

ACKNOWLEDGING GUILT: FORCING SELF-IDENTIFICATION IN POST-CONVICTION DNA TESTING

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I. INTRODUCTION

The role of post-conviction DNA testing in exonerating the actually innocent¹ has gained widespread public attention.² What receive far less

* Associate Professor of Law, Northwestern University. This paper was first presented at the University of Pennsylvania Constitutional Law Journal symposium on Constitutional Law and Positive Political Theory—Philadelphia, February 2007. Thanks to all participants, and also to Northwestern University Law School's Zodiac group, the audience at the American Law and Economics Association annual meeting for 2007, as well as Alvaro Bustos, Kiwi Camara, Brandon Garrett, Eric Rasmusen, Martin Redish, Song Richardson, and Samson Vermont.

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¹ Wrongful convictions, in contrast—of defendants who may be factually guilty but have been victims of prosecutorial misconduct, mistaken eyewitness testimony, or false confessions—are seldom resolvable by DNA evidence. See Daniel S. Medwed, *The Zeal Deal: Prosecutorial Resistance to Post-Conviction Claims of Innocence*, 84 B.U. L. Rev. 125, 131–32 (2004).

² See, e.g., Diane Kanon, *Will the Truth Set Them Free? No, But the Lab Might: Statutory Responses to Advancements in DNA Technology*, 44 ARIZ. L. REV. 467 (2002) (discussing the high-profile exonerations of wrongfully convicted prisoners and analyzing the response of various state legislatures, including New York and Illinois, to the problem of wrongful conviction); Adam Liptak, *Study Suspects*

public attention, but are nonetheless much more common stories, are cases where inmates seek post-conviction DNA testing, but the results confirm their guilt.³ This phenomenon has become so widespread that it has overwhelmed state prosecutors' offices, dramatically hampering their ability to process meritorious claims.⁴

A costless chance at freedom through post-conviction DNA testing is attractive to the innocent and the guilty alike. Numerous states have recognized that since the judicial system cannot cope with every prisoner trying his or her luck in this way, the state must develop a system that imposes costs for post-conviction DNA testing.⁵ But most states have responded by imposing monetary costs, which apply regardless of whether the tests establish prisoners' innocence or confirm their guilt. As such, these regimes do not address the fundamental problem of perverse incentives, which currently encourage the guilty to seek post-conviction DNA testing. Additionally, imposing monetary costs overly punishes potentially innocent poor or indigent prisoners, while at the same time undersanctioning wealthy guilty prisoners.

This is a problem of private information: The state wants to make a post-conviction DNA testing process available only to the innocent, but while prisoners know whether they are innocent, the state does not. The standard legal response to such a problem is to get more information, which has been the major state response to the problem of an unmanageable number of post-conviction DNA petitions. Various states and the federal government have set up comprehensive vetting mechanisms to attempt to ascertain which petitions are most likely to lead to exonerations. This process, however, necessarily devolves down to highly subjective judgments, adds to the workload of prosecutors and other vetters—thus worsening the problem of the overloaded petition system—and potentially excludes petitions of both guilty and innocent parties.

In contrast, an economic solution to the problem of private information is to structure incentives so as to force innocent and guilty prisoners alike to self-identify as such by creating screening mechanisms. By altering the incentives of prisoners, states can make it attractive to the actually innocent to

Thousands of False Convictions, N.Y. TIMES, Apr. 19, 2004, at A15; Joyce Purnick, *19 Years Late, Freedom Has A Bitter Taste*, N.Y. TIMES, Oct. 3, 2005, at B1.

³ See *infra* Part II. For example, one study found 340 exonerations in a fifteen year period; although the study reported that as a group, the exonerated “had spent more than 3400 years in prison,” it did not report either how many petitions established petitioners' guilt or how many petitions were filed in total by innocent and guilty prisoners, in order to result in the 340 exonerations. Samuel R. Gross, Kristen Jacoby, Daniel J. Matheson, Nicholas Montgomery & Sujata Patil, *Exonerations in the United States 1989 Through 2003*, 95 J. CRIM. L. & CRIMINOLOGY 523, 524 (2005).

⁴ See Gwendolyn Carroll, *Proven Guilty: An Examination of the Penalty-Free World of Post-Conviction DNA Testing*, 97 J. CRIM. L. & CRIMINOLOGY 665, 666–67 & nn.7–12 (2007) (describing studies and anecdotal evidence from prosecutors' offices indicating the substantial time commitments involved in processing post-conviction DNA testing); see also *infra* text accompanying notes 20–26.

⁵ See discussion *infra* Part IV.

seek post-conviction DNA testing, and at the same time make it unattractive to the guilty to seek such tests. We propose an economic screening model that would allow states to differentiate between innocent and guilty petitioners for the purposes of post-conviction DNA testing by punishing with additional incarceration those petitioners whose guilt is confirmed by DNA tests. Such a scheme may sound draconian, but under this system, actually innocent prisoners who were wrongfully incarcerated will have a far better chance of exoneration than under a system that indulges the socially worthless practice of allowing guilty petitioners to try their luck at freedom. Not only will deterring the guilty who falsely claim their innocence drastically reduce the expected waiting time for actually innocent prisoners seeking exoneration, but it will also free up considerable state resources and ultimately reduce the chances of test results falsely indicating guilt.

To understand how our proposal works, consider the analogy of airline prices and different classes of service. Airlines deliberately make the conditions in coach class less favorable, sometimes even spending additional money to do so, because it allows them to maximize their profits from both business class and coach passengers.⁶ Not satisfied to simply differentiate between coach and business class passengers, airlines often make coach airfares more expensive for other conditions, such as if a passenger does not stay a Saturday night. This is often done not because the airlines care when passengers travel, but instead because imposing costs on passengers makes them self-identify as those who are willing to pay more and those who are willing to pay less.⁷

The same logic applies to structuring the incentives of prisoners: If states wish to encourage the innocent to seek potentially exonerating tests, while at the same time discouraging the guilty from doing so, they must impose costs on petitioners.⁸ Fortunately, unlike airlines, states do not need to maximize profit; rather, their interest is in improving the efficiency and fairness of the criminal justice system. As such, states can make testing

⁶ See David Donaldson & B. Curtis Eaton, *Patience, More Than Its Own Reward: A Note on Price Discrimination*, 14 CANADIAN J. ECON. 93, 103 (1981) (describing how many firms maximize profit by using rationing-by-waiting to force consumers to self-select, revealing themselves as either impatient or long-suffering, even if the different services are equally costly; this includes “discriminatory schemes employed by airlines, particularly stand-by fares”).

⁷ See Severin Borenstein & Nancy L. Rose, *Competition and Price Dispersion in the U.S. Airline Industry*, 102 J. POL. ECON. 653, 659, 674 (1994) (describing price discrimination as consisting potentially of both “industry” elasticity of demand for the general product, e.g., discriminating by route preference, and cross-elasticity of demand among specific brands, e.g., discriminating by flight time preferences; use of the latter mechanism is established with confidence and use of the former cannot be ruled out).

⁸ See, e.g., Steven Shavell, *The Appeals Process as a Means of Error Correction*, 24 J. LEGAL STUD. 379, 388 (1995). Shavell argues that, in the context of judicial appeals, state imposition of fees on litigants will advantage the screening process, but will not always be essential if there are also private costs to appeal. In the context of post-conviction petitioning, however, no such private costs will reliably occur, and so cost imposition is essential.

free for innocent prisoners but costly for the guilty. These costs do not need to be monetary: We propose that states make petitioning costly by imposing additional incarceration, conditional on a test confirming the prisoner's guilt.

This Essay provides a novel solution to the problems of administering post-conviction DNA testing schemes. Three states have developed schemes that have some of our endorsed elements. Whereas most states have responded to the flood of petitions for post-conviction DNA testing by imposing monetary costs on all petitioners, three states—Maryland, Missouri, and Utah—make those penalties conditional on showings of guilt. Conditioning monetary penalties on showings of guilt is an improvement on across-the-board monetary costs for petitions because it does not discriminate against poor but innocent petitioners. Monetary costs, however, are an inadequate disincentive to guilty petitioners. Monetary penalties cannot legitimately be high enough to capture all of the costs of post-conviction DNA testing, or to offset the benefit of potential freedom. One state, Missouri, has recently adopted a scheme that includes two of our screening techniques.⁹ The scheme imposes penalties only when tests confirm guilt, and moreover, it imposes those penalties in the relevant currency: time spent incarcerated. Prisoners whose guilt is confirmed by post-conviction DNA testing are penalized by having their sentences increased.¹⁰ Missouri's system, however, imposes a maximum of sixty days of additional incarceration. To a convict contemplating a forty-year jail term, the risk of an additional sixty days incarceration will be inadequate to deter guilty petitioners from seeking post-conviction DNA testing. We show that the necessary penalty is over sixty days for a prisoner who would otherwise be facing a sentence of more than 1.63 years.

This Essay formally illustrates how it is possible to force prisoners to self-identify as innocent or guilty by deciding whether to seek post-conviction DNA testing. Additionally, it shows why other systems that aim to reduce the number of guilty petitioners seeking post-conviction DNA testing create perverse incentives, and why only additional incarceration can effectively encourage innocent and guilty prisoners alike to self-identify.¹¹ This will reduce costs on the judicial system by discouraging guilty prisoners from seeking post-conviction DNA tests. It will also make it faster and easier for actually innocent prisoners to seek the tests they need for timely exoneration.

⁹ See MO. REV. STAT. § 650.058 (2007). Data is not yet available on the effect of Missouri's 2006 legislation on reducing the backlog of post-conviction DNA petitions, but we hope to assess the effect of this legislation in future research.

¹⁰ See *id.* § 650.058(2) (incorporating sentencing increases defined in MO. REV. STAT. § 217.262).

¹¹ One of us has elsewhere examined all of the fifty states' various schemes in detail and endorsed the concept of additional incarceration, as embraced in the Missouri statutory regime. See Carroll, *supra* note 4. This Essay continues Carroll's analysis, utilizing economic models.

In Part II, we describe the problem: Costless or low-cost post-conviction DNA testing has created a flood of petitions from guilty prisoners, making it impossible to address actually innocent prisoners' petitions in a timely and just manner. In Part III, we provide a screening model, and show how a certain number of days of additional incarceration creates incentives for guilty petitioners to avoid seeking testing, while at the same time encouraging and enabling the innocent to seek potentially exonerating post-conviction DNA testing. The appropriate number of days will depend on factors such as the length of the sentence the petitioner would otherwise face and whether the petitioner will also bear the monetary costs of the test. In Part IV, we assess other regimes that govern post-conviction DNA testing. We explain why they have all failed to adequately deter guilty petitioners from seeking testing and why many run the risk of deterring the actually innocent from petitioning for testing. In Part V, we review the constitutional issues, and argue that imposition of a self-screening system through the use of additional incarceration is constitutional, if done properly. We conclude by considering whether our analysis can be applied more generally within the criminal justice system, such as to all habeas petitions made on factual grounds.

II. THE PROBLEM: COSTLESS PROCEDURES ENCOURAGE SYSTEMATIC OVERTESTING

DNA evidence was first used in 1987 to exclude a suspect in a rape case,¹² and shortly thereafter was used by prosecutors to aid conviction in another rape case.¹³ DNA continues to be used primarily for identification of suspects in rape and murder cases, as these cases often rely on biological material left at the scene of the crime.¹⁴ It is now used in every United States jurisdiction.¹⁵

¹² EDWARD CONNORS ET AL., U.S. DEP'T OF JUSTICE, CONVICTED BY JURIES, EXONERATED BY SCIENCE: CASE STUDIES IN THE USE OF DNA EVIDENCE TO ESTABLISH INNOCENCE AFTER TRIAL 4 (1996), available at <http://www.ncjrs.org/pdffiles/dnaevid.pdf>.

¹³ *Id.*; Anna M. Franceschelli, *Motions for Post-conviction DNA Testing: Determining the Standard of Proof Necessary in Granting Requests*, 31 CAP. U. L. REV. 243, 246 (2003). This defendant later sought retesting on the grounds that newer DNA testing technology became available that could potentially exonerate him, but the post-conviction test confirmed his guilt. Anthony Colarossi, *New DNA Test Confirms Rape: 2nd Trial Unlikely In Historic '88 Conviction*, ORLANDO SENTINEL, May 21, 2004, at B1.

¹⁴ This is also the case for the vast majority of exonerations in rape and murder cases, particularly those relying on DNA evidence. See Gross et al., *supra* note 3, at 528–29 (stating that 60% of the exonerations they found were for murder, and 36% for rape or sexual assault).

¹⁵ CONNORS ET AL., *supra* note 12, at 6 (noting that DNA is admissible in forty-six states). Every state in the nation has a DNA database that is used to compare DNA samples from suspects with those from known offenders. See SETH AXELRAD, AM. SOC'Y OF LAW, MED. & ETHICS, SURVEY OF STATE DNA DATABASE STATUTES USER'S GUIDE 1–2 (2005), available at http://www.aslme.org/dna_04/grid/guide.pdf; see also Robert Berlet, *A Step Too Far: Due Process and DNA Collection in California After*

DNA evidence is also used for post-conviction testing¹⁶: Post-conviction DNA testing is the primary evidence relied on in the systematic exoneration investigations undertaken by various innocence projects around the country.¹⁷ Post-conviction DNA testing is undertaken “not only in cases in which DNA testing was never done, but also in cases in which a newer, more sensitive technology may now be able to furnish a conclusive answer.”¹⁸ In response to a 1996 National Institute of Justice report profiling twenty-eight men exonerated by post-conviction DNA testing, a national commission was established to examine the future of DNA evidence in the criminal justice system, and thirty-eight states and the federal government have since passed statutes providing for post-conviction DNA testing.¹⁹

Each post-conviction DNA test involves considerable costs. First, there are the direct monetary costs involved with “identifying whether biological material is available for testing, obtaining approval to have the testing done, and costs of testing itself.”²⁰ The test itself can cost as much as \$5000.²¹ Second, the process can involve considerable cost to the victim, in

Proposition 69, 40 U.C. DAVIS L. REV. 1481, 1487 (2007) (“Every state has developed a criminal DNA database.” (citing AXELRAD, *supra*)).

¹⁶ The Supreme Court recently found that a case must present “truly extraordinary” evidence of actual innocence, such as critical physical evidence overlooked or misinterpreted at trial—like new DNA evidence—in order to warrant consideration of an otherwise defaulted appeal. *House v. Bell*, 126 S. Ct. 2064, 2076–78 (2006).

¹⁷ The Innocence Network is a non-profit affiliation of litigation and public policy organizations whose mission is to exonerate wrongfully convicted people through DNA testing and to address causes of wrongful conviction. See About the Innocence Project, <http://www.innocenceproject.org/about/index.php> (last visited Sept. 24, 2007) (explaining that the Innocence Project is only able to accept applicants for whom DNA testing has the potential to provide conclusive proof of innocence).

¹⁸ JEREMY TRAVIS & CHRISTOPHER ASPLEN, U.S. DEP’T OF JUSTICE, POST-CONVICTION DNA TESTING: RECOMMENDATIONS FOR HANDLING REQUESTS 2 (1999).

