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ORIGINAL PAPER

Cosmetic Psychopharmacology for Prisoners: Reducing Crime and Recidivism Through Cognitive Intervention

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Abstract Criminologists have long acknowledged the link between a number of cognitive deficits, including low intelligence and impulsivity, and crime. A new wave of research has demonstrated that pharmacological intervention can restore or improve cognitive function, particularly executive function (including the inhibition of impulsive response), and restore neural plasticity. Such restoration and improvement can allow for easier acquisition of new skills and as a result, presents significant possibilities for the criminal justice system. For example, studies have shown that supplements of Omega-3, a fatty acid commonly found in food such as tuna, can decrease frequency of violent incidents in an incarcerated population. Research has also begun to explore the use of selective serotonin reuptake inhibitors (SSRIs) to reduce impulsivity in some violent offenders. However, there are significant legal and ethical implications when moving from dietary supplements to prescription pharmaceuticals and medical devices for cognitive intervention. This paper will explore the legal and ethical issues surrounding the use of pharmacological intervention on prisoners as an effort to reduce crime and recidivism.

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Introduction

Cognitive deficits influence the onset and maintenance of criminal behavior [1, 2]. Despite the United States' sordid history acting on biological theories of criminality, scholars, policymakers, and even some medical professionals have come to accept and recognize the biological and psychological conditions underlying some individuals' criminality. As a result, the United States' criminal justice system has begun to explore therapeutic jurisprudence and rehabilitation. This article highlights the cognitive deficits associated with crime, recent responses, and discusses the legal and ethical implications of using nootropics, surgical and non-surgical interventions, and medical devices (hereafter cognitive interventions [CI]) to reduce recidivism of prisoners.

According to the 2007 National Academy of Sciences report on desistance from crime [3], many parolees have significant cognitive deficits. Motiuk and Brown concluded that these deficits were among the issues most highly correlated with recidivism in a sample of Canadian federal offenders [4]. Criminogenic cognitive deficits include deficiencies in social cognition and problem solving, impulsive decision-making, absence of goal setting behavior, and poor interpersonal skills [5, 6]. The fear that "nothing works" led to the abandonment of rehabilitation beginning in the

1970s [7, 8]. Four decades later, the U.S. criminal justice system remains focused on retribution; however scholars and advocates have placed a renewed emphasis on incorporating rehabilitation into the criminal justice system. Though currently underfunded, the criminal justice system has endeavored to develop means of reforming and rehabilitating offenders that target the underlying causes of crime and reduce recidivism [9]. A number of states have created specialized judicial processes, including juvenile, veteran, mental health and drug courts.

Additionally, cognitive behavioral therapy (CBT) has been explored as a promising intervention to reduce recidivism. The Risk/Needs/Responsivity Model, which asserts that (1) treatment and supervision should match an offender's *risk* level for reoffending, (2) treatment should match the *needs* associated with the individual's criminal conduct, and (3) the treatment should match that to which the individual is most *responsive*, has become the foundation for assessing and rehabilitating offenders around the world [10]. This approach has served as the impetus for the creation and implementation of CBT programs [11]. However, while some studies find a statistically significant positive effect of CBT programs on recidivism rates, the size of the observed reduction in recidivism is inconsistent and depends on offense type [12] and the individual's risk [13, 14]. Illescas, Sánchez-Meca, and Genovés conducted a meta-analysis of 32 European studies, evaluating recidivism following CBT [15]. Their analysis found a 12 % reduction in recidivism for those who had undergone some form of CBT. Another meta-analysis of 69 studies conducted between 1968 and 1996 found a significant, but small, reduction in recidivism [16]. In a 2005 meta-analysis, Wilson, Bouffard, and Mackenzie found a 20–30 % reduction in recidivism among those who participated in CBT programs compared to control groups [17]. However, the efficacy of CBT programs has been found to differ by offense type and findings within offense type are sometimes contradictory [12]. For example, results are mixed with respect to sex offenders. Grady and colleagues found no reduction in recidivism for sex or violent crimes for sex offenders who underwent CBT [18], while Travers, Mann, and Hollin found a 13 % reduction in reoffending for sex offenders participating in the Enhanced Thinking Skills program [12]. The same program resulted in a 17 % reduction in recidivism for violent offenders, and no reduction for burglary and robbery [12]. Overall, meta-analyses suggest a modest decrease in recidivism for sex offenders [19]. CBT has also proven successful in reducing recidivism for offenders with substance addiction. Needham and colleagues found a significant reduction in recidivism for individuals with alcohol addiction who completed a CBT program [20]. The next step in intervening at the cognitive level to alter behavior may be through pharmaceuticals, medical devices, or procedures.

