, the evidence surrounding the effectiveness of EM programs is more accurately characterized as mixed or inconclusive (Padgett et al., 2006). Similarly, in the often cited meta-analysis conducted by Gendreau and colleagues (2000) in which the authors examined the effect of various intermediate sanctions on recidivism, only six studies on EM were included in this analysis and the aggregated recidivism rate across these studies reported. The 6% recidivism rate for EM offenders compared to the 4% rate for the comparison group was taken to indicate that EM programs have minimal impact on re-offending. Although this conclusion may be valid based on the studies these authors evaluated, such sweeping conclusions should again be tempered by the fact that few studies specific to EM were included, and the effect sizes estimated across these studies were based on data from only 1,414 offenders.

Compared to the aforementioned studies which were limited in their sample sizes, larger scale evaluations provide a number of encouraging results concerning the utility of EM in reducing re-offending. For example, in October 2003, the state of Florida issued a report on the impact of EM across diverse outcome measures, including recidivism, revocation, and absconding (FDOC, 2003). The study covered a 10-year period from July 1993 through June

2003, included over 63,000 cases, and controlled for a number of background factors, such as current offence type, prior convictions, violations, sentence length, and demographic characteristics. Outcomes were evaluated at a two-year follow-up. Overall, compared to offenders who participated in an EM program, offenders who were under community supervision without the benefit of EM were three times more likely to commit a new felony (i.e., 2.8% vs. 9.8%, respectively), twice as likely to commit a new misdemeanour (i.e., 1.3% vs. 3.5%), and more than twice as likely to abscond (i.e., 7.0% vs. 16.1%). In addition, offenders who were not EM were two and a half times more likely to have their release revoked for any type of offence compared to those who were monitored electronically. Similarly, in another Florida-based study that used data from a five-year cohort of 75,661 serious offenders placed on home confinement, Padgett and colleagues (2006) reported equally positive results across comparable outcome indices. This study also examined the incremental value of GPS technology relative to RF equipment. Overall, both monitoring systems were found to significantly reduce the likelihood of revocation for a new offence and absconding from supervision, even after controlling for a number of potentially influential sociodemographic and offence-related variables. Despite the enhanced surveillance capabilities associated with GPS monitoring, this form of technology was no more likely to reduce revocations or incidents of absconding relative to RF monitoring, and the use of either had the same inhibiting effect across diverse offender groups (i.e., violent, property, and drug offenders). Hence, these findings highlight that the use of EM technology more generally can have a significant incapacitory or deterrent effect on offending behaviour for diverse offender groups. However, whether these deterrent qualities are limited to the duration of the monitoring period or whether they also lead to long-term behavioural change, remains unknown. Clearly, these results suggest that EM can enhance public safety, at a minimum, while it is being used, and further emphasize the need for future research addressing its long-term viability as a rehabilitative tool. Given that this was one of the few outcome evaluations to include GPS monitoring, it will be important that additional research examine the relative efficacy of this technology on re-offending compared to other modern-day monitoring devices.

Besides the United States, European nations are emerging as prominent leaders in EM programs. Research on EM in the Netherlands, Sweden, Belgium, and England has generally been positive, indicating that this technology can effectively be used to ensure compliance with release conditions and reduce re-offending (see Boelens et al., 2003). Successful program

completion rates have been reported to be as high as 80% to 90% in many cases, and this includes studies that have targeted higher-risk offenders (Boelens et al., 2003). Overall, there is an emerging consensus across Europe that EM programs have made a significant contribution to improving supervision practices and in working with individuals who would otherwise be regarded as too risky for community supervision (Boelens et al., 2003).

In short, the literature on the effectiveness of EM in reducing recidivism rates has produced contradictory results. In spite of the fact that EM has been used in correctional contexts for approximately two decades, methodologically sound evaluations of its utility are just beginning to emerge. Many of the studies to date have been conducted on offenders who are at a low risk to re-offend when released into the community, regardless of whether they are monitored electronically or not. As a result, it is frequently concluded that any beneficial effects observed are not in fact attributable to EM programs but rather offenders' risk level (Bonta et al., 1999). However, such arguments are tempered by the positive outcomes of studies that have included higher-risk offenders, many of which are based on considerably larger sample sizes, enhanced methodological rigor, and superior data analytic techniques (e.g., Padgett et al., 2006). Moreover, even if EM is not found to have a significant impact on recidivism rates in all cases, this should not be taken to indicate that EM programs serve no useful purposes. The added surveillance capabilities of EM above and beyond what could reasonably be obtained through traditional human monitoring practices may serve to increase feelings of public security and safety, particularly for the victims of crime and their families. In addition, the potential for EM to encourage program participation could prove instrumental in engaging offenders in the rehabilitation process (Bonta et al., 1999; Gable & Gable, 2005), a factor important for the achievement of long-term behavioural change (Hanson & Bussière, 1998; Levenson & Macgowan, 2004). At the very least, the positive results that have been obtained to date justify further research into those factors that make the program successful.