¹⁹ SETH AXELRAD & JULIANA RUSSO, AM. SOC’Y OF LAW, MED. & ETHICS, SURVEY OF POST-CONVICTION DNA TESTING STATUTES (2005), available at http://www.aslme.org/dna_04/grid/Post_Conviction_Grid.xls. Post-execution DNA testing is now also being undertaken by death penalty opponents, although “no executed convict in the United States has ever been exonerated by scientific testing.” Robert Tanner, *DNA Test Confirms Guilt in 1992 Execution, but Frees Scores of Other Prisoners*, AP ONLINE, Jan. 13, 2006, http://www.redorbit.com/news/general/356055/dna_test_confirms_guilt_in_1992_execution/index.html.

²⁰ Ellen Yankiver Suni, *Ethical Issues for Innocence Projects: An Initial Primer*, 70 U. MO. KAN. CITY L. REV. 921, 925 n.19 (2002).

²¹ Daniel S. Medwed, *Actual Innocents: Considerations in Selecting Cases for a New Innocence Project*, 81 NEB. L. REV. 1097, 1098 n.4 (2003); Teresa Johnson, *Orange County’s Innocence Project*, ORANGE COUNTY LAW, Dec. 18, 2001 at 19. Single sample tests of this sort cost only a few hundred dollars, but DNA testing for exoneration purposes typically requires testing of multiple samples, either from multiple donors or from multiple pieces of physical evidence, with an average total cost of approximately \$5000. Telephone Interview with Liz Webster, The Innocence Project (May 29, 2007) (indicating that a single sample test run by a state lab, as opposed to a private lab, costs a few hundred dollars; but testing by private labs is more expensive, usually requiring testing multiple samples—either from multiple donors or from multiple pieces of physical evidence—making the average cost of post-conviction testing \$3000–\$5000).

terms of reliving trauma from the case being reopened,²² potentially having to provide new DNA samples, and fearing the loss of resolution.²³ Third, examining, vetting, and processing these petitions absorbs considerable time of often overburdened state prosecutors.²⁴

These costs may seem trivial when compared with the possibility of an innocent person remaining in jail, but viewing the tradeoff that way inverts reality. Innocence projects and courts receive far more petitions than can be granted: Most innocence projects receive hundreds of petitions for help, but can only pursue a fraction of those in depth because each project involves thousands of hours of investigation.²⁵ Successes for many innocence projects number in the single digits.²⁶ Meritorious claims for post-conviction DNA testing are extremely likely to be lost in the sea of petitions. Currently, most petitions take at least one year to resolve and can take many years if there are evidentiary complications or peculiar circumstances in a

In contrast, other forms of DNA testing can be relatively cheap—for example, it is possible to use DNA to determine the breed of a dog for approximately \$38. See DDC Veterinary Animal DNA Services, <http://www.vetdnacenter.com/fees.html> (last visited Sept. 24, 2007). Although DNA testing for the purposes of criminal exoneration is unlikely to become that cheap, the cost can be expected to decrease over time. As such, we discuss the effect of the decreasing costs of DNA testing due to improving technology at *infra* Part III.B.

²² The impact on victims is being increasingly recognized by the courts, and is thus becoming more legally salient. See *Payne v. Tennessee*, 501 U.S. 808, 817–28 (1991) (allowing consideration of victim impact statements in criminal sentencing).

²³ See generally Lynne N. Henderson, *The Wrongs of Victim's Rights*, 37 STAN. L. REV. 937, 965–66 (1985) (“A victim’s contact with the criminal justice system may hinder him or her from coming to grips with death, meaning, responsibility, and isolation in innumerable ways To be of value to past victims of core crimes, victim’s rights proposals ideally ought to assist, rather than interfere with, the victim’s resolution of the experience.”); Cynthia Bryant, *When One Man’s DNA is Another Man’s Exonerating Evidence: Compelling Consensual Sexual Partners of Rape Victims to Provide DNA Samples to Postconviction Petitioners*, 33 COLUM. J. L. & SOC. PROBS. 113, 141–50 (2000) (discussing the necessity of obtaining elimination samples from third parties who may have had contact with the victim of a rape, and from whom a sample of DNA is necessary in order to show that the third party rather than the suspect was the source of the crime scene DNA).

²⁴ See Carroll, *supra* note 4; see also *supra* notes 20–26.

²⁵ Telephone Interview with Jennifer Chunias, Executive Coordinator, New England Innocence Project (Oct. 14, 2005).

²⁶ For example, the New England Innocence Project, run through Duquesne University’s Cyril H. Wecht Institute of Forensic Science and Law, has received 350 inquiry letters from inmates since August 2004. The Institute is working towards its first exoneration this year. Telephone Interview with Maria Comas, Manager of Academic and Student Services, The Cyril H. Wecht Institute of Forensic Science and Law (Oct. 13, 2005). After eliminating those inquiries that do not meet certain basic requirements (such as being within the correct jurisdiction), the New England Innocence Project handles 200 inquiries per year, and they “take far fewer than they end up rejecting.” Telephone Interview with Jennifer Chunias, *supra* note 25. The Project has been in existence since 2001, *id.*, and has been involved with six exonerations. New England Innocence Project, http://www.newenglandinnocence.org/site/content/recent_exonerations.php (last visited Nov. 1, 2007).

case.²⁷ Thus, a system that allows a flood of petitions prevents the innocent from being exonerated quickly or at all.

The major cause of this flooding effect is that, unlike the headlines-garnering cases where DNA testing leads to the exoneration of prisoners, the majority of petitions involve guilty prisoners applying for post-conviction DNA testing, only to have the tests confirm their guilt. Even among those cases vetted and supported by innocence projects, in an estimated fifty²⁸ to sixty percent,²⁹ testing “further implicate[s] the defendant.”³⁰ However, even these figures understate the problem. These figures do not mean that forty to fifty percent of those granted post-conviction DNA testing are exonerated by the tests. Many results are neither exculpatory nor guilt-confirming; they are inconclusive. And while approximately half of innocence project-assisted post-conviction tests result in confirmations of guilt, the percentage of petitions from guilty parties is almost certainly considerably higher, as most innocence projects rigorously screen applications in an attempt to exclude the actually guilty.³¹ The only empirical study that looks both at individuals exonerated and those inculpated by post-conviction DNA testing failed to find that appellants whose innocence was subsequently established by DNA testing litigated their appeals any more aggressively than the actually guilty.³²

Petitions by guilty parties are overwhelming the post-conviction DNA testing system, rendering it less likely to vindicate the rights of the innocent. The reason for this is that guilty prisoners can potentially benefit from post-conviction DNA testing despite their guilt, and generally face little or no consequences for the attempt. Although DNA testing is viewed as some of the most concretely verifiable evidence of identification available to the

²⁷ Carroll, *supra* note 4, at 666–67 (“For Assistant Cook County State’s Attorney Mark Ertler, the numbers [of post-conviction DNA testing petitions resulting in confirmation of guilty] are similarly sobering. In October 2005, Ertler had thirty pending petitions from inmates seeking post-conviction DNA testing. In 2004, ten of Ertler’s testing petition cases had met resolution. Of those ten, none were conclusively exculpatory. Rather, two resulted in matches to the petitioner’s DNA, confirming guilt. Each petition may take anywhere from one year to many years to reach resolution, depending on the evidentiary complications and peculiar circumstances of a particular case.” (citing Interview with Mark Ertler, Deputy Supervisor of the Special Litig. Unit for Cook County, Cook County State’s Attorney’s Office, in Chi., Ill. (Sept. 22, 2005)) (footnotes omitted)).

²⁸ Peter J. McQuillan, *DNA News* (2005), <http://www.innocenceproject.org/dnanews/index.php> (last visited Oct. 20, 2005).

²⁹ Stephanie Simon, *DNA Tests for Inmates Debated*, L.A. TIMES, Feb. 10, 2003, at A10.

³⁰ *Id.*

³¹ See Carroll, *supra* note 4, at 677–78.

³² Brandon L. Garrett, *Judging Innocence*, 108 COLUM. L. REV. (forthcoming Jan. 2008) (manuscript at 52, available at <http://ssrn.com/abstract=999984>). Prior to DNA testing, guilty petitioners also received reversals at a similar rate to the innocent in matched comparison groups, although the small samples in these comparison groups limit the confidence associated with these correlations. *Id.*

courts,³³ it is not infallible. First, test results can be inconclusive for many reasons.³⁴ These potential errors will not necessarily result in exclusion of the evidence; rather, the fact-finder is instructed to “give weight to the evidence accordingly.”³⁵ Second, and more significantly in terms of potentially overturning a conviction, tests can produce false negatives, meaning that the results support exoneration even when the defendant is guilty. Although this is unlikely to result from a failure of the testing process itself, there is a chance of a false negative arising through laboratory error, con-

³³ Henry L. Chambers, Jr., *Reasonable Certainty and Reasonable Doubt*, 81 MARQ. L. REV. 655, 679 n.103 (1998) (“[DNA] is viewed as some of the most reliable evidence available.”).

³⁴ The sample can be too small to positively identify the DNA source, or in cases with multiple perpetrators, it can be unclear whether the petitioner’s DNA was deposited at the scene. A 1995 survey of forty laboratories (with nineteen laboratories providing sufficient data) reported that of the 21,621 cases received for DNA analysis, 16% yielded inconclusive results, often due to deteriorated or inadequately small test samples; only 23% of cases provided results that excluded suspects. CONNORS ET AL., *supra* note 12, at 20–21; *see also* Cynthia E. Jones, *Evidence Destroyed, Innocence Lost: The Preservation of Biological Evidence Under Innocence Protection Statutes*, 42 AM. CRIM. L. REV. 1239, 1240–41 (2005) (“[T]he Innocence Project of the Benjamin Cardozo School of Law, the national leader in the use of DNA to exonerate wrongly convicted prisoners, reports that 75% of the cases it accepts cannot go forward because the evidence has been lost or destroyed.”). Note that this number does not reflect how many cases are affected before trial due to loss of evidence or other reasons. This number only reflects a percentage of (a) petitioners seeking post-conviction testing and (b) petitions taken on by the Innocence Project. *Id.* The percentage of cases with flaws such as evidence deterioration or lab error out of the total number in which DNA testing is performed is probably significantly lower than the 16% quoted by Connors et al. Note also that small samples have been increasingly testable as the testing technology has improved. *See* Christopher L. Blakesley, *Scientific Testing and Proof of Paternity: Some Controversy and Key Issues for Family Law Counsel*, 57 LA. L. REV. 379, 398 (1997) (“Recent developments in DNA replication, however, have made testing minute samples of blood, semen, hair follicles, saliva, or skin tissue possible.”).

³⁵ *See* Ryan McDonald, *Juries and Crime Labs: Correcting the Weak Links in the DNA Chain*, 24 AM. J. L. & MED. 345, 359–60 (1998) (“The jury hears the arguments about lab error and population databases and is told to give weight to the evidence accordingly. . . . Some courts have responded to the problem by allowing the use of DNA evidence without supporting statistical information. Critics are skeptical of this approach, noting that it still subjects juries to complex expert testimony about frequency of allele occurrence and lab error rates.”); *see, e.g., State v. Thomas*, 586 A.2d 250, 437 (N.J. Sup. Ct. App. Div. 1991) (noting the trial court’s responsibility on remand to let the conviction stand if the test results were either inconclusive or indicated that defendant was the assailant, or to either conduct an in limine hearing on admissibility or order a new trial if the test results indicated that defendant was not the assailant); *see also* Peter Neufeld, *Preventing the Execution of the Innocent: Testimony Before the House Judiciary Committee*, 29 HOFSTRA L. REV. 1155, 1161 (2001) (discussing the example of Kirk Bloodsworth, who received a death sentence and “had inconclusive DNA testing using RFLP (Restriction Fragment Length Polymorphism Testing) but was exonerated by PCR (Polymerase Chain Reaction) testing”). However, there is no uniform standard governing the weight given to inconclusive evidence. In some cases, inconclusive evidence has rendered courts reluctant to grant post-conviction DNA testing. *See, e.g., In re Washpon*, 625 N.Y.S.2d 874, 878 (Sup. Ct. 1995) (agreeing to a provisional grant of post-conviction DNA testing; testing would be permitted only if there was adequate genetic material to be tested, so that a result would not be rendered inconclusive by an insufficient sample size); *Sewell v. State*, 592 N.E.2d 705, 708 (Ind. Ct. App. 1992) (describing appropriate circumstances in which to allow post-conviction DNA testing and declaring that DNA testing should be used “when the State’s proofs are weak, [and] when the record supports at least a reasonable doubt of guilt” (citation omitted)).

tamination, human error, or population database error.³⁶ Also, there exists a range of discretion in interpretation, such as whether markers in two samples have identical bands or extremely similar bands. Studies of error rates in DNA testing estimate that there is approximately a one percent error rate.³⁷

DNA evidence is thus unique in that it is exceptionally accurate, but it is not exempt from the need to interpret what constitutes a positive versus a negative result. It is necessary to set the cut-off for which results shall be interpreted as confirming guilt or adequately establishing innocence. A line must be drawn somewhere, and that line-drawing creates the incentive for

³⁶ See McDonald, *supra* note 35, at 354–56 (discussing notable instances in which forensic lab conditions produced inaccurate identifications); Jennifer L. Mnookin, *Fingerprint Evidence in an Age of DNA Profiling*, 67 BROOK. L. REV. 13, 45–46 (2001) (describing the various sources of potential DNA errors).

³⁷ See Christopher L. Blakesley, *La Preuve Penale et Tests Genetiques United States Report*, 46 AM. J. COMP. L. (SUPPLEMENT) 605, 613 (1998) (“Although there are few published studies of actual error rate in forensic DNA testing, those which have been done seem to suggest an error rate of about one percent.”); see also *State v. Bible*, 858 P.2d 1152, 1180 n.16 (Ariz. 1993), *cert. denied*, 511 U.S. 1046 (1994) (discussing the inconsistent testing protocols and accuracy records among the three major laboratories conducting RFLP DNA testing in the United States); *State v. Alt*, 504 N.W.2d 38, 53 n.26 (Minn. Ct. App. 1993) (noting that courts often admit DNA test results from laboratories with no known or available error rates and that error rates have been estimated to be as high as one to four percent); Jonathan J. Koehler, *One in Millions, Billions, and Trillions: Lessons from People v. Collins (1968) for People v. Simpson (1995)*, 47 J. LEGAL EDUC. 214, 221 (1997) (“One surprising finding that emerges from studies of DNA proficiency tests is that laboratories’ false positive error rates appear to be on the order of 1 in 100. That is, when a laboratory reports a match, there is about 1 chance in 100 that the match report is in error [E]rrors occur for a variety of reasons. Some errors are technical, others are human. The human errors—which appear to be more common—include such problems as contamination, mislabeling, misrecording, case mixups, interpretive errors, and misrepresentations.”); Jonathan J. Koehler, *Error and Exaggeration in the Presentation of DNA Evidence at Trial*, 34 JURIMETRICS J. 21, 22–26 (1993) (evaluating a survey of results of open proficiency tests and concluding that the results suggest that false positive errors occur in one to four percent of the match reports); Richard A. Nakashima, *DNA Evidence in Criminal Trials: A Defense Attorney’s Primer*, 74 NEB. L. REV. 444, 464 & n.95 (1995) (“Estimates of error rates in forensic DNA testing have varied widely, from as low as 9 in one million (0.001%) to as high as 4%.”). These problems arise in relation to both false positives and false negatives:

There are two basic types of errors that can occur in DNA typing. These are false negatives and false positives. The false negative error occurs when the crime scene sample actually came from the suspect, but the DNA analysis shows that it does not match the suspect’s DNA profile. False negatives, of course, favor the criminal defendant. If there is other strong evidence linking the suspect to the crime, it is likely that the analysis will be repeated and any errors corrected. The problem for the defendant occurs when there is a “false positive.” In that case, someone other than the suspect left the crime scene sample, but the DNA analysis shows a match with the suspect’s DNA. Because the majority of criminal defendants cannot afford independent DNA testing, it is unlikely that a false positive result will be detected by retesting the samples.