Lawyers, philosophers, neuroscientists, and policy advisors (e.g., the Presidential Commission for the Study of Bioethical Issues) have begun to examine whether medical intervention could assist in further reducing recidivism. Hank Greely has written of the United States' dark history of biological and pseudo-medical interventions to affect behavioral changes in those deemed "defective" and the numerous ethical and legal issues associated with testing new forms of medical interventions (i.e., CI) to assess safety and efficacy [21]. That history surely informs the ethical and legal challenges before we have determined through clinical research that a drug, device, or procedure is safe and effective according to FDA standards. This article, however, focuses on the ethical and legal challenges of implementation of CI once this hurdle is overcome. The following sections examine recent efforts to intervene in the biological roots underlying cognitive deficits and address the ethical and legal issues associated with bringing recidivism reduction under the auspices of medicine.

Cognitive Interventions: Past and Present

Androgen Deprivation Therapies (ADT) (i.e., chemical castration) have been used to attempt to reduce recidivism in sex offenders in the United States for nearly two decades. While a 2006 study suggests these interventions are successful in reducing recidivism [22], evidence for the effectiveness of chemical castration is weak [23]. Maletzky and colleagues conducted a five-year follow-up on offenders in Oregon following the state's implementation of a medroxyprogesterone acetate (MPA) – more commonly known as Depo-Provera – program [22]. They compared recidivism rates among individuals who were determined to need MPA and who received it, individuals who needed MPA and did not receive it (for a variety of reasons), and individuals deemed not to need MPA [22]. Individuals who received

MPA committed few offenses, none of which were sexual [22]. In contrast, one third of those who were deemed to need MPA, but did not receive it, committed new offenses - 60 % of which were sexual [22]. However, Rice and Harris note that most research on the effectiveness of MPA for reducing recidivism is weak and poorly designed [23]. They conclude, "The outcome evaluation research is weak, so weak that, were the treatment not so plausible, it would have to be regarded as empirically unsupported" [23].

While medications have been shown effective in treating addiction and preventing overdose, particularly for opioid addiction [24], availability is limited in criminal justice related drug diversion programs [25]. U.S. Drug Courts often mandate offenders undergo treatment for addiction. However, the lack of widespread use of medication-assisted treatment in U.S. Drug Courts [25] has left the effectiveness in reducing recidivism unclear. For example, only 39 % of the drug courts that responded to Matusow and colleagues' survey reported offering methadone as a treatment for opioid addiction.

While the use of pharmacological and surgical interventions to reduce recidivism has largely been shunned in recent decades (with the exception of sex-offender castration and medication-assisted addiction treatment), researchers have examined the effect of ordinary dietary supplements to enhance cognition and reduce antisocial and criminal behavior in incarcerated populations. In 1997, Stephen Schoenthaler examined the effect of vitamin and mineral supplementation on violent and nonviolent behavior in a sample of 62 incarcerated juveniles [26]. Participants ranged in age from 13 to 17 years old. Schoenthaler found a significant difference between the placebo and treatment group, with significant reduction in violent, antisocial behavior in the treatment group. The results of this study inspired a replication in California with 402 adult offenders between 18 and 25 years of age [27]. Participants taking the active tablet had 38 % fewer rule violations than those on the placebo.

The results of Schoenthaler s studies led to further examination in 2002, when Bernard Gesch and colleagues examined the effect of vitamin and mineral supplementation in Aylesbury Prison in the United Kingdom [28]. The study involved 231 young adult offenders, who were given either a placebo or an Omega-3 and Forceval vitamin and mineral supplement. Gesch found a significant reduction in violent and non-violent infractions while participants were on the supplement. However, offenses increased once the supplementation was discontinued.