Moving Forward: Recommendations for Advancing EM Practices

EM programs will likely continue to be a controversial issue for many years until there is a body of sound empirical evidence showing their merit. In the meantime, there are several issues that need to be addressed. In terms of future research endeavours, it could serve community corrections well if higher-risk offenders are targeted for participation, comparisons

made amongst the types of equipment available (i.e., RF vs. GPS), and the links between successful completion and program characteristics are more fully explored. Further probing into offenders' perceptions of EM, as well as those of significant others affected by their participation, also remain worthy endeavours, as would a survey of the public's view of such practices across the stages of the criminal justice process. Educational efforts on the use of EM could then be directed accordingly. The establishment of a national database incorporating program characteristics, standards, and guidelines, and outcome evaluation data could additionally prove useful for research purposes. Ultimately, such undertakings would facilitate the development of the most effective EM programs and illuminate for whom they are most suitable. In this regard, European researchers have similarly noted the potential rewards that could be gleaned through the creation of an EM information network which would act as a central reference point where researchers and practitioners could share their experiences with EM and any results obtained (Boelens et al., 2003). It is held that increased information sharing and greater inter-disciplinary collaboration would be most influential in moving the field forward – a sentiment reminiscent of the "what works" literature in corrections.

Therefore, both research and practice have the potential to merge in their efforts to inform our understanding of what makes EM programs effective and what factors may hinder their success. Indeed, best practice guidelines have begun to emerge, and thus far underscore the importance of clear, well-defined program objectives, the proper targeting of offender groups, good communication to all parties involved, fair and consistent application of sanctions, and practices that are non-discriminatory in nature and protective of offenders' rights (Boelens et al., 2003). The most successful schemes also have support from upper management, close working relationships between field and administrative staff, as well as contractors, adequate resources, and trained and adaptable staff (Boelens et al., 2003). Adequate attention to each of these factors would appear to provide a more solid foundation for the implementation of an effective EM program.

CONCLUSION

In summary, this review of the literature has highlighted that many of the initial factors driving the implementation of EM programs, such as reducing prison populations and cost savings, have yet to materialize nearly 20 years after their implementation. It is also evident that,

at the present juncture, it is difficult to make any firm conclusions regarding the ability of EM to achieve such desired objectives as managing offenders' risk, reducing recidivism rates, and affecting positive behavioural change. To date, some of the evidence appears to support the merit of such programs in each of these areas, while other data does not. However, given that methodologically sound outcome evaluations have only begun to emerge in this area, and few have kept pace with the technological advancements that have been made in recent years, further research into how such programs operate, what makes them successful, and the value added component associated with incorporating EM into existing community supervision practices, remain worthy endeavours. Research of this sort is particularly needed in a Canadian context.

REFERENCES

Albrecht, H. (2005). *Electronic monitoring in Europe. A summary and assessment of recent developments in the legal framework and the implementation of electronic monitoring.* Retrieved March 6, 2007, from http://www.iuscrim.mpg.de/forsch/onlinepub/albrecht.pdf

Altman, R.N., Murray, R.E., & Wooten, E.B. (1997). Home confinement: A 90's approach to community supervision. *Federal Probation, 61,* 30-32.

Andrews, D.A., & Bonta, J. (2003). *The psychology of criminal conduct* (3rd ed.). Cincinnati, OH: Anderson Publishing Company.

Andrews, D.A., Bonta, J., & Hoge, R.D. (1990). Classification for effective rehabilitation: Rediscovering psychology. *Criminal Justice and Behaviour, 17,* 19-52.

Beck, J.L., Klein-Saffran, J., & Wooten, H.B. (1990). Home confinement and the use of electronic monitoring with federal parolees. *Federal Probation, 54,* 22-31.

BI Incorporated. (2006). *Active electronic monitoring becomes viable option for offender tracking.* Retrieved February 25, 2007, from http://www.mspoa.org/pdf/BI%20Electronic%20Monitoring.pdf

Black, M., & Smith, R.G. (2003). Electronic monitoring and the criminal justice system. *Trends and Issues in Crime and Criminal Justice, 254,* 1-6.

Boelens, R., Jonsson, U., & Whitfield, D. (2003, May). *Electronic monitoring in Europe.* Proceedings of the Conférence Permanente Européenne de la Probation. Egmond aan Zee, Netherlands. Retrieved March 2, 2007, from http://www.cep-probation.org/publications/reports/electronic_monitoring_in_europe.shtml

Bonta, J., Rooney, J., & Wallace-Capretta, S. (1999). *Electronic monitoring in Canada.* Ottawa, ON: Public Works and Government Services Canada.