Nakashima, *supra*, at 463–64; see also Blakesley, *supra*, at 612 (noting that in one significant case, a lab did not “even bother to record in a laboratory notebook the fact that a probe was found to be contaminated,” and that such a practice “invites the occurrence of false positives and false negatives”); Jonathan J. Koehler, *The Psychology of Numbers in the Courtroom: How to Make DNA-Match Statistics Seem Impressive or Insufficient*, 74 S. CAL. L. REV. 1275, 1303 n.74 (2001) (noting that proficiency tests may measure both the false positive and the false negative rates of a laboratory).

guilty prisoners to petition for post-conviction DNA testing if there is no cost in doing so.

To see why, Figure 1 illustrates a hypothetical density distribution of DNA test results. As mentioned, no study has revealed the number of petitions sought for DNA testing, and thus we need to hypothesize about the actual distribution, but our analysis stands as long as only two elements of Figure 1 are true, as discussed below.

Figure 1: Hypothesized Density Distribution of DNA Test Results

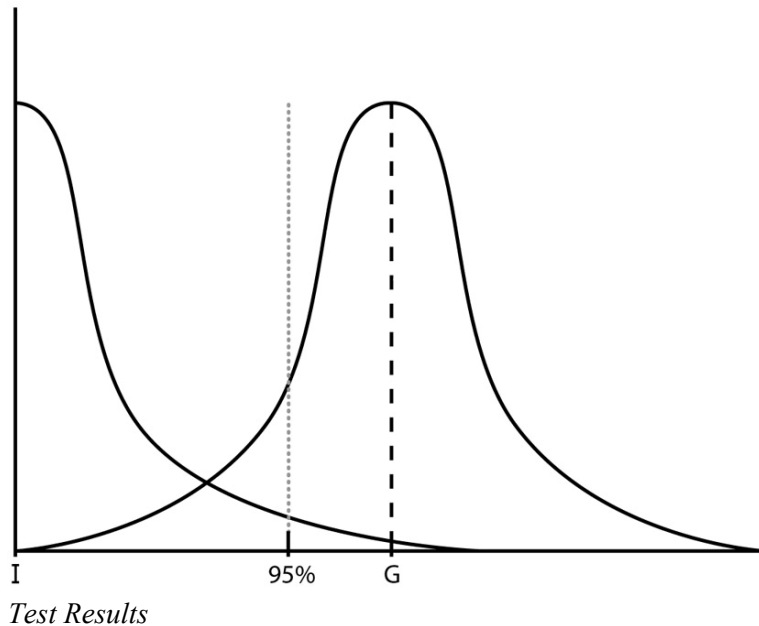


Figure 1 represents the range of possible test results on the x-axis, which cluster at the points “I,” for Innocent, i.e. negative identification results, and “G,” for Guilty, i.e. positive identification results. Inconclusive results lie in between. The y-axis is simply the density of results. The two distribution curves are the likely range of results for innocent and guilty prisoners—the curves above I and G respectively. The bimodal distribution is tightly clustered at each of the points I and G, representing the extremely high accuracy of DNA testing. But because even DNA evidence is fallible, we still expect a distribution of results for any given factual scenario. Depending on where we draw the cut-off line, it is possible to have both false positives and false negatives.

If we draw the cut-off line so as to avoid all possible chance of a false positive—i.e., to remove any chance of falsely imprisoning the innocent—the cut-off line would be at the very right-hand tail end of the distribution of results for innocent prisoners (the I curve). This would avoid false posi-

tives, but then the vast majority of guilty prisoners would also have results that have to be categorized as showing innocence, to be absolutely sure that no innocent prisoners are accidentally categorized as showing positive results.

The criminal law system has many elements that attempt to balance the possibility of false positives and false negatives in favor of freeing innocent prisoners, such as the “beyond reasonable doubt” burden of proof. But to completely avoid any chance of false positives would render the process unworkable, as it would exclude very few guilty prisoners. In all criminal contexts, the courts have recognized that such line-drawing cannot avoid the possibility of imprisonment of an innocent person—even in the context of the death penalty.³⁸

Instead, the cut-off line must be drawn in a way that balances the desire to avoid false positives with the need to have a credible number of positive results, so as to avoid a deluge of petitions seeking tests resulting in false negatives. Most criminal law rules place that line strongly in the direction that favors innocent defendants, while accepting the possibility of false positives. In Figure 1, this translates to positioning the cut-off point in a strongly rightward direction toward point G and away from point I.³⁹ One such possibility is represented by the 95% line, which aims to capture 95% of innocent prisoners’ tests as negative results. The result of such a rule, however, is necessarily to include a large proportion of factually guilty petitioners within the realm of outcomes labeled negative results. As such, any rule that aims to protect against false positives necessarily creates the possibility of false negatives, which in turn incentivizes guilty prisoners to seek testing.

It does not matter if Figure 1 is a particularly accurate representation of the actual density distribution of post-conviction DNA testing petitions. The result that false negatives will occur arises as long as two conditions are met: first, the distribution of DNA results do not all occur at the points I and G, but rather tail off as illustrated; and second, the cut-off line is in a position such that some of the distribution of guilty prisoners’ test results is within the range categorized as showing a negative result. We know that both these conditions are met: first, as discussed above, DNA testing is not 100% accurate; second, courts have recognized that false negatives are unavoidable:

³⁸ As Justice Scalia recognized recently, even in relation to the death penalty, “[o]ne cannot have a system of criminal punishment without accepting the possibility that someone will be punished mistakenly.” *Kansas v. Marsh*, 126 S. Ct. 2516, 2539 (2006) (Scalia, J., concurring).

³⁹ In post-conviction DNA tests, the line is arguably less skewed toward G than it is in pre-conviction procedures because the courts have developed categorizations of testing results, excluding as inappropriate for post-conviction DNA testing the cases that are most likely to produce inconclusive results. See *infra* Part IV. These categories are minimally useful, however, and ultimately collapse down to one narrow exclusion rule: testing should be avoided when crimes involve multiple perpetrators and it is unclear whether the petitioner’s DNA was left at the crime scene. See *infra* Part IV.A.

DNA testing could produce a “false negative,” where a match between DNA prints is not declared when one in fact exists. Contradictory expert testimony was offered on whether a “false positive,” where the wrong individual is identified as the contributor of the DNA sample, could result.⁴⁰

The above quotation suggests that the chances of a false positive may be very small relative to the chances of a false negative. There is evidence to support the court’s claim that false negatives are more likely than false positives. One expert claims that the “chances of an innocent person being implicated are next to nil, but the chance[s] of a guilty person being falsely exonerated are reasonably high.”⁴¹ The high statistical standards for similarity in DNA testing contribute to this inequality, as they are designed to be very stringent and so minimize the risk of false positives. The higher the standard of what constitutes a DNA match, the more the probability of a false positive becomes “vanishingly small”; this also necessarily translates to increasing the chance of a false negative.⁴² Nevertheless, we work under the assumption that there is a positive probability of both false positive and false negative results. Our scheme decreases the probability of both false positives and false negatives arising.

What is not doubted is that false negatives will arise from post-conviction DNA testing. The chance of a false negative result, however small, creates the possibility that guilty parties will benefit from seeking post-conviction DNA testing. Even if the probability of exoneration arising from DNA testing for a guilty petitioner is only 1 in 100, when multiplied by the value of potential freedom, and particularly when compared to the low cost of seeking testing under most legal regimes, every guilty petitioner has an incentive to seek testing.⁴³

⁴⁰ State v. Schwartz, 447 N.W.2d 422, 426 (Minn. 1989).

⁴¹ William Tucker, *DNA Fingerprinting Is Reliable and Accurate*, in IS DNA FINGERPRINTING ACCURATE? 121, 126 (1996). However, Nakashima argues that “in an initial criminal investigation,” this imbalance may be reversed because when there is non-DNA evidence of a suspect’s guilt, and a DNA test exonerates the defendant, the evidence will probably be retested and the error corrected, but that defendants’ attorneys do not generally challenge these tests. Nakashima, *supra* note 37, at 463–64.

⁴² The University of Michigan, DNA Fingerprinting, Genetics and Crime: DNA Testing and the Courtroom, Fathom: The Source for Online Learning, <http://www.fathom.com/course/21701758/session2.html> (last visited Sept. 25, 2007) (“Imagine that we just accept as matches, alleles that migrate exactly the same distance in the electrophoresis process. The possibility that we will mistakenly declare a match (false positive), when none exists, will be vanishingly small. However, we will mistakenly declare that there is no match (false negatives) frequently as the same alleles will show small variations in migration distance due to experimental error Thus we can see the two types of errors are related. We cannot minimize one without adversely affecting the other. The use of many loci also minimizes the possibility of false positive error. To declare a match with [ten] loci, all [twenty] alleles (two/locus) must match. If just one allele is different in the forensic sample and the defendant, then there is no match.”).

⁴³ Testing by the actually guilty may not be truly “costless” without a penalty scheme, as there is a potential built-in “cost” if the prisoner is also seeking reversal on some other ground, and if the guilt-confirming test can be used against the prisoner in that other process. Thus, there is an inherent deterrent against petitioning by the guilty among those with other possible avenues of reversal. However,

Courts have recognized this danger and expressed concern that they will be “inundated in habeas petitions each time a new form of testing became available which might shed light on the defendant’s evidence.”⁴⁴ This strongly suggests that we can expect that DNA technology advances will not stem the flow of petitions. As new DNA technologies continue to be developed, prisoners will continue to petition for post-conviction testing under each new technique, even if they were initially convicted with the aid of inculpatory DNA evidence.

As such, in a costless post-conviction DNA testing system, there is an incentive for guilty prisoners to seek post-conviction DNA testing. Thus, a system without petitioning costs unavoidably overwhelms itself with a flood of pointless petitions for post-conviction DNA testing for the guilty. This testing also has a social welfare opportunity cost: Pursuing a petition of an actually guilty petitioner reduces the chances of exonerating an actually innocent petitioner. Thus, without a cost-based system, the system renders itself less able to meet its aim of protecting the innocent. The following Part sets out our solution to this problem.

III. A PROPOSAL: FORCED SELF-IDENTIFICATION THROUGH INCARCERATION PENALTIES

This Part provides an economic model that illustrates that, by punishing prisoners with additional incarceration if DNA tests confirm their guilt, states can structure incentives such that innocent prisoners will seek post-conviction DNA testing and guilty prisoners will not.

A. *The Model and Its Results*

As discussed in Part II, DNA testing may result in false positives⁴⁵ or false negatives. We represent the situation as:

$$pr(t=i|G), pr(t=g|I) > 0$$

That is, the probability of a test result, t , indicating innocence, i , when in fact the party is guilty, G , and the probability of a test result indicating guilt, g , when in fact the party is innocent, I , are both greater than zero. If, however, we can create a penalty, P , that is a function of the probability of a test

this deterrent does not seem to be adequate, given the flood of petitions by the guilty. Also, as more states build comprehensive databases of DNA samples of people convicted of crimes, *see, e.g.*, Patrick Mcgeehan, *Spitzer Wants DNA Sampling in Most Crimes*, N.Y. TIMES, May 14, 2007, at A1, another inherent deterrent may increasingly arise: being caught for other offenses through sample comparisons.

⁴⁴ Karen Christian, “*And the DNA Shall Set You Free*”: *Issues Surrounding Postconviction DNA Evidence and the Pursuit of Innocence*, 62 OHIO ST. L.J. 1195, 1210–13 (2001) (discussing *Jenner v. Dooley*, 590 N.W.2d 463, 472 (S.D. 1999)).

⁴⁵ We argue that our proposal will further reduce the probability of a test result indicating guilt when in fact the party is innocent. *See infra* Part III.B.

indicating guilt, then we can begin to differentiate the innocent from the guilty on the basis of their utility functions. For convenience, let:

$$\alpha_1 = pr(t=g|I)$$

$$\alpha_2 = pr(t=i|G)$$

B = Benefit of freedom

C = Cost of testing

P = Penalty in days of incarceration

δ = The discount factor on future time served

The two α terms, α_1 and α_2 , are each the probabilities of failure of the respective tests; thus $(1 - \alpha_1)$ and $(1 - \alpha_2)$ are the probabilities of success of the respective tests. B is the benefit to a prisoner of the freedom that results from a test establishing innocence. C is the cost to the state in terms of testing, which can be passed on to petitioners. We argue that this cost should only be transferred to petitioners if the test confirms their guilt, if at all. P is the number of days of additional incarceration that constitutes the penalty. Importantly, the penalty, P , only applies if the DNA test confirms guilt. δ is the discount factor, by which future gains and losses, including time served, is discounted. This is a well-recognized phenomenon in both the economics⁴⁶ and the psychology literature⁴⁷: Individuals give greater salience to current costs and benefits than to identical future costs and benefits.

We aim to achieve a separating equilibrium that structures incentives such that the innocent will seek testing and the guilty will not. To have a separating equilibrium, and thus to have a mechanism that forces petitioners to reveal their guilt or innocence, the expected utility of a petition to an innocent prisoner must be greater than zero, and the expected utility of a petition to a guilty prisoner must be less than zero. That is:

$$EU_I > 0$$

⁴⁶ See, e.g., JEFFREY L. HARRISON, LAW AND ECONOMICS: CASES, MATERIALS AND BEHAVIORAL PERSPECTIVES 29 (2002) (describing the use of present value and discount rate analysis as “pervasive” in law and economics: “[t]he present value is the total amount ‘discounted’ or decreased by the amount you could expect to earn on a safe investment”).

⁴⁷ Psychologists typically refer to such discounting of value, depending on the time frame, as myopia. See Richard H. Thaler, Amos Tversky, Daniel Kahneman & Alan Schwartz, *The Effect of Myopia and Loss Aversion on Risk Taking: An Experimental Test*, 112 Q. J. ECON. 647, 647–48 (1997).

and

$$EU_G < 0$$

We can now define these expected utilities:

$$EU_I = (1 - \alpha_1)B - \alpha_1\delta P - \alpha_1C > 0 \quad (1)$$

$$EU_G = \alpha_2B - (1 - \alpha_2)\delta P - (1 - \alpha_2)C < 0 \quad (2)$$

The benefit to the innocent prisoner is multiplied by $(1 - \alpha_1)$, whereas the benefit to the guilty prisoner is multiplied by α_2 , because the innocent prisoner gets the benefit if the test is correct, whereas the guilty party gets the benefit only when the test produces a false negative. Similarly, the innocent prisoner suffers the penalty, $(P + C)$, when the test falsely shows him or her to be guilty, i.e., α_1 , whereas the guilty prisoner suffers the penalty when the test is correct, $(1 - \alpha_2)$. P is discounted by δ because that penalty is not borne until the end of the prisoner's sentence, whereas B and C are not discounted because they arise immediately.