Based on Gesch's findings, Zaalberg and colleagues conducted a similar study on Dutch prisoners between 18 and 25 years of age [29]. The study involved 221 individuals who received nutritional supplements containing minerals and essential fatty acids for a period of one to three months. The researchers saw a significant reduction in the number of staff-observed incidents. However, there was no corresponding reduction in self-reported incidents.

In 1996, Hamazaki and colleagues examined the effect of docosahexaenoic acid (DHA) on 41 students [30]. According to this study, DHA prevented extragression (aggression against others) from increasing during times of mental stress. Iribarren and colleagues also examined the impact of DHA and N-3 fatty acids on 3581 white and black young adults [31]. They found those who consumed high levels of DHA and N-3 fatty acids expressed less hostility than those who consumed lower levels of each.

Foreshadowing things to come, scholars recently examined the impact of off-label use of prescription medications on criminal behavior. Butler and colleagues in Australia explored the use of selective serotonin reuptake inhibitors (SSRIs) to reduce impulsivity in repeat violent offenders [32]. Sertraline (Zoloft) was administered to a sample of highly impulsive, repeat violent offenders over a three-month period. At the conclusion of the three months the researchers observed a significant reduction in impulsivity, irritability, anger, and violent and non-violent incidents.

These attempts to alter cognition to change deviant behavior along with a series of new off-label discoveries regarding the power of various prescription drugs to enhance cognition suggest the very real possibility that CIs role in the criminal justice endeavor could expand dramatically in the coming years.

Future Cognitive Interventions

Kayser and colleagues have discovered that the drug Tolcapone used to treat Parkinson's syndrome increased dopamine levels and blood-oxygen-level dependent activity in the left ventral putamen and anterior insula, decreasing impulsivity in otherwise normal, healthy subjects, particularly in high-impulsivity individuals [33]. Given the significant relationship between

impulsivity and criminal conduct, Tolcapone represents an intervention that may be explored in the future to assess its ability to reduce criminal conduct and recidivism. Valproate, an anti-seizure medication, has recently been found to increase neural plasticity and significantly improve an individual's ability to acquire new skills [34]. Researchers discovered that individuals could be taught absolute pitch, a skill known to be acquired only in early youth. The researchers concluded that administration of Valproate returns neural plasticity to levels a juvenile state [34]. If inmates can acquire new skills in significantly reduced periods of time with the assistance of psychiatric drugs like Valproate, prisons might significantly reduce the cost and time involved in skills-training programs, allowing more offenders to participate in these programs. Noted biocriminologist Adrian Raine is conducting a double-blind, placebo controlled experiment to assess the impact of transcranial magnetic stimulation (TMS) to increase prefrontal cortex activity and reduce antisocial and aggressive behavior [https://clinicaltrials.gov/ct2/show/NCT02427672]. Unlike deep brain stimulation (DBS), TMS is a non-invasive method of stimulating neurological activity in small regions of the brain. Raine's prior research demonstrates that low activity and reduced gray matter in the prefrontal cortex are significantly associated with antisocial and criminal behavior [35–37]. A 2014 study in Cirugia y Cirjunos journal (Surgery and Surgeons) assessed the impact of stereotactic radiosurgery (anterior capsulotomy and bilateral cingulotomy) on aggressive behavior. The authors concluded that this surgical intervention significantly reduces aggressive behavior [38].

However, this move from dietary supplements to prescription drugs, medical devices, and procedures, for purposes of reducing behaviors deemed criminal, brings with it significant legal and ethical challenges. These challenges are heightened when intervention is mandated as a condition of sentencing or release to reduce recidivism, and how these challenges can be analyzed likely depends on whether the intervention is viewed as "treatment", "enhancement", or "punishment".

Before examining what we believe are the major legal and ethical issues associated with cognitive interventions intended to reduce recidivism, treatment, enhancement, and punishment must be defined and distinguished. As used in this article, we define enhancement as improving an individual's cognition to a level above his/her own baseline. This definition makes the individual's own capabilities and functioning, rather than the *societal average*, the reference point. In contrast, we define treatment as a restoration to the individual's normal level of cognitive functioning. While this distinction is fixed, where any intervention falls can change as society changes and influences the medical community. Through the process of medicalization, conditions and conduct once thought to be a normal part of life, and not considered illnesses, are brought into the realm of medicine and treated as medical problems, often with pharmacological solutions, (e.g., depression, ADHD, and addiction) [39]. We define punishment as a penalty, imposed by a court following a guilty verdict, that inflicts pain or other unpleasant consequences on an individual.