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

Bonta, J., Wallace-Capretta, S., & Rooney, J. (2000b). A quasi-experimental evaluation of an intensive rehabilitation supervision program. *Criminal Justice and Behavior, 27,* 312-329.

Clear, T.R., & Cole, G.F. (2003). *American corrections* (6th ed.). Belmont, CA: Thomson-Wadsworth.

Clear, T., White, M., & Presnell, K. (1998). The offender in the community: Implications of the experience in the United States for the New Czech Republic. *Crime, Law and Social Change, 28,* 243-268.

Cooprider, K.W., & Kerby, J. (1990). A practical application of electronic monitoring at the pre-trial stage. *Federal Probation, 54,* 28-35.

Corbett, R., & Marx, G.T. (1991). Critique: No soul in the new machine: Technofallacies in the electronic monitoring movement. *Justice Quarterly, 8,* 399-414.

Courtright, K., Berg, B.L., & Mutchnick, R. (2000). Rehabilitation in the new machine? Exploring drug and alcohol use and variables related to success among DUI offenders under electronic monitoring – Some preliminary outcome results. *International Journal of Offender Therapy and Comparative Criminology, 44,* 293-311.

Crowe, A.H. (2002). Electronic supervision: From decision-making to implementation. *Corrections Today, 64,* 130-133.

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

Florida Department of Corrections. (2003). *A controlled study of the effects of electronic monitoring and officer caseload on outcomes for clients in community control.* Tallahassee, FL: Bureau of Research and Data Analysis.

Gable, R.K., & Gable, R.S. (2005). Electronic monitoring: Positive intervention strategies. *Federal Probation, 69,* 1-7.

Gainey, R.R., & Payne, B.K. (2000). Understanding the experience of house arrest with electronic monitoring: An analysis of quantitative and qualitative data. *International Journal of Offender Therapy and Comparative Criminology, 44,* 84-96.

Gainey, R.R., Payne, B.K., & O'Toole, M. (2000). Time in jail, time on electronic monitoring, and recidivism: An event history analysis. *Justice Quarterly, 17,* 733-752.

Gendreau, P., Goggin, C., Cullen, F.T., & Andrews, D.A. (2000). The effects of community sanctions and incarceration on recidivism. *Forum on Corrections Research, 12,* 10-13.

Gibbs, A., & King, D. (2003). The electronic ball and chain? The operation and impact of home detention with electronic monitoring in New Zealand. *The Australian and New Zealand Journal of Criminology, 36,* 1-17.

Hanson, R.K., & Bussière, T. (1998). Predicting relapse: A meta-analysis of sexual offender recidivism studies. *Journal of Consulting and Clinical Psychology, 66,* 348-362.

Ingraham, B.L., & Smith, G.W. (1972). The use of electronics in the observation and control of human behaviour and its possible use in rehabilitation and parole. *Issues in Criminology, 7,* 35-53.

Jarred, W. (2000). *Electronic monitoring: Corrective Services Bill 2000.* Legislative Brief 11/00. Queensland Parliamentary Library, Brisbane.

John Howard Society of Alberta (2000). *Electronic monitoring.* Retrieved February 15, 2007, from http://www.johnhoward.ab.ca/PUB/A3.htm

John Howard Society of Alberta (2006). *Electronic (radio frequency) and GPS monitored community based supervision programs.* Retrieved February 15, 2007, from http://www.johnhoward.ab.ca/PUB/PDF/monitorupdate.pdf

Klein-Saffran, J. (1995). *Electronic monitoring vs. halfway houses: A study of federal offenders. Alternatives to Incarceration Research Report.* Washington, DC: U.S. Department of Justice, Federal Bureau of Prisons.

Levenson, J.S., & Macgowan, M.J. (2004). Engagement, denial, and treatment progress among sex offenders in group therapy. *Sexual Abuse: A Journal of Research and Treatment, 16,* 49-63.

Lilly, J.R. (1992). Electronic monitoring: Another fatal remedy? In C.A. Hartjen & E.E. Rhine (Eds.), *Correctional theory and practice* (pp. 87-115). Chicago, IL: Nelson-Hall.

Lilly, J.R. (2006). Issues beyond empirical EM reports. *Criminology and Public Policy, 5,* 93-102.

Lilly, J.R., & Ball, R. (1987). A brief history of house arrest. *Northern Kentucky Law Review, 20,* 505-530.

Mainprize, S. (1992). Electronic monitoring in corrections: Assessing cost-effectiveness and the potential for widening the net of social control. *Canadian Journal of Criminology, 34,* 161-180.

Martinovic, M. (2002, September). *The punitiveness of electronically monitored community based programs.* Paper presented at the Probation and Community Corrections Officers' Association Inc. Conference, Perth, Australia.