From equation (1) we get:

$$P < \frac{B(1 - \alpha_1) - \alpha_1C}{\delta\alpha_1} \quad (3)$$

And from equation (2) we get:

$$P > \frac{B\alpha_2 - (1 - \alpha_2)C}{\delta(1 - \alpha_2)} \quad (4)$$

We now establish three significant results. First, petitioning must be costly to some extent, otherwise all prisoners will petition, including the guilty. Second, for a certain range of penalties, separating equilibria exist. And third, there is only one condition for the existence of the range of equilibria, that $\alpha_1 + \alpha_2 < 1$.

1. Result 1.—Petitioning must be somewhat costly in order for states to avoid the situation described in Part II, whereby the system is overwhelmed by a flood of petitions, largely from guilty parties. We prove this by contradiction. If petitioning is costless, then:

$$P = 0 \text{ and } C = 0$$

Then, from equation (2):

$$EU_G = \alpha_2 B$$

Since all probabilities range between one and zero, $\alpha_2 \geq 0$. Furthermore, as established in Part II, there is currently a positive probability of false negative results arising (the next Section discusses what happens when this probability falls to zero). As such, $\alpha_2 > 0$. Also, $B > 0$, because B is the benefit to prisoners of gaining their freedom. Presumably freedom is preferable to imprisonment, at least for prisoners petitioning for their freedom. Therefore, as long as the benefit of testing is an actual benefit (i.e., prisoners seeking testing do not really want to remain in prison), and there is any chance of an error, guilty prisoners will always have an incentive to petition in a costless setting. That is:

$$EU_G > 0 \text{ if } P = 0 \text{ and } C = 0 \quad (5)$$

Consequently, it is not possible to have a separating screening equilibrium if petitioning is costless. Petitioning must have a cost for there to be any chance that prisoners will self-identify. The next result shows that self-identification *will* occur under certain conditions.

2. *Result 2.*—If petitioning is not costless, then we can define an interval in which $EU_I > 0$ and $EU_G < 0$. From equations (3) and (4):

$$\frac{B\alpha_2 - (1 - \alpha_2)C}{\delta(1 - \alpha_2)} < P < \frac{B(1 - \alpha_1) - \alpha_1 C}{\delta\alpha_1}$$

$$\text{And so: } P \in \left[\frac{B\alpha_2 - (1 - \alpha_2)C}{\delta(1 - \alpha_2)}, \frac{B(1 - \alpha_1) - \alpha_1 C}{\delta\alpha_1} \right] \quad (6)$$

This defines the range of penalties for which prisoners will have the incentive to self-identify under our scheme. Thus, contingent on result 3, discussed below, a range of penalties exists that results in separating equilibria; in the next Section, we discuss which equilibrium penalty within this range is likely to be observed.

3. *Result 3.*—In order for the separating equilibrium contained in equation (6) to be achievable, and thus to ensure that prisoners self-identify, the only condition is that:

$$\frac{B(1-\alpha_1)-\alpha_1C}{\delta\alpha_1} > \frac{B\alpha_2-(1-\alpha_2)C}{\delta(1-\alpha_2)} \quad (7)$$

By calculation, the sole condition for the equilibrium is:

$$1 > \alpha_1 + \alpha_2 \quad (8)$$

Put another way, this means $1 - \alpha_1 > \alpha_2$, or $1 - \alpha_2 > \alpha_1$. That is, the probability that the test accurately determines innocence has to be greater than the probability that the test wrongly determines guilt, or vice versa. Therefore, as long as both α_1 and α_2 , the probabilities of error, are less than 50%, the condition is satisfied. This condition simply requires that the test for both of these groups, the guilty or the innocent, needs to work more than 50% of the time in order to induce screening. This is a very low threshold to satisfy; in fact, we know empirically that both error terms are approximately in the range of 0.1% to 1%. Thus, in reality we know that this condition will always be satisfied.

What this means intuitively is that the only condition for the screening equilibrium to hold is that DNA testing is not meaningless—that there is a less than 50% probability of false positives and false negatives occurring. As we established in Part II, DNA testing is highly precise, just not infallible. As such, this condition will be met, and by results (5), (6) and (8), we have established that post-conviction DNA testing is a perfect candidate for the screening mechanism of using P , a penalty of added incarceration.

Our results show that by using the penalty mechanism of added incarceration, a range of perfect separating equilibria exists. As such, if P is properly calibrated, the outcome we expect is that guilty prisoners should not petition for post-conviction DNA testing, and innocent prisoners should always petition for such testing. Thus, as long as we properly set P within the equilibrium range, we will achieve the socially optimal outcome of creating the greatest likelihood of wrongfully convicted, actually innocent prisoners being exonerated, while leaving guilty prisoners to serve out their prison terms.

The next Section establishes how we can determine the requisite level of P —the number of days of additional incarceration—necessary to achieve this socially optimal outcome.

B. Implications and the Achievability of Our Results

This Section explores the implications of our three results: (1) that petitioning must be costly to some extent; (2) that for a certain range of penalties, separating equilibria exist; and (3) that the only condition for the existence of these equilibria is that DNA testing is at least 50% effective. In doing so, we estimate the minimum penalty—in terms of the number of

days of additional incarceration—necessary to force petitioners to self-identify.

The first comparative static to emerge from an examination of our first and third results is that as the accuracy of DNA testing increases, it becomes easier to differentiate between the two types of petitioners. We see this in equation (6):

$$P \in \left[\frac{B\alpha_2 - (1 - \alpha_2)C}{\delta(1 - \alpha_2)}, \frac{B(1 - \alpha_1) - \alpha_1 C}{\delta\alpha_1} \right]$$

As DNA accuracy increases, α_1 and α_2 will tend towards zero, so $(1 - \alpha_1)$ and $(1 - \alpha_2)$ will tend towards 1. Then, even without any monetary penalty, C , the requisite penalty, P , will approach the interval $P \in [0, \infty]$. This means that any nonnegative penalty will suffice to induce self-identifying behavior. That makes sense: The closer we get to perfect testing, the less of an incentive there is for guilty parties to bother petitioning, and even a very trivial penalty will discourage petitioning when there is little to be gained from it.

This first implication is particularly significant when we consider how we expect DNA accuracy to change over time. We expect that the costliness of DNA testing will decrease as DNA testing becomes more efficient and widely available. These changes will make DNA testing much more standard in pre-conviction procedures. As such, the need for a penalty of the type we are proposing can be expected to dissipate over time. However, back-capturing is always very costly: With over two million prisoners currently incarcerated in the United States,⁴⁸ post-conviction DNA testing will still be a highly demanded and costly enterprise for some time to come.⁴⁹

⁴⁸ As of June 30, 2006, there were 2,245,189 prisoners held in federal or state prisons or in local jails. U.S. DEP'T OF JUSTICE, BUREAU OF JUSTICE STATISTICS: PRISON STATISTICS, SUMMARY FINDINGS, available at <http://www.ojp.usdoj.gov/bjs/prisons.htm> (last visited Sept. 25, 2007).

⁴⁹ Biological evidence is only available in approximately 10–20% of criminal cases. Daniel S. Medwed, *Up the River Without a Procedure: Innocent Prisoners and Newly Discovered Non-DNA Evidence in State Courts*, 47 ARIZ. L. REV. 655, 656–57 (2005) (“Evidence suitable for DNA testing, however, exists only in a smattering of criminal cases: an estimated 80–90% of cases do not have any biological evidence. Even where biological evidence conducive to a DNA test is present at the outset of a particular case, the evidence is often lost, destroyed, or degraded over time.”); see also Ronald J. Tabak, *Finality Without Fairness: Why We Are Moving Towards Moratoria on Executions, and the Potential Abolition of Capital Punishment*, 33 CONN. L. REV. 733, 735 (2001) (“[A]lthough the great public emphasis on DNA testing may obscure this[,] science is often unable to provide dispositive results. Notwithstanding all the hoopla surrounding DNA testing, it can be performed only in a small minority of situations in which significant biological evidence from the real culprit is collected properly at the scene of the crime.”). Advances in DNA technology, however, can be expected to lead to increased demand for retesting. See Seth F. Kreimer, *Truth Machines and Consequences: The Light and Dark Sides of ‘Accuracy’ in Criminal Justice*, 60 N.Y.U. ANN. SURV. AM. L. 655, 658–59 (2005) (“During the next decade we are likely to see at least a second wave of cases . . . , for DNA technology continues to ad-

Even if quality DNA testing becomes standard in pre-conviction procedures going forward, post-conviction DNA testing will be a costly enterprise for the foreseeable future. And as mentioned, even prisoners convicted with the use of DNA are likely to seek post-conviction review on the basis that new DNA technologies may render a different result. As such, reducing the costs of post-conviction DNA testing is a laudable policy priority, but our proposal will still be worth pursuing for states seeking to reform their post-conviction DNA testing system for the foreseeable future.

The same comparative statics from equation (6) yield further implications as to what happens when the probability of false positives and false negatives remains positive. We can predict what the requisite penalty levels, P , must be in order to create the self-identifying equilibrium policy-makers seek by using estimates of our terms α_1 , α_2 , B , C , and δ . Table 1 presents predictions for P , under the following assumptions.

As discussed in Part II, α_1 and α_2 are estimated as between 1/100 and 1/1000.⁵⁰ For our calculations, we calculate P first assuming that α_1 and α_2 are each 1/100, and then that α_1 and α_2 are each 1/1000. Higher α_1 and α_2 errors result in a higher requisite penalty for screening to occur.

We assume δ is .1, a reasonable expectation of the level of impatience we can expect from inmates facing lengthy prison terms.⁵¹ This means that an additional day in prison today has ten times the salience of an additional day in prison in ten years' time. If δ increases, the penalty required will decrease.

As discussed in Part II, the current cost of conducting DNA tests is \$5000. We ignore the nonfinancial costs mentioned, including victim trauma and prosecutorial time wasted, so this is probably a conservative estimate. In our concluding section, we discuss the effect if the monetary costs of DNA testing become trivial. In Table 2, we calculate P if C falls to \$1000. Decreases in C raise the requisite penalty for screening to occur.

vance. Systems are currently becoming available that permit analysis of mitochondrial DNA, a substance that resists degradation more effectively than the cellular DNA that formed the basis for the first generation of tests and can be more easily recovered from hair and bone. Similarly, more sophisticated and sensitive methods of DNA analysis are beginning to be tested that can engage in DNA matching from ever smaller amounts of biological material. Laboratory reports have been released of effective DNA matches from the small amounts of skin cells contained in smudged latent finger or palm prints. Indeed, in New York City, the Medical Examiner's office has recently established a plan to open a high-sensitivity DNA laboratory to test such evidence from nonviolent crime scenes.”)

⁵⁰ See text accompanying *supra* notes 36–37.

⁵¹ This assumes that the discount rate is constant, which may not be the case: not only may time be valued less in the future, but the *rate* at which time is valued less in the future could also vary. As such, the appropriate discount rate may in fact be, for example, δ^{year} . See, e.g., ANDREU MAS-COLELL, MICHAEL D. WHINSTON & JERRY R. GREEN, MICROECONOMIC THEORY 733 (1995). Ultimately, the discounting rate of prisoners is an empirical question; we analyze here the simpler scenario in which the discount rate is constant, but our analysis easily could be adapted. Additionally, this assumes that the discount rate is uniform across prisoners; in this Section below we discuss what happens when prisoners have different discount rates and also what happens when prisoners display irrational behavior.

B is the amount of incarceration prisoners can avoid if the DNA tests establish their innocence. This will of course vary by prisoner. We consider here prisoners facing five-, ten-, twenty-, and forty-year sentences, a selection that covers much of the range of sentences for rape and murder. A higher B results in a higher requisite penalty.

Finally, we must convert days incarcerated into dollar values, or vice versa, since C is in dollar amounts and P is in time amounts. We calculate this using the assumption that each additional day in prison is worth \$200. This element of our calculations is quite subjective,⁵² and a higher value on freedom will result in a higher requisite penalty. We also consider the case where prisoners do not need to bear the cost, C , which avoids the need to translate days of incarceration into dollar amounts.

The minimum penalties necessary to create separating equilibria for each of the prison terms, varying by whether prisoners have to bear the cost C , are set out in Table 1.

The first element to note about Table 1 is that it sets out only the minimum penalties required for the equilibria to work. P is in fact an interval, but the upper bound on P for the smallest range considered here—with a prison sentence of five years and where prisoners bear the cost of both C and P —is 1,791,900 days. The upper bound when a prison sentence is forty years and prisoners do not bear the cost C is 1,806,500 days. These upper bounds are clearly absurd, but there is no reason why the upper bounds need to be meaningful. The purpose here is to determine how much

⁵² A brief examination of a range of legislative tradeoffs between financial penalties and jail time reveals that the ratio between incarceration and monetary penalties is highly varied. For example, one Michigan statute prohibiting the transmission to children of email messages containing advertisements for alcohol, tobacco, pornography, and other adult materials punishes at a ratio of \$10,000 per year, while another statute in the same jurisdiction prohibiting possession of peyote punishes at a ratio of \$2000 per year. Compare Laura Dunlop, *Don't Send that E-Mail to a Minor!: Compliance with State Child Protection Registry Statutes*, 3 SHIDLER J.L. COM. & TECH. 3 (2006), <http://www.lctjournal.washington.edu/Vol3/a004Dunlop.html> (noting that violations of the Utah child registry law are punishable by three years in prison and \$30,000 in fines), with Autumn Gray, *Effects of the American Indian Religious Freedom Act Amendments on Criminal Law: Will Peyotism Eat Away at the Controlled Substances Act?*, 22 AM. J. CRIM. L. 769, 787 (1995) (noting that violators of the peyote law are punishable by six months in jail or a \$1000 fine). These, however, are only the prices that legislatures put on jail time—we are attempting to estimate the value to prisoners of avoiding an additional day spent in prison. It seems quite possible that prisoners would value avoiding prison differently than a legislature would weigh various penalties. On the analogous issue of what defendants will pay to avoid jail through bail payments, see David S. Abrams & Christopher A. Rohlfs, *Optimal Bail and the Value of Freedom: Evidence from the Philadelphia Bail Experiment* (U. Chi. Law & Econ., Olin Working Paper No. 343, 2007), available at <http://ssrn.com/abstract=995323> (finding that a typical defendant was willing to pay roughly \$1000 for 90 days of freedom, but arguing that these are probably artificially low estimates, because the study used a particularly poor segment of the population (with potential credit constraints): those with high re-arrest risks or accused of serious crimes). There is a broad and deep law and economics literature on the related question of the relative costs and efficiency advantages of fines versus criminal punishment. For a concise summary, see Robert L. Bard & Lewis Kurlantzick, *Knicks-Heat and the Appropriateness of Sanctions in Sport*, 20 CARDOZO ARTS & ENT. L.J. 507, 517–20 n.43–44 (2002).

at a minimum we need to penalize petitioners in order to force self-identification.