Legal Challenges

Significant legal questions arise from any proposal to mandate CI therapy for a convicted criminal. The standards that must be satisfied and the legality of CI may be contingent upon whether CI is punishment or treatment. Ultimately, CI may be neither punishment nor treatment, and instead enhancement, in which case the criminal justice system will find itself in uncharted waters as we have found no legal precedent or statutes to provide guidance on the legality of enhancement. We therefore limit our discussion below to the legal challenges to CI as punishment and treatment mandated as a part of sentencing or as an administrative decision made by prison officials. We later discuss the ethical challenges of coerced consent in exchange for early release. However, this common practice (prisons offer GED programs, substance-abuse programs, and other life-skills programs in exchange for early release) has generally escaped legal scrutiny.

Legal Challenges to CI as Punishment

If CI were considered part of an offender's punishment the Eighth Amendment of the U.S. Constitution's proscription against cruel and unusual punishment may prove a difficult barrier to overcome. Chemical castration of convicted sex offenders provides an analogue to examine the implications of CI as an element of punishment and the subsequent Eighth Amendment implications. Chemical castration works by drastically reducing the level of testosterone, subsequently reducing sex

drive. Chemical castration may be mandated as a part of sentencing or offered as a condition of release. Legal scholars have argued that chemical castration is a pharmaceutical intervention designed to incapacitate the offender, eliminating not only the deviant sexual behavior for which the offender was convicted but all sexual behavior [40]. This incapacitation of the offender is a sort of biological imprisonment. For nearly five decades, chemical castration has been administered to convicted sex offenders, with relatively little judicial scrutiny. This lack of judicial scrutiny may be attributable to widespread fear and disdain for these offenders. While the high-level crimes that shock the public's conscience are exceedingly rare, they capture the public's attention and allow for legislation. Legislators have exploited Americans' fears about crime and security and the judiciary has largely relinquished its power to determine the appropriate course of action [41].

In 1996, California enacted the country's first chemical castration law, which makes certain sex offenders eligible for the discretionary or mandatory administration of MPA or an equivalent drug [40]. California's law provides a graduated sentencing scheme for certain sex offenders [42]. First-time offenders are eligible for chemical castration at the judge's discretion, while administration for second-time offenders is mandatory. Administration begins one week prior to the offender's release from prison and continues until the Department of Corrections deems the treatment no longer necessary [40]. In the following years eight other states enacted similar legislation: Florida, Georgia, Iowa, Louisiana, Montana, Oregon, Texas, and Wisconsin [40]. Only Georgia and Oregon have since repealed their chemical castration laws.

While castration laws have largely escaped litigation, scholars and civil rights advocates have expressed significant concerns over the constitutionality of chemical castration [41, 43–45]. Stinneford contends that chemical castration runs afoul of the Eighth Amendment's proscription against "cruel and unusual punishment" [40]. According to his analysis, castration deprives an offender of three fundamental rights: the rights to bodily integrity, to procreation, and to freedom of thought. He further contends that the historical view of castration as an ultimate wrong against an individual, often treated akin to murder, highlights its inherently cruel nature [40]. Perhaps most useful for understanding the legality of CI, Stinneford contends that a punishment must meet two criteria for constitutionality: it must not be designed to control capacities fundamental to human dignity (e.g., reason and free will); and it must not treat the offender's suffering with indifference [40]. According to his analysis, the very purpose of chemical castration is to control an offender's mind and body, and is therefore unconstitutional.