Maxfield, M.J., & Baumer, T. (1990). Home detention with electronic monitoring. *Crime and Delinquency, 36,* 521-536.

Mayer, M. (2004). *Evaluation of a pilot project on electronic monitoring.* Retrieved March 1, 2007, from http://www.iuscrim.mpg.de/forsch/krim/mayer_en.html

Ministry of Community Safety and Correctional Services (2004). *Community corrections: Electronic monitoring.* Retrieved March 6, 2007, from http://www.mcscs.jus.gov.on.ca/english/corr_serv/comm_corr/elect_mon.html

Ministry of Correctional Services of Ontario. (1991). *An evaluation of the electronic monitoring pilot project: Mimico correctional centre, April, 1989 – October, 1990.* North Bay, ON: Ministry of Correctional Services of Ontario.

Minnesota Department of Corrections. (2006). *Electronic monitoring of sex offenders: 2006 report to the legislature.* Retrieved March 1, 2007, from http://archive.leg.state.mn.us/docs/2006/Mandated/060146.pdf

Mukherjee, S. (1999). Intermediate sanctions: Electronic monitoring and house arrest. In G. Newman (Ed.), *Global report on crime and justice*. New York: Oxford University Press.

National Law Enforcement Corrections Technology Center. (1999). *Keeping track of electronic monitoring.* Retrieved March 2, 2007, from http://nlectc.org/txtfiles/ElecMonasc.html

Nellis, M. (1991). The electronic monitoring of offenders in England and Wales. *British Journal of Criminology, 31,* 165-185.

Office of Program Policy Analysis and Government Accountability. (2005). *Electronic monitoring should be better targeted to the most dangerous offenders.* Research Report No. 05-19. Retrieved February 20, 2007, from http://www.oppaga.state.fl.us/reports/pdf/0519rpt.pdf

Padgett, K.G., Bales, W.D., & Blomberg, T.G. (2006). Under surveillance: An empirical test of the effectiveness and consequences of electronic monitoring. *Criminology and Public Policy, 5,* 61-92.

Payne, B.K., & Gainey, R.R. (1999). Attitudes toward electronic monitoring among monitored offenders and criminal justice students. *Journal of Offender Rehabilitation, 29,* 195-208.

Payne, B.K., & Gainey, R.R. (2000). Electronic monitoring: Philosophical, systemic, and political problems. *Journal of Offender Rehabilitation, 31,* 93-112.

Payne, B.K., & Gainey, R.R. (2004). The electronic monitoring of offenders released from jail or prison: Safety, control, and comparisons to the incarceration experience. *The Prison Journal, 84,* 413-435.

Petersilia, J., & Turner, S. (1990). Comparing intensive and regular supervision for high risk probationers. *Crime and Delinquency, 36,* 87-111.

Renzema, M. (2003). *Electronic monitoring's impact on reoffending.* Retrieved March 1, 2007, from http://www.campbellcollaboration.org/CCJG/reviews/electronic_monitoring_protocol.pdf

Renzema, M., & Mayo-Wilson, E. (2005). Can electronic monitoring reduce crime for moderate to high-risk offenders? *Journal of Experimental Criminology, 1,* 215-237.

Richardson, R. (1999). Electronic tagging of offenders: Trials in England. *The Howard Journal, 38,* 158-172.

Rogers, R., & Jolin, A. (1989). Electronic monitoring: A review of the empirical literature. *Journal of Contemporary Criminal Justice, 5,* 141-153.

Rondinelli, V. (1997). *Tracking humans: The electronic bracelet in a modern world.* Retrieved February 22, 2007, from http://www.criminallawyers.ca/newslett/aug97/rondinelli.htm

Roy, S. (1997). Five years of electronic monitoring of adults in Lake County, Indiana. *Journal of Crime and Justice, 20,* 141-160.

Rubin, B. (1990). Electronic jails: A new criminal justice concern. *Journal of Offender Monitoring, 3,* 8-11.

Schmidt, A. (1998). Electronic monitoring: What does the literature tell us? *Federal Probation, 62,* 10-19.

Tewey, J.F. (2005). *Task force to study criminal offender monitoring by global positioning systems: Final report to the Governor and the General Assembly.* Retrieved March 1, 2007, from http://www.dpscs.state.md.us

Tonry, M., & Lynch, M.J. (1995). Intermediate sanctions. In M. Tonry (Ed.), *Crime and justice: A review of research* (vol. 20). Chicago, IL: University of Chicago Press.

White, E. (2001, May). *Electronic surveillance: Where do we draw the line?* Paper presented at the Electronic Monitoring and the Ontario Crown Attorneys' Association Conference. Retrieved March 3, 2007, from http://www.stleonards.ca/docs/policy/plelectro.asp