Table 1: Minimum Additional Days of Incarceration Necessary for Self-Identification

Time remaining in sentence ⁵³	P in days: if pay only P, ⁵⁴ $\alpha_2 = .01$	P in days: if pay C & P, ⁵⁵ C = \$5000, $\alpha_2 = .01$
5 years	184	*
10 years	369	119
20 years	737	487
40 years	1475	1225

* signifies < 0 .

In equilibrium, guilty prisoners should not seek testing, so there is no reason to prefer the minimum equilibrium penalty over the maximum, or anything in between. But given the chance of irrational behavior on the part of prisoners, and the social cost associated with higher penalties—in terms of either unfairness to prisoners or actual incarceration costs—the equilibrium that should be observed is the minimum of the penalty interval. Also, as discussed in the next Part, a penalty of hundreds of thousands of days may cause constitutional problems that do not attach to the minimum penalties approximated above. As such, we concern ourselves with the minimum penalty applicable. We discuss below potential responses to the paternalistic concern that prisoners may need protection from their own irrational behavior.

The second point of interest about Table 1 is that the penalty must be higher if prisoners do not bear the cost, C. We can also see this directly from equation (6):

$$P = \frac{\beta\alpha_2 - (1 - \alpha_2)C}{\delta(1 - \alpha_2)}$$

⁵³ The relevant measure is time *remaining* in a prisoner’s sentence, not the initial sentence. In practice, to comply with constitutional notice requirements (discussed in *infra* Part IV), a prisoner would have to be notified of the potential penalty he or she would face, depending on the sentence for the underlying crime, at the initial sentencing. The penalty could, however, be reduced proportionally to the amount of time served at the time of the guilt-confirming petition.

⁵⁴ $P = \frac{\beta\alpha_2}{\delta(1 - \alpha_2)}$

⁵⁵ $P = \frac{\beta\alpha_2 - (1 - \alpha_2)C}{\delta(1 - \alpha_2)}$

If C equals zero, P must be higher than it is when C has positive value. Since P is a function of $B - C$, as the cost increases, the minimum penalty necessarily increases. In fact, for any sentence under 6.8 years, when C is borne by petitioners, there is no positive minimum for P because C can do all of the incentive work. In the next Part, however, we argue that imposing the monetary costs of post-conviction DNA testing on prisoners is likely to be both ineffective and harmful to actually innocent petitioners. Our results here show that it is unnecessary to impose these imprecise and unfair monetary penalties as long as the appropriate incarceration penalties are applied.

The third insight arising from our results is that, as is clear in Table 1, for any sentence over 8.4 years when C is borne by petitioners, or over 1.6 years when C is not borne by petitioners, a penalty of more than sixty days of additional incarceration will be needed in order for petitioners to self-identify. This is important because Missouri, the only state to use incarceration penalties to deter petitioning by guilty prisoners, imposes a standard sixty days of additional incarceration for guilt-confirming tests (discussed in more detail in the next Part below). Given that most petitioners seeking post-conviction DNA testing are serving long sentences for rape or murder, the Missouri legislation does not impose adequate incarceration penalties to deter petitioning by guilty prisoners. Thus, Missouri's scheme, while sound in its conception, does not go far enough in its application.

Table 2: Minimum Additional Days of Incarceration Necessary for Self-Identification as DNA Testing Improves

<i>Time remaining in sentence</i>	<i>P in days: if pay only P, $\alpha_2 = .001$</i>	<i>P in days: if pay C & P, C = \$1000, $\alpha_2 = .001$</i>
<i>5 years</i>	18	*
<i>10 years</i>	37	*
<i>20 years</i>	73	23
<i>40 years</i>	146	96

* signifies < 0 .

In Table 2, we approximate the effect of advances in DNA technology. We consider the effect if the cost of post-conviction DNA testing falls to \$1000 and the accuracy of that testing increases to the point where $\alpha = .001$. This radically shifts the requisite penalty, P , downwards, whether the petitioners pay only P or pay both P and C . In fact, if both the accuracy and cost of DNA testing improves to this extent, only P or C is necessary for a prisoner serving 10 years or less: there is no minimum penalty, P , if there is a cost, C . We discuss the merits of monetary penalties in the following Part. Meanwhile, we consider how best to implement our proposal.

To craft a legislative scheme that perfectly captures our recommendations, policymakers have two options. One is to create a mechanism that

varies the applicable penalty according to the length of the sentence the prisoner would otherwise serve. This would allow for perfect screening, and thus ensure that no guilty prisoners petition for post-conviction DNA testing. The alternative is to set one standard, based on the anticipated distribution of prisoner sentences. If the standard penalty is based on, for example, the average prisoner sentence, every prisoner serving a longer-than-average sentence would still have an incentive to petition. This approximation method would result in underpenalizing some guilty petitioners and thus would not result in perfect screening, unless it set the penalty at the level required to deter prisoners serving the longest sentences. Missouri's scheme, then, will not fully discourage guilty prisoners from petitioning, because it uses a standard penalty that is lower than the disincentive needed for any petitioner serving even a five-year sentence. Policymakers, however, could still achieve a separating equilibrium if they set the standard penalty adequately high: as discussed, the upper bound on even a very short sentence is higher than the lower bound on a forty-year sentence.

Both options can create a perfect screening outcome. The relative advantages and disadvantages of the two solutions are as follows. A varying penalty system would be somewhat more administratively complex since the penalty associated with seeking a petition that ultimately confirms guilt would be different for different prisoners. Nevertheless, we submit that a varying penalty would not be inordinately administratively difficult to pursue. There could be a preset standard, akin to sentencing guidelines, that lays out the penalty for tests confirming guilt based on the sentence the prisoner would otherwise serve. In contrast, the standard penalty option would be administratively straightforward, but would involve systematically overpenalizing all prisoners except those serving the longest sentences. At least in theory, this should not matter: In a screening equilibrium, the guilty should not seek testing at all, and thus, erring on the side of a higher penalty decreases errors without unnecessarily punishing prisoners.

Our aim is not to overly punish guilty prisoners who seek post-conviction DNA testing, but rather to create a workable system for administering post-conviction DNA testing that advantages actually innocent prisoners. Those prisoners are currently suffering because actually guilty prisoners abuse the low-cost petitioning system. Both the varying and standard penalty models would achieve this aim. But to the extent that policymakers believe that prisoners are highly irrational and need protection from their own choices to petition when guilty, they may prefer the varying penalty proposal because it will punish most prisoners less if they nevertheless petition when guilty. However, given that criminal behavior studies have shown that criminality and recidivism are closely associated with such irrationality and hyperbolic discounting, policymakers may be less concerned

with imposing harsher punishments on these prisoners.⁵⁶ The constitutionality of both the varying and standard penalty proposals is discussed in Part V.

Our proposal has a second important advantage aside from screening the guilty from the innocent. Because in equilibrium the guilty should not seek testing, our scheme (in either form) will help actually innocent prisoners by deterring actually guilty prisoners from petitioning, by both freeing up financial resources and reducing the petitioning queue. But we can go further in the aid we offer actually innocent prisoners. Because the guilty should not seek testing, a test that confirms guilt would be a highly unusual result—it would be “off the equilibrium path.” The resources freed up by not pursuing actually guilty prisoners’ petitions can be made available to retest any result that indicates guilt. A second test would reduce the probabilities of a false positive from 1/100 to 1/10,000, or from 1/1000 to 1/1,000,000. As such, our scheme will not only reduce the number of guilty petitions getting in the way of innocent petitions, it will also reduce the ultimate number of false positives. Thus, our scheme does not face the trade-off between deterring guilty prisoners and possibly adding incarceration to the unlucky actually innocent prisoners whose test results show a false positive. By reducing both the backlog of petitions and the possibility of false positive conclusions, our proposal has the potential to radically improve the prospects of exoneration for actually innocent prisoners.

We can now compare our proposal to other legislative regimes that aim to reduce the problem of overpetitioning by guilty prisoners. The next Part outlines the inherent flaws in the response of most jurisdictions to the problem of guilty prisoners seeking post-conviction DNA testing—subjective vetting and the imposition of monetary costs.

IV. OTHER SOLUTIONS AND THEIR FLAWS: VETTING AND MONETARY PENALTIES

Most states have responded to the problem we have identified—that post-conviction DNA testing regimes potentially encourage a flood of petitions by guilty prisoners—by setting up rigorous vetting schemes. These schemes, however, are unavoidably subjective. Furthermore, unlike our proposal, although these schemes reduce the *number* of petitions, they do nothing to address the *proportion* of those petitions by innocent rather than guilty prisoners. That is, they discourage the innocent and guilty alike from seeking testing, rather than deterring the guilty and encouraging the innocent. Thirty-six states have also instituted monetary charges for post-

⁵⁶ See David S. Lee & Justin McCrary, *Crime, Punishment, and Myopia* 4, 30 (Nat’l Bureau of Econ. Research, Working Paper No. 11491, 2005), available at <http://www.columbia.edu/~wbm2103/Courses/Papers-SLEPP/Lee-NBER-11491.pdf> (showing that hyperbolic discounting is statistically higher among criminal offenders, and that the expected opportunity cost of incarceration will be smaller for those who hyperbolically discount).

conviction DNA testing.⁵⁷ These schemes still fail to differentially deter the guilty from seeking testing, and they are potentially unfair to innocent but poor prisoners.⁵⁸ Three states—Maryland, Missouri, and Utah—make monetary penalties contingent on a confirmation of guilt, which somewhat mitigates the unfairness of such penalties, but neither does so fully nor discourages guilty petitioners completely. This Part briefly⁵⁹ summarizes and critically assesses both the alternative solutions that the states have established to combat the problem of guilty prisoners seeking testing, as well as Missouri’s scheme, which comes closest to our proposal, but is nonetheless inferior.

A. *Vetting Petitions*

An extensive examination of the thirty-nine states with post-conviction DNA testing statutes reveals that all thirty-nine have some combination of five review criteria,⁶⁰ as well as some evidentiary criteria. The review criteria can be summarized as follows:

- 1) A reasonable probability exists that DNA testing will provide exculpatory evidence or that the petitioner’s verdict or sentence would have been more favorable if the results of the DNA testing had been available at the trial;

⁵⁷ AXELRAD & RUSSO, *supra* note 19.

⁵⁸ There is a law and economics literature on this topic with two central camps: those who argue that monetary fines are preferable to prison terms because of their lower social costs, *see, e.g.*, A. Mitchell Polinsky & Steven Shavell, *The Optimal Use of Fines and Imprisonment*, 24 J. PUB. ECON. 89 (1984), and those who argue both that fines are unfair because they sanction the poor more than they sanction the rich, and that fines are potentially ineffective because they undersanction the wealthy, *see, e.g.*, Richard A. Posner, *An Economic Theory of the Criminal Law*, 85 COLUM. L. REV. 1193, 1208 (1985). This debate is informative but not determinative: consideration of factors such as probability of being detected have less weight in the current context because here we are concerned specifically with finding punishments that effectively sanction those already in prison.

⁵⁹ For a more extensive analysis, see Carroll, *supra* note 4 (discussing the following proposed solutions: a more rigorous screening process for applications for post-conviction DNA testing, shifting the burden of payment for DNA testing to petitioners seeking testing, or adopting the Missouri statutory framework—specifically, incorporating a sentence extension for those petitioners whose tests confirm their guilt); TRAVIS & ASPLEN, *supra* note 18, at 43–45 (outlining potential screening mechanisms for evaluating the usefulness of post-conviction DNA testing in an individual case); AXELRAD & RUSSO, *supra* note 19 (reviewing each state’s DNA testing requirements and procedures). *See also* Justice for All Act of 2004, Pub. L. No. 108-405, 118 Stat. 2260 (codified in scattered sections of the U.S.C.) (federal statute authorizing post-conviction DNA testing).

⁶⁰ Some states incorporate an extremely minimal version of these five review criteria. *See, e.g.*, N.Y. CRIM. PRO. § 440.30(1-a)(a) (2005) (“[U]pon the court’s determination that any evidence containing deoxyribonucleic acid (‘DNA’) was secured in connection with the trial resulting in the judgment, the court shall grant the application . . . upon its determination that if the DNA test had been conducted on such evidence, and if the results had been admitted in the trial . . . , there exists a reasonable probability that the verdict would have been more favorable to the defendant.”). In contrast, some states, such as Oregon, incorporate every listed criterion. *See* OR. REV. STAT. tit. 14, ch. 138, prec. § 138.005 (2005).

- 2) The testing requested employs a scientific method generally accepted within the relevant scientific community;
- 3) The testing has the scientific potential to produce noncumulative evidence materially relevant to the defendant's assertion of actual innocence;
- 4) The identity of the perpetrator of the crime was, or should have been, a significant issue in the case; and
- 5) The motion is not made solely for the purpose of delay.⁶¹

The problem with these criteria is that all of these statutory schemes involve some version of the “reasonable probability” requirement of the first criterion⁶²—that the test is likely to have influenced the verdict or may now establish the petitioner's actual innocence. Despite the objective language of these requirements, they involve an inherently subjective and time-intensive undertaking. Ultimately, they all require a court to determine whether or not the test is likely to prove the petitioner innocent.

Although some states have attempted to establish multipart tests to give this criterion greater traction,⁶³ as the Kansas Court of Appeals stated in *Mebane v. State*⁶⁴:

Cases from other jurisdictions which have allowed post-conviction DNA testing have . . . two main similarities. First, each case involved a single perpetrator, which would make DNA testing determinative of the guilt or innocence of the defendant. Second, the State's evidence in each case was weak or the defense was sufficient to support a reasonable doubt.⁶⁵

⁶¹ Similarly, the federal statute incorporates most of these criteria. Innocence Protection Act of 2004, 18 U.S.C. § 3600A(c)(4)(A)–(B) (Supp. 2005).

⁶² Georgia, for example, has eight requirements, three of which are direct corollaries of requirements 1, 3, and 4, with additional requirements regarding identification of the evidence, people believed to be in possession of the evidence, and anyone who would otherwise testify for the petitioner. GA. CODE ANN. § 5-5-41 (West 2006). On the other hand, Michigan requires only that “[b]iological material identified during the investigation leading to [the person's] conviction” may be tested. When a sample of identified biological material is available for DNA testing, if the identified biological material was not previously subjected to DNA testing or, if previously tested, will be subject to DNA testing technology that was not available when the defendant was convicted, the testing can be performed. MICH. COMP. LAWS ANN. § 770.16 (2006). Both types of statutes—those with many criteria, such as Georgia, and those with only one criterion, such as Michigan—still ultimately require an assessment of a reasonable probability that the evidence will be exculpatory.

⁶³ See, e.g., *Jenner v. Dooley*, 590 N.W.2d 463, 472 (S.D. 1999).

⁶⁴ 902 P.2d 494 (Kan. Ct. App. 1995).