Additionally, the U.S. Supreme Court has held that the Eighth and Fourteenth Amendments prevent the state from imposing criminal punishment or civil commitment solely based on an individual's undesirable characteristic; rather, the individual with an undesirable characteristic (such as addiction) must commit an act for which he or she can be imprisoned. Harlan discusses this notion of the unconstitutionality of punishing an individual for a trait or thought rather than an action in his concurrence: "[A]ddiction alone cannot reasonably be thought to amount to more than a compelling propensity to use narcotics…[thus] to authorize criminal punishment for a bare desire to commit a criminal act [is impermissible]" [46]. Thus, the broad scope of offenders that may come under a CI law, whether mandatory or discretionary, may lead to similar, or even more criticism about the constitutionality of such a provision. However, the exact nature of the CI used could be the largest determinant in whether CI is constitutional under Stinneford's proposed analysis. Interventions that truly increase cognitive abilities (e.g., reducing impulsivity), rather than simply eliminating a targeted behavior (e.g., chemical castration) may be said to have less of an incapacitative aim and more of a restorative aim, making the intervention less legally problematic and potentially more ethically sound.

Legal Challenges to CI as Treatment

If CI therapy is deemed treatment or medical care, the analysis and framework for considering its legality is significantly different than if it is simply to be used for enhancement purposes. Prisoners must be offered the right to seek medical care [47] and at the same time, like non-incarcerated individuals, inmates are usually free to decline treatment. For example, prisoners with advanced cancer may refuse further curative therapy in favor of palliative care. However, because prisoners are not entirely autonomous, there are some instances in which it has been deemed legal, and by some ethical as well, to mandate that they receive treatment. While the U.S. Supreme Court has heard several cases

involving forcible medication of individuals within the criminal justice system that provide some insight, the specific facts distinguish these cases from CI.

The Supreme Court's decision in *Washington v. Harper*, addressing the forcible medication of an inmate with antipsychotic drugs, is most applicable to CI. In *Harper*, the U.S. Supreme Court held that an inmate can be forcibly medicated following an administrative, rather than judicial, hearing [48]. The hearing provides sufficient due process to challenge the state's decision to forcibly medicate, satisfying the defendant's constitutional rights. If at the hearing the inmate is deemed a danger to himself or others and the medication is in the individual's medical interest, the state may medicate the individual against his/her wishes. This case raises issues for mandating CI for prisoners. One important issue that must be considered is how immediate a danger to himself or others must the individual be for CI to be mandated. There is a logical distinction between those who present an obvious and immediate danger, and those who may be an eventual danger by reoffending during incarceration or upon re-entry into society. This distinction stems from both the ease and predictive success with which the dangerous individual can be identified and the gravity of the state interest at stake. An individual who is in the midst of a psychotic break may leave little question about his/her dangerousness. However, if long-term recidivism was considered within the scope of *Harper*, the system would be forced to rely on imperfect predictive risk measures. Concerns over subjective clinical judgment have given rise to significant improvement in risk assessment methods [49]. Actuarial risk assessment instruments are now used in a variety of legal decisions involving risk-assessment, including parole decisions, bail determinations, and post-incarceration commitment of some sex offenders [50]. For example, the STATIC-99 is routinely to assess sex offender's, particularly as part of Sexually Violent Predator (SVP) Proceedings [51]. Other tools are specifically devised for non-sexual offender's risk including the Historical, Clinical, and Risk Management Violence Risk Assessment Scheme [HCR-20] [51].

However, these instruments have brought about their own controversy. Actuarial risk prediction is based on group-level data [52]. Critics have argued that applying group data to an individual raises moral, logical, and mathematical problems [53–58]. These criticisms, however, are not unique to actuarial risk assessment. Issues with group to individual inference are being raised with respect to recent efforts to use neuroscience to predict dangerousness [58, 59]. Given the widespread use in the legal system, however, it is likely that the issues inherent in using actuarial instruments would not be a barrier to implementation for assessing whether an inmate presents a risk of future dangerousness.

The text of the Washington correctional institute policy at issue in *Harper* does not address the immediacy issue, nor does the U.S. Supreme Court's opinion. Other contexts only provide limited guidance on the issue. The immediacy of harm is a significant factor for determining the appropriateness of involuntary civil commitment. Statutes frequently mention the immediacy of harm as a consideration [60]. However, this is largely due to the restraint of liberty on an individual who has yet to do anything wrong. The balance between an individual's liberty interest and the state's need to maintain public safety and order may be significantly different post-conviction.