⁶⁵ *Id.*; see also *People v. Henderson*, 799 N.E.2d 682, 692 (Ill. App. Ct. 2003) (“While it may be much more difficult to successfully analyze ‘mixed samples’ (those containing genetic material from more than one person), it is not impossible.” (citations omitted)); *Jenner*, 590 N.W.2d at 472 (stating that post-conviction testing is “most suitable” where “the identity of a single perpetrator is at issue”); *In re Washpon*, 625 N.Y.S.2d 874, 878 (N.Y. Sup. Ct. 1995) (using the New York standard of reasonable probability and indicating that there were not multiple assailants and that DNA tests would be significant because the victim said she had not had sexual relations with anyone else the night of the rape);

Essentially, the lone pragmatic guideline that emerges from the common law is that cases involving multiple perpetrators in which it is unclear that the petitioner's DNA was deposited at the scene of the crime do not rise to the necessary standard of proof. The evaluation of the "weakness" of the state's case and the reasonable probability of the petitioner's guilt or innocence being established by the evidence are still left to the subjective determination of the trial court. Despite the attempts of national commissions, state courts, state statutes, innocence projects, and state prosecutors to specify which cases are appropriate for post-conviction review, the determination of whether testing will be determinative of guilt often comes down to "gut instinct,"⁶⁶ or the subjective judgment of courts, prosecutors, or innocence project attorneys.

Due to concern over this subjectivity and a desire to maximize the value of forensic DNA evidence "as a tool of investigation and adjudication in criminal cases,"⁶⁷ the National Commission on the Future of DNA Evidence established a five-category system to attempt to standardize the treatment of post-conviction DNA testing.⁶⁸ But each of the categories involves subjective determinations of such things as the likelihood that the test will determine innocence or whether it will be inconclusive or impossible to conduct.⁶⁹ Thus, this categorization system adds little certainty to the process and simply adds another level of scrutiny. But lack of scrutiny is not the problem. Even states that adopt relatively few of the above criteria, such as Illinois⁷⁰ and Kansas,⁷¹ have more specific requirements in state court interpretations of the statutes.⁷² Additionally, innocence projects often

State v. Thomas, 586 A.2d 250, 254 (N.J. Super. Ct. App. Div. 1991) (declaring that DNA testing should be used "when the State's proofs are weak, [and] when the record supports at least a reasonable doubt of guilt"); Sewell v. State, 592 N.E.2d 705, 708 (Ind. App. 1992) (approving the test specified in *Thomas*, 586 A.2d 250).

⁶⁶ Medwed, *supra* note 21, at 1127 ("[I]t is the amount of detail in the inmate's correspondence, the credibility displayed during the prison interview, and a sense of 'smell' that often convinces [the reviewer] that a particular case warrants our services.")

⁶⁷ Nat'l Inst. of Justice, <http://www.ojp.usdoj.gov/nij/topics/forensics/dna/commission/welcome.html> (last visited Sept. 25, 2007).

⁶⁸ TRAVIS & ASPLEN, *supra* note 18, at 3–6.

⁶⁹ For more details, see *id.* at 3–6, and Carroll, *supra* note 4, at 685–86.

⁷⁰ 725 ILL. COMP. STAT. ANN. 5/116-3(c) (West 2002) ("The trial court shall allow the testing upon a determination that: (1) the result of the testing has the scientific potential to produce new, non-cumulative evidence materially relevant to the defendant's assertion of actual innocence even though the results may not completely exonerate the defendant; [and] (2) the testing requested employs a scientific method generally accepted within the relevant scientific community.")

⁷¹ KAN. STAT. ANN. § 21-2512(c) (1995 & Supp. 2006) ("The court shall order DNA testing . . . upon a determination that testing may produce noncumulative, exculpatory evidence relevant to the claim of the petitioner that the petitioner was wrongfully convicted or sentenced.")

⁷² See, e.g., *People v. Gholston*, 697 N.E.2d 375, 379 (Ill. App. Ct. 1998) (holding that because ejaculation was not an element of the crime appellant was convicted of, DNA testing could not provide conclusive evidence of innocence); *People v. Dunn*, 713 N.E.2d 568, 571 (Ill. App. Ct. 1999) (remanding with instructions to determine whether appellant raised a prima facie case that identity was an issue

impose more levels of scrutiny than mandated by the statute.⁷³ Any additional vetting simply increases the number of difficult determinations courts must make, and so increases the already large burden on the courts rather than lessening it.

Although the vetting process may reduce the number of petitions granted, it does nothing to reduce the flood of petitions that prosecutors must sort through because it does not deter guilty prisoners from petitioning in the first place. And by simply increasing the evidentiary burden on prisoners, it risks excluding those whose cases may not fit the guidelines but are nevertheless actually innocent. Ultimately, additional vetting guidelines do little to discourage petitions from guilty prisoners or free up resources for innocent applicants.

B. Monetary Penalties

The other state response to the problem of overpetitioning has been to make the petitioner liable for the monetary costs incurred in conducting the DNA test. Most states now require petitioners to pay the costs of their tests.⁷⁴

The obvious concern here is that indigent innocent petitioners could be deterred from seeking testing.⁷⁵ Most states, though not all, make the requirement of payment dependent on solvency.⁷⁶ But the opposite problem also arises under such a scheme: Monetary penalties may not sufficiently deter some guilty petitioners from seeking testing. A wealthy or simply liquid prisoner is likely to be willing to pay a high monetary fee for even a small chance at freedom, and so any monetary penalty that is likely to be constitutional is also unlikely to deter prisoners facing lengthy sentences. States should be more concerned with deterrence than cost-reduction.

Thirty-six states impose the monetary cost of petitioning on prisoners regardless of whether the result establishes their guilt.⁷⁷ As such, paying the cost is a pretesting requirement rather than a penalty. These schemes are especially perverse, as they punish the guilty and innocent alike. Three states—Maryland, Missouri, and Utah—have attempted to properly shape

in the original trial); *Mebane v. State*, 902 P.2d 494, 497 (Kan. Ct. App. 1995) (denying appellant's motion because DNA testing in a case involving multiple assailants would necessarily have inconclusive results).

⁷³ Telephone Interview with Stanley Fisher, Applicant Review Committee, New England Innocence Project (Oct. 14, 2005).

⁷⁴ AXELRAD & RUSSO, *supra* note 19.

⁷⁵ This may even be unconstitutional if courts take the view that the right to prove one's innocence is analogous to the right to legal advice, psychiatric expertise, and other such mandatorily state-funded protections. See Carroll, *supra* note 4, at 691–92.

⁷⁶ AXELRAD & RUSSO, *supra* note 19.

⁷⁷ Carroll, *supra* note 4, at 690.

incentives by making the cost contingent on a confirmation of guilt.⁷⁸ Once again, this solution goes some way toward lifting the burden on poor, actually innocent prisoners but fails to provide an adequate disincentive to guilty petitioners. Given that post-conviction DNA testing is most often used for murder and rape convictions, the amount of time that petitioners will spend incarcerated without a test is usually very high. The full cost of each test—currently around \$5000—is trivial when compared to the value of avoiding years in prison, even when discounted for the probability of a confirmation of guilt.

In accordance with the findings of our model, states could prefer to institute a monetary penalty that goes well beyond the cost of testing. For example, the penalty could be \$20,000 for a \$5000 test, on the theory that this will similarly create screening incentives. But in reality, many poor or indigent prisoners will not be able to bear even the \$5000 cost of DNA testing, let alone an additional monetary penalty. If prisoners are forced to prove financial liquidity prior to testing, then poor but actually innocent prisoners will be unable to seek exoneration through DNA testing. At the same time, guilty but wealthy petitioners may still be willing to bear this cost. In comparison, the advantage of incarceration penalties over monetary penalties—even those that are conditional on guilt—is that they are in the same currency as the benefit that petitioners seek from testing: liberty. As such, incarceration penalties can be perfectly tailored to the incentives of prisoners.

Wealthy prisoners will always have an advantage over poor prisoners. Even under our scheme, wealthy prisoners will be able to seek private DNA testing, rather than petitioning the state. However, even if the effect of our scheme is to drive wealthy, actually guilty prisoners to private testing, it will still have achieved an important screening result: Resources will be freed up for the state to exonerate actually innocent prisoners.

C. Missouri's Scheme: Additional Incarceration and Good Time Credit Revocation

Missouri provides a contrasting statutory scheme: When petitioners seek post-conviction DNA testing and that test confirms their guilt, they are subject to mandatory penalties. These penalties take the form of both monetary liability for the cost of the test⁷⁹ and sixty days of additional incarceration.⁸⁰ Missouri imposes the incarceration penalties by making use of its system of “good time credits.”⁸¹ Good time credits are a mechanism for reducing the length of a prisoner’s sentence in response to various forms

⁷⁸ MD. CODE ANN., CRIM. PROC. § 8-201(g)(2) (LexisNexis 2001); MO. REV. STAT. § 650.058(2) (2007); UTAH CODE ANN. § 78-35a-302(4) (2002 & Supp. 2007).

⁷⁹ MO. REV. STAT. § 650.058(2).

⁸⁰ *Id.* § 217.262(1).

⁸¹ *Id.*

of good behavior, including following prison rules or participating in educational, substance abuse, or counseling programs.⁸² The Supreme Court has recognized the value of the allocation or revocation of good time credit as an effective disciplinary tool in *Wolff v. McDonnell*, saying that “[t]he deprivation of good time is unquestionably a matter of considerable importance. The State reserves it as a sanction for serious misconduct, and we should not unrealistically discount its significance.”⁸³

Every state that has a post-conviction DNA testing regime also has a statutory good time credits scheme, and all provide mechanisms not only for the granting of good-time credits, but also for their revocation for poor behavior, such as escape attempts, assaults, or failing to complete a program.⁸⁴ Twelve states other than Missouri include in their forfeiture schemes provisions for penalizing prisoners who file frivolous lawsuits.⁸⁵ Only Missouri, however, specifically codifies revocation of good-time credits for post-conviction DNA testing that confirms guilt within the application of the frivolous suits forfeiture scheme. Missouri law deems that if the results of a DNA test confirm a person’s guilt, that person shall:

- (1) Be liable for any reasonable costs incurred when conducting the DNA test, including but not limited to the cost of the test. Such costs shall be determined by the court and shall be included in the findings of fact and conclusions of law made by the court; and
- (2) Be sanctioned under the provisions of section 217.262, RSMo [statute punishing frivolous suits].⁸⁶

⁸² See, e.g., CAL. PENAL CODE § 2931(c) (West 2000), as amended by 1982 Cal. Adv. Legis. Serv. 307 (Deering). The new California sentencing law provides one month’s credit every eight months “for participation in work, educational, vocational, therapeutic or other prison activities”; see also N.Y. CORRECT. LAW § 804(1) (McKinney 1968 & Supp. 1982–1983) (repealed 1970), quoted in James B. Jacobs, *Sentencing by Prison Personnel: Good Time*, 30 UCLA L. REV. 217, 235 n.76 (1982) (“Persons performing a work assignment . . . shall receive wages or good conduct credit . . . or both under the rules and regulations of the Department. In determining rates of compensation, the Department shall consider the effort, skill[,] and economic value of the work performed.”). For a detailed discussion of various states’ approaches to good time penalties, see Jacobs, *supra*.

⁸³ 418 U.S. 539, 561 (1974).

⁸⁴ Carroll, *supra* note 4, at 692–94.

⁸⁵ The following statutes penalize inmates for filing frivolous petitions and suits with the court: DEL. CODE ANN. tit. 10, § 8805(b) (1999); FLA. STAT. ANN. § 944.28(2)(a) (West 2006); 730 ILL. COMP. STAT. ANN. 5/3-6-3(d) (West 2007); KY. REV. STAT. ANN. § 197.045(5)(a) (LexisNexis 2007); MINN. STAT. ANN. § 244.035(b) (West 2003); MISS. CODE ANN. § 47-5-138(3) (2004); N.Y. CORRECT. LAW § 803(1)(d)(iv) (McKinney 2003 & Supp. 2007); OKLA. STAT. ANN. tit. 57, § 566(C)(3) (West 2004 & Supp. 2007); S.C. CODE ANN. § 24-27-300 (2007); TENN. CODE ANN. § 41-21-816 (2006); TEX. GOV’T CODE ANN. § 498.0045 (Vernon 2004 & Supp. 2006); W. VA. CODE ANN. § 25-1A-6 (LexisNexis 2004). Lynn S. Branham, *Toothless in Truth? The Ethereal Rational Basis Test and the Prison Litigation Reform Act’s Disparate Restrictions on Attorneys’ Fees*, 89 CAL. L. REV. 999, 1023–24 (2001), provides a useful overview of the twelve state statutory provisions for sanctioning the filing of frivolous suits.

⁸⁶ MO. REV. STAT. § 650.058(2).

Thus, Missouri imposes a penalty in the currency that is relevant to petitioners seeking post-conviction DNA testing. It imposes incarceration costs on those who seek to lessen their incarceration, and thus avoids the difficulty of putting a monetary price on the chance of freedom. It also avoids the problem of undersanctioning wealthy prisoners, as all prisoners are equally subject to good time credit reward and punishment.⁸⁷ Finally, and most significantly, it deters guilty prisoners from seeking post-conviction DNA testing, thus lessening the burden on courts, prosecutors, and innocence projects, and freeing up time and money to aid in the exoneration of actually innocent prisoners seeking release.

The failings of the Missouri scheme, however, are twofold. First and foremost, it imposes a standard sixty-day penalty when tests confirm guilt, regardless of the length of sentence that the prisoner would otherwise face (but for the chance of freedom offered by the post-conviction procedure). As established in Part III, it is only possible to achieve perfect screening between guilty and innocent prisoners if the punishment of additional incarceration is proportional to the benefit of avoidance of prison time, which varies by prisoner, or by a uniform but much higher penalty imposed on all. Therefore, a sixty-day penalty will overpunish some prisoners and underdeter others. Ironically, the prisoners who will be underdeterred are those guilty of the most heinous crimes: those serving the longest sentences.

The second failing of the Missouri scheme is that it uses both monetary and incarceration penalties. As established in Part III, monetary penalties are unnecessary if the state can instead impose incarceration penalties. Missouri may well impose the secondary penalty out of a recognition that the sixty-day standard penalty will often inadequately deter guilty petitioners.

⁸⁷ There is little merit to the criticism that this proposal would have minimal incentive effect on petitioners who have not accumulated good time credit because in most states, good time credits are automatically provided, often as a lump sum at the beginning of a prisoner sentence, so revocation, not reward, is the incentive structure of most good time credit systems. See Jacobs, *supra* note 82, at 224–25. Jacobs argues that states that do not have automatic allocation of credits, such as New York, nonetheless probably ultimately function like an automatic allocation system, due to the administrative limits of individual periodic recalculation. Given this, our scheme may be even more effective, given the consistent evidence in psychological studies that loss aversion causes people to value avoidance of losses considerably higher than equivalent gains. See Daniel Kahneman, Jack L. Knetsch & Richard H. Thaler, *Experimental Tests of the Endowment Effect and the Coase Theorem*, 98 J. POL. ECON. 1325, 1346 (1990) (confirming that loss aversion and endowment effects are fundamental to individual preferencing). As such, revocation of good time credits as punishment can be expected to be more effective at structuring incentives than provision of good time credits for good behavior, or even provision of good time credits for forgoing seeking testing. Additionally, under Missouri law, the sixty-day penalty can either be deducted from a prisoner's good time credit or it can simply be added to the existing sentence. MO. REV. STAT. § 217.262(1). As discussed in the Conclusion, the one limit to this scheme is that it will have no effect on prisoners serving life without parole; however, a similar analysis could be applied to the revocation of other privileges.

It is true that wealthy but actually guilty prisoners may still be able to independently petition and thus avoid the sanction of additional incarceration. This effect is not entirely undesirable, however: it will still further free up resources for poor but actually innocent prisoners to seek exoneration.

However, given the unfairness associated with monetary penalties discussed above, and the perfect screening a varying incarceration penalty accomplishes, Missouri would be better served by a higher standard penalty or a varying incarceration penalty of the kind proposed herein.

V. CONSTITUTIONAL ISSUES

This Part considers some constitutional objections that our scheme might raise. Potential constitutional objections fall under two broad categories: whether imposing additional incarceration as a penalty for seeking post-conviction DNA testing constitutes cruel and unusual punishment, contrary to the Eighth Amendment; and whether the imposition of such penalties violates prisoners' due process rights under the Fifth and Fourteenth Amendments. Subject to some minor limits, we conclude that there are no serious constitutional objections to structuring prisoners' incentives to seek post-conviction DNA testing by imposing additional incarceration.

The most obvious constitutional issue our scheme raises is whether punishing the mere seeking of a review process, in this case a petition for post-conviction DNA testing and review, with an incarceration penalty of up to 1475 days is so disproportionate as to constitute cruel and unusual punishment. This objection is unlikely to be effective because, in contrast to the close scrutiny given to the proportionality of capital punishment,⁸⁸ the Supreme Court has given the states a high level of deference in determining the proportionality of noncapital punishments.

In holding specific forms of noncapital punishments unconstitutional, two key cases suggested some sort of proportionality requirement for noncapital punishment cases. *Weems v. United States* held that a lengthy punishment, including hard labor in stocks, combined with the loss of basic rights, including property and voting rights, was excessive for the crime of falsifying records.⁸⁹ *Trop v. Dulles* held that denationalization for military desertion was cruel and unusual.⁹⁰ The Supreme Court has gone back and

⁸⁸ In addition to evidence that evolving standards of decency render the infliction of capital punishment cruel and unusual in these cases, the Court has also argued that the requirement of proportionality prevents the following: imposition of capital punishment for the rape of an adult woman, *Coker v. Georgia*, 433 U.S. 584, 597 (1977); the execution of mentally retarded defendants, *Atkins v. Virginia*, 536 U.S. 304, 321 (2002); and the execution of juveniles, *Roper v. Simmons*, 543 U.S. 551, 578 (2005). However, Chief Justice Rehnquist, along with Justices Scalia and Thomas, has argued there is no proportionality requirement separate from an inquiry as to whether a punishment is contrary to evolving standards of decency. *Atkins*, 536 U.S. at 324 (Rehnquist, C.J., dissenting); see also *Penry v. Lynaugh*, 492 U.S. 302, 351 (1989) (Scalia, J., concurring in part and dissenting in part) (joining the Court's opinion as to both the principle of using state legislation to establish a national consensus and its application in this case, but questioning the Court's additional analysis of proportionality), *overruled by Atkins*, 536 U.S. 304.

⁸⁹ 217 U.S. 349, 381 (1910) (holding that such physical punishment is contrary to "the spirit of constitutional limitations formed to establish justice").

⁹⁰ 356 U.S. 86, 101–02 (1958) (the use of denationalization as a punishment is barred by the Eighth Amendment and is "offensive to cardinal principles for which the Constitution stands").

forth as to whether these cases constitute a general requirement of proportionality in non-death penalty sentences. In 1980, in *Rummel v. Estelle*, the Court concluded that there is no proportionality test; rather, the punishment in *Weems* was considered excessive because of the *combination* of punishments.⁹¹ However, in 1983, in *Solem v. Helm*, the Supreme Court interpreted the Eighth Amendment to include a test for proportionality.⁹² Finally, in 1991, *Harmelin v. Michigan* overruled *Solem*, holding that a determination of whether a punishment is cruel and unusual such that it violates the Eighth Amendment does not include a proportionality test because the Eighth Amendment limit concerns the mode rather than the proportionality of punishment.⁹³ Nonetheless, in *Harmelin*, Justice Kennedy, in his concurring opinion, suggested that a “grossly disproportionate” test exists,⁹⁴ though he found that gross proportionality did not prohibit a life sentence for a drug possession conviction.⁹⁵ This notion of gross proportionality has since been adopted by the Supreme Court in *Lockyer v. Andrade*, although the Court stressed it was only applicable in extreme and rare cases.⁹⁶

Two factors prevent the *Lockyer* ruling from providing an obstacle to our scheme. First, the ruling in *Lockyer* was that a “gross disproportionality principle is applicable to sentences for terms *of years*,”⁹⁷ whereas our proposed punishments are generally in months—the penalty is only over one year for prisoners serving at least ten-year sentences—and so will not otherwise trigger this gross proportionality requirement. Second, even when the requirement is triggered, exceptionally long punishments, including multiple life sentences, can be imposed even for relatively minor offenses if defendants have prior felony convictions.⁹⁸ The Court in *Lockyer* recognized the principle of gross proportionality but nonetheless upheld the imposition of two consecutive terms of twenty-five years to life for stealing

⁹¹ 445 U.S. 263, 273–74 (1980) (holding that the basis for the unconstitutionality of *Weems*’s imprisonment was not the length of the imprisonment itself, but rather the “accessories” or “accompaniments” of the sentence).

⁹² 463 U.S. 277, 284 (1983) (“[The term] ‘cruel and unusual punishment[.]’ . . . prohibits not only barbaric punishments, but also sentences that are disproportionate to the crime committed.”).

⁹³ 501 U.S. 957, 965 (1991) (concluding that *Solem* was “simply wrong;” the Eighth Amendment contains no proportionality guarantee).

⁹⁴ *Id.* at 1001 (Kennedy, J., concurring in part and concurring in the judgment) (“The Eighth Amendment does not require strict proportionality between crime and sentence. Rather, it forbids only extreme sentences that are ‘grossly disproportionate’ to the crime.”).

⁹⁵ *Id.* at 1005 (“In light of the gravity of petitioner’s offense, a comparison of his crime with his sentence does not give rise to an inference of gross disproportionality . . .”).

⁹⁶ 538 U.S. 63, 73 (2003) (“[T]he only relevant clearly established law . . . is the gross disproportionality principle, the precise contours of which are unclear, applicable only in the ‘exceedingly rare’ and ‘extreme’ case.” (citation omitted)).

⁹⁷ *Id.* at 72 (emphasis added) (“Through this thicket of Eighth Amendment jurisprudence, one governing legal principle emerges as ‘clearly established’ A gross disproportionality principle is applicable to sentences for terms of years.”).

⁹⁸ *Id.* at 77.

approximately \$150 in videotapes.⁹⁹ Given the Court's emphasis that the gross proportionality requirement will only be triggered in extreme cases, and not by life sentences for relatively minor offenses, we can confidently conclude that the imposition of even our maximum proposed punishment does not approach the gross proportionality limit of *Lockyer*. The Iowa Supreme Court apparently agrees: When it addressed the closely analogous question of revocation of good-time credits for filing frivolous lawsuits, it ruled that a loss of 2000 days' credit was not disproportionate to the offense of filing a frivolous suit.¹⁰⁰

A second potential Eighth Amendment objection to our proposal is that varying a penalty according to the characteristics of a preexisting sentence is arbitrary. This argument suggests that varying the amount of the additional incarceration a petitioner would face is cruel and unusual because it imposes different punishments for the same wrong: namely, petitioning for testing when the test confirms guilt.

The principle that a punishment cannot be arbitrary, capricious, or barbaric comes from the famous 1972 case, *Furman v. Georgia*, in which the Court imposed a national moratorium on the death penalty.¹⁰¹ In *Furman*, the Supreme Court found that the death penalty was applied in some cases but not in other, very similar cases. The Court ruled that the death penalty as it was then implemented was unconstitutional because of its discretionary nature and its indeterminate and haphazard application, which rendered it arbitrary, and thus cruel and unusual.¹⁰² Subsequently, the Supreme Court lifted the moratorium in *Gregg v. Georgia*.¹⁰³ Georgia's capital punishment legislation satisfied the *Gregg* Court that it was not arbitrary, as it provided a list of aggravating and mitigating circumstances that could be found by a jury or a judge, in a trial with separate stages for guilt and sentencing determinations, and it provided for the possibility of higher court review.¹⁰⁴

The potential criticism that our varying penalty proposal is arbitrary fails because our proposal imposes different penalties on the basis of prior conduct. Penalty differentiation on the basis of prior conduct has strong

⁹⁹ *Id.* (holding a sentence of two consecutive terms of twenty-five years to life in prison was not unconstitutional given that "the gross disproportionality principle reserves a constitutional violation for only the extraordinary case").

¹⁰⁰ *Maghee v. Reade*, 712 N.W.2d 687, 695 (Iowa 2006) (affirming the lower court because the applicable statute gave the district court discretion to revoke "some or all" of a prisoner's accrued good time credits to sanction a frivolous suit, and there was no evidence of abuse of that discretion).

¹⁰¹ 408 U.S. 238, 239 (1972).

¹⁰² *Id.* at 309–10 (Stewart, J., concurring) ("These death sentences are cruel and unusual in the same way that being struck by lightning is cruel and unusual. For, of all the people convicted of rapes and murders in 1967 and 1968, many just as reprehensible as these, the petitioners are among a capriciously selected random handful upon whom the sentence of death has in fact been imposed.").

¹⁰³ 428 U.S. 153 (1976).

¹⁰⁴ *Id.* at 194–95 ("[Such factors] provide guidance to the sentencing authority and thereby reduce the likelihood that it will impose a sentence that fairly can be called capricious or arbitrary.").

precedent.¹⁰⁵ It is standard in statutory guidelines, for instance, for sentences to depend on the presence or absence of a defendant's prior convictions. As long as these guidelines are advisory, and not mandatory, taking account of prior convictions in this way has been recognized by the Supreme Court as constitutional.¹⁰⁶ Similarly, these guidelines typically account for the severity or seriousness of the prior offenses. Thus, just as in our varying penalty proposal, it is legitimate for convicted defendants to face greater punishment for petitioning if they have been convicted of more serious prior offenses and face longer prior prison terms.

So well established is the notion that later punishments can and should vary with prior offenses that the inverse of the above objection can plausibly be made: that *not* varying punishment according to the length of a prisoner's initial sentence is unconstitutional. This alternative critique would argue that if states chose to implement our fixed penalty proposal—under which all petitioners face the highest minimum required to establish a separating equilibrium—then the state would effectively be penalizing some petitioners for the long sentences being served *by other petitioners*. The alternative critique, however, is also flawed. Imposing fixed penalties is not punishing prisoners for other prisoners' wrongs; every person whose test confirms his or her guilt has necessarily already been convicted of a crime and has subsequently falsely petitioned, claiming his or her innocence. The only question is whether the fixed minimum penalty under our scheme—between 184 and 1475 days—can constitutionally be applied to each prisoner without being grossly disproportionate. The fact that we arrive at the size of the penalty with reference to deterring the actions of others does not render unconstitutional a punishment that would otherwise satisfy the Eighth Amendment. As long as the punishment for the conviction in question is not grossly disproportionate, it is not cruel and unusual.

A final concern about the length of the penalty is whether the penalty would be unconstitutional if, when added to the petitioner's original sentence, the total incarceration exceeded the maximum penalty applicable for the offense for which the petitioner was convicted. It is established that, "[o]ther than the fact of a prior conviction, any fact that increases the penalty for a crime beyond the prescribed statutory maximum must be submitted to a jury, and proved beyond a reasonable doubt."¹⁰⁷ Clearly, this constitutes a constitutional limit on the amount of additional incarceration that can be added to a petitioner's sentence. However, this will not radically limit the effectiveness of our proposal for prisoners already sentenced

¹⁰⁵ Prior convictions can even extend a sentence beyond its statutory maximum. See *Blakely v. Washington*, 542 U.S. 296, 301–02 (2004) (specifying that prior convictions constitute an explicit exception to the rule that all factors must be considered by a jury if they are to increase a sentence beyond the prescribed statutory minimum); *Apprendi v. New Jersey*, 530 U.S. 466, 490 (2000).

¹⁰⁶ *United States v. Booker*, 543 U.S. 220, 221 (2005).

¹⁰⁷ *Apprendi*, 530 U.S. at 490; see also *Blakely*, 542 U.S. at 301.

to a maximum or near-maximum sentence. Read literally, Missouri's statute imposes additional incarceration for post-conviction DNA tests confirming guilt,¹⁰⁸ which is typical of the legislation of the twelve states that impose incarceration penalties for frivolous litigation. But in application, all of these schemes rely on the provision and revocation of good-time credits as the means of adding or subtracting incarceration as punishment or reward. As such, it is not necessary for our proposal to actually *add* incarceration to prisoners' sentences; it is enough to *revoke* good-time credits that would otherwise reduce prisoners' sentences. Our proposal provides incentives even for prisoners serving the maximum possible sentence, and the constitutional limit against exceeding that maximum does not undermine the effectiveness of our scheme.¹⁰⁹

The second basis of a constitutional challenge to our proposal is due process. As a general matter, the rights associated with seeking exoneration through post-conviction DNA testing are limited, for many reasons. There is no constitutional requirement for a state to provide a post-conviction DNA procedure. As a general matter, convicted inmates do not have a "cognizable liberty or property interest" in the possibility of early release, only "a hope which is not protected by due process," unless the government creates a statutory liberty interest.¹¹⁰ By virtue of being a post-conviction process and a discretionary procedure, the rights associated with post-conviction DNA testing petitioning are more limited than other criminal rights. This is not, however, to deny that any due process interest arises. Two key elements of due process still apply: the requirement of a hearing and the requirement of notice.

Two Supreme Court cases shed light on the question of the due process requirements involved in the revocation of good time credits.¹¹¹ *Wolff v. McDonnell* held that good time credits could not be revoked without any formal procedure whatsoever because the state's good time credit statute

¹⁰⁸ MO. REV. STAT. § 217.262(1) (2007) ("An additional sixty days shall be added to the time that an offender is first eligible for [a] parole consideration hearing or a sum of up to fifty percent of the average balance of the offender's account for any portion of the preceding twelve months during which the offender's account had a positive balance, shall be deducted from an offender's account for each instance that a court finds that the offender has done any of the following while in the custody of the department: (1) Filed a false, frivolous or malicious action or claim with the court . . .").

¹⁰⁹ As discussed, there is little merit to the objection that the effectiveness of our proposal would be undermined for petitioners who have accumulated no good time credit because most prisons dole out good time credit in a lump sum at the beginning of prisoners' sentences, so revocation, not reward, is the incentive structure of the good time credit system. See Jacobs, *supra* note 82, at 225.

¹¹⁰ *Greenholtz v. Inmates of Neb. Penal & Corr. Complex*, 442 U.S. 1, 11 (1979).