Two years after *Harper*, the U.S. Supreme Court defined the limited circumstances under which the state may forcibly medicate a trial defendant to *maintain* his/her competence [61]. In *Riggins v. Nevada*, the U.S. Supreme Court determined that an individual has a constitutionally protected liberty interest in avoiding the involuntary administration of antipsychotic drugs, and that only an *essential* state interest may overcome this liberty [61]. The Supreme Court held that an individual could be forcibly medicated only if both parts of a two-part test are satisfied: 1) if the administration of antipsychotics is medically necessary, and 2) only if less intrusive means of maintaining competence have been considered and deemed insufficient [61]. In addition to the challenges posed by *Harper*, the second part of the *Riggins* test raises several questions of its own. While the *Riggins* decision applies specifically to pre-trial detainees, a judge might reasonably employ similar requirements for post-conviction CI. If such a scenario occurs, the ability to mandate CI as a part of sentencing may be significantly limited. The requirement that medicating an individual be the least intrusive means possible to achieve the government's goal may mean that mandating CI would be limited to recidivists who have already been unsuccessfully treated with CBT. These criteria were further applied to the forcible medication of an individual who had already been deemed incompetent to stand trial in *Sell v United States* [62]. While the U.S. Supreme Court has yet to address the issue, the Eighth Circuit Court of Appeals (which covers

Arkansas, Iowa, Minnesota, Missouri, Nebraska, and the Dakotas) ruled that these criteria also apply to efforts to make an individual competent for execution [63]. The judges ruled that despite the fact that it seems to be against an individual's interest to be restored to competence to be executed, the criteria established in *Riggins* and *Sell* would apply.

Ethical Challenges

In addition to the legal challenges of mandating cognitive intervention, there are myriad ethical issues that must be considered before implementing programs that offer cognitive intervention to prisoners. The foundation of these ethical issues are Beauchamp and Childress' four fundamental principles of bioethics: respect for autonomy, or respecting the ability of individuals to make their own informed decisions; beneficence, or providing benefits; non-maleficence, or avoiding harm; and justice, or distributing benefits, risks, and costs equitably [64]. Although we contend the legal challenges to CI depend on whether it qualifies as punishment or treatment, we contend that serious ethical concerns about CI to reduce recidivism will arise in two important areas in which our society has a vested interest: the possibility of a prisoner receiving "good time credit" for undergoing CI, and the uncertainty of who should pay for CI for prisoners. Prisoners who earn good time credit are released prior to the end of their sentence and return to the community sooner than they otherwise would. Furthermore, it is the members of that community who may pay for CI.

CI as Treatment for Chronic Condition

Before addressing these ethical concerns, we must address a more fundamental one – if CI is considered treatment, the failure to offer it to prisoners may represent a major ethical breach. Scholars have argued that because patients must at least receive medical screening if they present to an emergency room even if the patients cannot pay for such service [65], prisoners should have at least the same opportunity for care [66]. Furthermore, given prisoners' limited ability to assure their own needs are met, society has an obligation to ensure that prisoners receive adequate health care [66].

Whether CI constitutes medical care and thus should be considered treatment for a medical problem is unclear, but if it is treatment, ethical principles such as beneficence and justice indicate that it is not only ethical to offer it to prisoners but also unethical to fail to offer it. Furthermore, in keeping with the principles of autonomy and informed consent, prisoners who are offered CI should be fully informed of the risks and benefits of the intervention. To fail to offer it is to fail to do good by offering treatment, and is unjust because the decision not to offer it would be based solely on the status of the individuals as prisoners. Prisoners are able to seek medical care on both a routine basis (e.g., a prisoner who takes metformin to treat his diabetes), as well as on an emergency basis (e.g., a prisoner who needs an appendectomy). Though CI is unlike an appendectomy in that it is unlikely to be implemented in an emergent situation, it is comparable to treatment administered over time for a chronic condition, as metformin would be for a diabetic prisoner. However, whether CI is a form of medical care may depend on whether cognitive deficits are a "chronic condition." The impulsivity and low levels of cognition that are common in those who will likely benefit from cognitive intervention do not affect the overall physical health of the individual the way a chronic disease like diabetes does. However, the effects on the individual's psychosocial well-being and on the overall safety and welfare of society may be significant.

If CI were to be implemented for the sake of punishment and not treatment, however, the the legislature or the court system will inevitably engaged in an Eighth Amendment analysis that will resolve the issue of whether CI for the sake punishment is ethical as well as legal. Ethical norms will inevitably inform any decision made by either of these entities; however, we do not undertake a discussion of the ethical issues associated with cruel and unusual punishment here.

Ethical Challenges of Good Time Credit for CI

If prisoners must be offered CI during their sentence because it constitutes treatment, whether they can obtain additional benefits for compliance such as early release or credit for time-served represents an ethical challenge. Prisoners are frequently offered the opportunity to participate in a variety of programs in exchange for credit for time served. For example, they can decide to participate in an education program to earn a GED or high school diploma in order to make themselves eligible for "good time" [67] or to receive "educational good time sentence credit" [68]. They might also receive credit for

time served or a reduced sentence in exchange for participation in an alcohol or drug treatment program, or in the case of some sex offenders, for undergoing chemical or surgical castration. While undergoing CI in exchange for credit for time served would seem to pose significantly greater risks than participating in an education program, this type of medical care is more comparable to a drug treatment program or medical or surgical castration. Critics of castration laws contend there is inherent coercion in giving an offender the choice between a prolonged prison sentence and chemical or surgical castration, and castration laws have remained largely unchallenged. However, this may be the result of nearly unanimous disapproval of these particular offenders and offenses, rather than tacit agreement that the laws are constitutional or ethical. Nonetheless, whether it is ethical to award good time credit in exchange for undergoing CI therapy may depend on a prisoner's ability to consent to the therapy.

Prisoners lose most of their autonomy upon incarceration but the ability, or even the right, to provide informed consent to medical care remains, with limited exceptions. Informed consent in a health care setting means the opportunity to make an autonomous, voluntary choice to accept or refuse care based on adequate information about the risks, benefits, and alternatives to that care. In the event that a prisoner lacks the capacity to provide such informed consent, an appropriate decision-maker should be designated to do so.

In a typical health care setting, patient decision-making typically is based only on these elements of informed consent, combined with other factors such as advice from the physician or other care team members, family preferences, and cost. The benefit a person ultimately derives from undergoing medical care is the health benefit of that care (e.g., pain relief, cure of a disease, mitigation of symptoms of a disease). Thus, their consent is based on the information they receive about it rather than another type of benefit they may derive. Patients may receive parking vouchers, bus passes, or something similar to facilitate their ability to seek medical care but this may be viewed more as reimbursement than "something extra" received in exchange for seeking care. Prisoners find themselves in an analogous situation. A diabetic prisoner does not receive any specific benefit such as good time credit for complying with treatment. Instead, that prisoner benefits only from the control or cure of their disease or condition.

In a research context, however, the situation is different. A clinical trial participant might receive monetary compensation for his or her participation in a study, though payment for research participation is typically not considered a benefit to the participant. FDA guidance provides that that payment to research subjects is acceptable but is not a benefit of participation; rather, it represents a "recruitment incentive" [69]. Furthermore, Institutional Review Boards (IRBs) review research carefully to ensure it satisfies regulatory criteria specified by the Department of Health and Human Services and any other applicable agency requirements. Part of this review involves an assessment of the amount and type of payment to research subjects to ensure it is not of such a nature and amount that it could be coercive, thus making potential participants feel compelled participate in something they might not do otherwise.

Regulations governing human subjects research are also explicit in terms of research that may be conducted with prisoners as the proposed subjects to prevent potential coercion of these subjects; IRBs must ensure any possible benefits to the prisoner "are not of such a magnitude that his or her ability to weigh the risks of the research against the value of such advantages in the limited choice environment of the prison is impaired" [70]. Thus, a large payment, or potentially even any payment to a prisoner for research participation may be prohibited, as would good time credit in exchange for participation. Furthermore, federal regulations specify research participation cannot be considered by a parole board when making parole decisions [71].

Thus, if we do not compensate patients for undergoing medical care and compensation for research subjects is restricted due to concerns about coercion, it may be coercive for a prisoner to have the option of earning good time credit in exchange for undergoing CI, rendering a prisoner unable to provide informed consent for it. Bomann-Larsen has argued that prisoners can provide effective consent for interventions affecting the central nervous system that could address and help prevent anger, sexual misconduct, and bad parental behavior, as well as improve impulse control. She notes that a coercive circumstance like imprisonment may restrict the choices of an individual, but such a coercive circumstance does not necessarily undermine his autonomy [72]. Thus, providing prisoners with an alternative to CI for earning equal good time credit may reduce the coercive nature of the CI option because CI would no longer be an "all or nothing" proposition.

Ethics of CI as a Taxpayer Expense

The Presidential Commission for the Study of Bioethical Issues report, "Gray Matters: Topics at the Intersection of Neuroscience, Ethics, and Society," advocates for widespread access to cognitive intervention [73]. The report contends that limiting cognitive enhancers to those who already possess greater access to social goods would be unjust. The commission also recognized that hose with lower levels of baseline cognitive functioning often experience a greater improvement from cognitive intervention. In light of this report, prisoners may eventually be given these interventions at taxpayer's expense.

Prisoners' health care is paid for by federal or state Departments of Corrections (DOCs); thus, if CI is considered treatment the cost may be covered just as it would if it were any other medication or therapy they would receive while incarcerated. If CI is considered enhancement, determining who is responsible for the expense becomes more difficult. DOCs and other entities pay for non-medical programs that benefit prisoners and society at large, such as GED programs; the state of New York even proposed to pay for college courses for prisoners, though this proposal was abandoned [74]. However, federal and state DOCs have limited resources and we wonder whether CI might be rationed if resources for it are slim and demand is high. The rationing of health care raises a number of ethical issues related to the fairness of the rationing process, and scholars have noted considerations such as the need for oversight of rationing implications The justice implications of rationing CI are similar to those of rationing health care in general, and include the need to consider "oversight by a legitimate institution, transparent decision making, reasoning according to information and principles that all can accept as relevant, and procedures for appealing and revising individual decisions" [75]. However, if the cost of CI for a prisoner is less than the economic impact of future crimes an individual may commit and the cost of re-incarceration, it may make more sense to avoid rationing CI and reduce spending elsewhere.

Ethical concerns about the cost of CI are not limited to the expense the DOC will incur while the individual is incarcerated; depending on the type of CI an individual undergo (for example, a one-time surgery versus a long-term drug regimen), an individual may need to continue the therapy even upon release. However, DOCs do not continue to pay for medical care for individuals once they are released. As a result, many inmates are released from prison and find themselves without health insurance, though there are now grant-funded programs that assist prisoners with obtaining Medicaid coverage so they will be insured upon release [76]. Thus, Medicaid may cover the cost of CI upon release, but not everyone who is released may ultimately apply for or be eligible for Medicaid. Additionally, Medicaid may determine that CI is not a covered therapy under its plans. Private insurance might cover the cost but given the lower socioeconomic status of most prisoners and former prisoners [77], there is a small likelihood that these individuals will have such coverage. Furthermore, private insurance companies may also elect not to CI, especially if the therapy is offered as an off-label use. However, other programs such as parolee education programs may be provided at no cost to individuals who are recently released so there may be justification for the DOC or some other entity to pay for CI on behalf of individuals upon release. Whether these entities are willing to do so may depend on the cost of the CI and the duration for which the individual must continue the therapy.

If the prisoner will be unable to afford the drug after being released and DOC refuses to assume the costs on behalf of the prisoner, there are ethical implications associated with starting them on the drug prior to release.

Furthermore, research will need to examine whether the susceptibility to misbehavior in prison may undo the work that the cognitive enhancers are doing. If the environment has as much or more of an effect on an individual than does the therapy, perhaps cognitive intervention therapy will be more effective in parolees.

Conclusion

Cognitive deficits play a significant role in recidivism. Efforts to address these deficits and the associated criminal behaviors have taken many forms, including addiction treatment programs, educational program (e.g., GED courses), and cognitive behavioral therapy. While these programs have proven moderately effective in reducing recidivism, CI may be the next step in the criminal justice system's efforts to rehabilitate repeat offenders and further reduce recidivism rate. These therapies are likely to face significant legal and ethical challenges depending on whether CI is included as part

of sentencing, a condition of release, or is part of a voluntary program. We conclude that the responses to these challenges are ultimately contingent upon whether CI is viewed as treatment or enhancement.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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