¹¹¹ If instead the penalties were the actual addition of time incarcerated, rather than the revocation of good time credits, the due process requirements might be higher than outlined in this Section. In particular, when the prisoner was given his or her initial sentence, the prisoner would have to be given notice of the potential penalty that would apply for filing a petition that ultimately confirmed the prisoner's guilt. Consequently, it could be constitutionally infeasible to apply a screening scheme that does not use good time credits to prisoners who have already received their initial sentences.

created a liberty interest in avoiding additional prison time.¹¹² In that case, the state statute provided that inmates could only forfeit good time credits when found guilty of serious misconduct.¹¹³ On this basis, the Supreme Court ruled that due process required notice and a hearing.¹¹⁴ However, the due process safeguards that applied were far less stringent than those usually required to satisfy due process, given the context of a prison disciplinary process.¹¹⁵ The Court required that written notice of the charges be given to the defendant to enable him to prepare a defense, but as little as twenty-four hours could be allowed for the preparation of that defense.¹¹⁶ The defendant must be given an opportunity to call witnesses and present a defense, but this interest is subject to the institutional safety and correctional goals of the prison environment.¹¹⁷ Finally, a written statement by the fact-finder of the evidence relied on and the reasons for the disciplinary action must be provided.¹¹⁸ However, a subsequent case, *Superintendent, Massachusetts Correctional Institution v. Hill*, determined that the record need only provide “some evidence” to support the discipline imposed.¹¹⁹ The “some evidence” standard mandated only that there be “any evidence in the record that could support the conclusion reached by the disciplinary board” and that the decision have “some basis in fact.”¹²⁰

These cases do not address the exact question of whether good time credits can be revoked specifically for petitioning for post-conviction DNA testing when that testing subsequently establishes the petitioner’s guilt; no court has yet addressed this issue. However, these cases do address the more general issue of the revocation of good time credits for actions in which the prisoner seeks his or her freedom through the appeals process or filing related petitions. These cases make clear the general point that revoking good time credits does not inherently violate due process. Rather, only normal due process requirements of hearings and notice, and at a less stringent standard, apply to the revocation process. Thus, our proposal need only be subject to the ordinary due process requirements of post-conviction good-time credit revocation procedures.

It should be unsurprising that legal precedent strongly suggests that there is no serious constitutional problem with imposing incarceration penalties for prisoners seeking post-conviction DNA testing when the results

¹¹² 418 U.S. 539, 557 (1974).

¹¹³ *Id.* at 546–47.

¹¹⁴ *Id.* at 563.

¹¹⁵ *Id.* (recognizing that the need for flexibility in disciplinary procedures in prison, as well as “the necessity to maintain an acceptable level of personal security in the institution,” must be taken into account in assessing due process requirements in the prison context).

¹¹⁶ *Id.* at 563–64.

¹¹⁷ *Id.* at 566.

¹¹⁸ *Id.* at 564–65.

¹¹⁹ 472 U.S. 445, 454 (1985).

¹²⁰ *Id.* at 455–56.

confirm the prisoners' guilt. The criminal justice system commonly imposes the risk of additional incarceration when defendants or prisoners pursue a potentially exonerating process.¹²¹ Plea bargains, upon which the efficacy of the criminal justice system relies,¹²² necessarily involve offering defendants guaranteed lower sentences in return for not pursuing their full rights to a trial. The trial process, in contrast, offers defendants potential freedom through acquittal, but also poses the danger of a higher sentence being imposed due to conviction for a more serious crime. Similarly, a defendant who successfully appeals his or her sentence or conviction and gains a retrial can face a higher sentence if convicted again.¹²³ Finally, under many sentencing guidelines, prisoners' ongoing insistence on their innocence can be held against them in sentencing: That is, continuing to seek exoneration through claiming one is innocent can lead to a higher sentence.¹²⁴

In all of the above examples, defendants subject themselves to the risk of a higher sentence by seeking further process. Our proposal involves the same tradeoff inherent in so many aspects of the criminal justice system: Prisoners can seek post-conviction DNA testing and the possibility of exoneration it offers, but face additional incarceration if that process confirms their guilt. The difference here is that the basis for imposing a higher sentence—DNA testing—is more reliable than the factors usually relied on, such as pursuing a trial, seeking an appeal, or insisting on one's innocence.

¹²¹ This phenomenon is not unique to the criminal justice system. The National Football League, for example, gives a coach two opportunities per game to challenge a ruling by throwing a red flag onto the field; if the challenge is vindicated, the ruling is reversed, but if the initial ruling was correct, the challenging team loses a timeout. Additionally, if the first two challenges are successful, the coach is permitted a third challenge in the game. ROGER GOODELL, 2006 OFFICIAL PLAYING RULES OF THE NATIONAL FOOTBALL LEAGUE, Rule 15, § 9 (Larry Upson ed., 2006). Our proposal involves a similar incentive-shaping technique: punishing review appeals that do not vindicate the petitioner, but not punishing review appeals that do vindicate the petitioner, so as to discourage meritless petitions but not meritorious petitions.

¹²² *Santobello v. New York*, 404 U.S. 257, 260 (1971) (noting that plea bargaining "is an essential component of the administration of justice" and "is to be encouraged [because i]f every criminal charge were subjected to a full-scale trial, the States and the Federal Government would need to multiply by many times the number of judges and court facilities"; but acknowledging that breaches occasionally occur in prosecutorial procedure, and can result in unfairness).

¹²³ The Supreme Court held that after retrial and conviction following a defendant's successful appeal, a sentencing authority could justify an increased sentence by affirmatively identifying relevant conduct or events that occurred subsequent to the original sentencing proceedings. "[D]ue process does not in any sense forbid enhanced sentences or charges, but only enhancement motivated by actual vindictiveness toward the defendant for having exercised guaranteed rights [by appealing a criminal conviction]." *Wasman v. United States*, 468 U.S. 559, 568 (1984).

¹²⁴ For a discussion of the normative implications of this practice, see Daniel Givelber, *Punishing Protestations of Innocence: Denying Responsibility and Its Consequences*, 37 AM. CRIM. L. REV. 1363, 1369 (2000), and Stephen J. Schulhofer, *Due Process of Sentencing*, 128 U. PA. L. REV. 733, 780–86 (1980).

Others may disagree. Addressing the analogous practice of revoking good time credits for filing frivolous lawsuits, Lynn Branham argues that the practice unconstitutionally interferes with the right to access the courts and raises First Amendment problems.¹²⁵ However, Branham recognizes that “[i]t is evident that the right to have access to the courts does not mean that a litigant is immune from sanctions for litigation-related activity. Otherwise, states would be powerless to prosecute a litigant for perjurious testimony.”¹²⁶ Further, she admits that revoking good time credits when an inmate consciously pursues a groundless claim “would generally comport with the First Amendment”:

The requisite sincere and honest belief in a claim is . . . lacking when a prisoner knew the claim was frivolous. But what if a prisoner recklessly files a baseless claim? In other words, what if the prisoner is aware that there is a substantial risk that the claim is groundless, but files it anyway? In that situation, does revoking the prisoner’s good-time credits fall outside the penumbral protections of the First Amendment? The answer to that question is not readily evident.¹²⁷

So Branham seems reasonably unconcerned with imposing incarceration penalties when prisoners pursue post-conviction procedures that they know to be baseless. This suggests that Branham would support our proposal, as long as the prisoner knows that the DNA test will confirm his or her guilt. Is there any basis for Branham’s concern about reckless petitions in the context of post-conviction DNA testing?

For a recklessness concern to apply, the petitioner seeking post-conviction DNA testing would have to be uncertain as to his or her guilt. Post-conviction DNA testing overwhelmingly applies to rape and murder convictions because these crimes involve forensic samples being deposited at the crime scene, which can then be tested using DNA techniques. In a rape case, a defendant could potentially be uncertain whether he raped the victim because consent was unclear, but the purpose of DNA testing would be to ascertain whether sex occurred between the defendant and the victim; testing tells us little to nothing about consent. Thus, for the recklessness concern to arise, the defendant would have to not know whether he had sex with the victim, consensual or otherwise—an unlikely scenario. More likely is the problem that the defendant may be uncertain whether he deposited a DNA sample during the rape, and thus whether the test will confirm guilt. This is most likely to occur in a situation with multiple offenders, in which case the vetting mechanisms discussed above would typically determine the petition inappropriate for testing at the outset. Similarly, in a murder case, the only conceivable way a defendant could be unsure whether a

¹²⁵ Lynn S. Branham, *Of Mice and Prisoners: The Constitutionality of Extending Prisoners’ Confinement for Filing Frivolous Lawsuits*, 75 S. CAL. L. REV. 1021 (2002).

¹²⁶ *Id.* at 1059–60.

¹²⁷ *Id.* at 1075.

DNA test would confirm guilt would be if the test is unlikely to lead to exoneration even if the test is negative. This might arise, for example, if the defendant's presence at the scene is otherwise explicable. But once again, such a case would likely be excluded under the vetting procedures.

Even if such a petition did get through the vetting process, the Supreme Court ruled in *Wolff v. McDonnell* that the revocation of good time credits as a punishment generally is not a violation of due process, saying that such revocation is a legitimate sanction used by the states against prisoner misconduct.¹²⁸ Additionally, the Supreme Court of Delaware, in finding a prisoner's suits to be frivolous, ruled that if the prisoner filed another suit found to be "factually or legally frivolous, this Court may order the Department of Correction to forfeit a portion of [his] accumulated good time credits."¹²⁹ Thus, the Supreme Court has ruled that there is no due process problem with the revocation of good time credits in general, and the Delaware Supreme Court has determined that revocation can be an appropriate sanction for the filing of frivolous petitions in particular. As such, the Missouri approach—including post-conviction DNA testing petitions that confirm guilt within the realm of frivolous petitions that can be punished by the revocation of good time credits—is also unlikely to be found to constitute a violation of due process.

As such, there are only two constitutional limits on our proposal. First, the additional incarceration penalty must not render the overall sentence above the maximum sentence permissible for the given offense. Second, minimal hearing and notice requirements of due process must be met, including the requirement that the decision to revoke good time credits be based on "some evidence." Given the Supreme Court's position on the use and revocation of good time credits for sanctioning misbehavior, and other precedent supporting the revocation of good time credits for sanctioning filing lawsuits, no other constitutional problems with our scheme should arise if these requirements are met.

VI. CONCLUSION

This Essay establishes that imposing incarceration costs on prisoners seeking post-conviction DNA testing when those tests confirm a prisoner's guilt is the most efficient and effective means of structuring a penal system to force prisoners to accurately self-identify as innocent or guilty. This scheme has the potential to greatly reduce the costs of the post-conviction DNA testing system—in terms of financial burdens, time wasting, and victim trauma—thereby improving the chances of exonerating actually innocent prisoners.

¹²⁸ 418 U.S. 539, 561 (1974).

¹²⁹ *Proctor v. Bunting*, 797 A.2d 671, 673 (Del. 2002).

It would not be onerous for states to implement such a scheme because the necessary infrastructure already exists. Every state that provides a scheme for post-conviction DNA testing also has a system for allocating and revoking good time credits. Missouri's system is innovative because it combines the two, and makes its penalties conditional on a test confirming guilt. Missouri can fix the limitations of its post-conviction petitioning incentive scheme by taking one of two approaches. First, it can create a sliding scale of the number of days of additional incarceration that apply, given the sentence the prisoner is currently serving. Alternatively, it can increase the current across-the-board penalty. Either solution is constitutionally sound and reasonably administratively simple, and would create optimal screening. As such, both variants of our proposal solve the current problem of the penal system being flooded by petitions from guilty parties seeking post-conviction DNA testing.

Two limitations should be noted. First, for prisoners serving life in prison without possibility of parole, the penalty of additional incarceration provides no disincentive to seek post-conviction DNA testing. However, no other solution provides much disincentive in these cases either. When prisoners have little to lose, it is difficult to discourage poor behavior. Nevertheless, our analysis could potentially be applied to these prisoners through similar forms of disincentives, such as taking away certain privileges, subject to constitutional constraints. For all other prisoners—including those serving extremely long sentences, for whom discouragement from seeking DNA testing on the off chance of a false negative is most pressing—our scheme provides incentives that create optimal screening of the actually innocent from the actually guilty.

Second, as discussed, the problem of costly DNA testing is likely to dissipate over time, as DNA testing becomes more efficient and widely available, and thus more standard in pre-conviction procedures. However, back-capturing the more than two million prisoners currently incarcerated in the United States will still be extremely costly. Also, prisoners regularly petition for DNA testing using new techniques, even when convicted using DNA evidence. As such, our proposal is worth pursuing for states seeking to reform their post-conviction DNA testing systems for the foreseeable future.

The penalties must be conditional on confirmations of guilt. States that impose monetary costs on prisoners regardless of the result of their tests may be offsetting some of the monetary costs of post-conviction DNA testing, but they do nothing to target guilty prisoners specifically, and so will not reduce the nonmonetary costs. In contrast, our proposal only punishes the actually guilty who seek to profit from errors. At the same time, it aids the actually innocent by freeing up resources for testing and potentially making the testing process more reliable.

Given these advantages, our conclusion begs the question whether our proposal could be applied to other areas where verification is costly and de-

defendants or prisoners have private information. This category of private information scenarios includes the following: in trials of first instance, such matters as introduction of evidence and the very fact of pursuing a trial rather than taking a guilty plea; and after conviction, revisiting a sentence based on factual grounds, such as habeas corpus claims, appeals, or motions to reconsider. We submit that, although in each of these examples the prisoners or defendants have private information, the application of a similar incentive scheme to create screening is far less appropriate than in the context of post-conviction DNA testing.¹³⁰

Post-conviction DNA testing is a special case where screening through increased penalties is particularly appropriate for a number of reasons. First, although there are errors in DNA testing, and these potential errors drive many petitioners to seek post-conviction testing that only confirms their guilt, DNA testing is nevertheless unusually precise. But for human error, the probability of false positives and false negatives in DNA testing is infinitesimally small; even accounting for human error, DNA testing is accurate in about 99% of cases. As such, we can be unusually confident in our reliance on DNA indicia of guilt. Only with such confidence can we propose imposing additional incarceration for seeking a criminal review process.

Second, the evidence sought through DNA testing is unusually clear-cut, particularly given the application of the various vetting mechanisms discussed above. Many criminal review procedures involve relatively subjective judgments, be they factual—such as determinations of intent or consent—or legal—such as determinations of whether a punishment is cruel and unusual. In contrast, DNA testing ascertains the simple fact whether a person left a DNA deposit. Granted, unambiguous determinations might not always be possible: For example, sample sizes may be too small for testing, multiple offenders may be involved, or samples may have degraded. But to the extent that DNA tests can produce a result, we can have an exceptionally high level of confidence in the interpretation of those results.

Third, unlike other post-conviction habeas procedures, DNA testing is exogenous to the judicial process. Whereas we may naturally hesitate to make a judicial determination that future exoneration or appeals processes should be unavailable due to a prior judicial determination that supports guilt, we can have greater confidence in resting a proposed judicial decision to punish the prisoner for his or her petition on a fact that was determined by a nonjudicial process.

¹³⁰ However, other screening and incentive-manipulation proposals may be more appropriate. See, e.g., Oren Bar-Gill & Oren Gazal-Ayal, *Plea Bargains Only for the Guilty*, 49 J.L. & ECON. 353 (2006) (showing that the Federal Sentencing Guidelines' restriction on prosecutorial sentence reduction in plea bargaining forces prosecutors to plead out fewer cases that have a low probability of conviction and, when this is positively correlated with probability of guilt, it creates a selection effect that reduces the number of innocent defendants who accept plea bargains).

Fourth, by its nature, our post-conviction DNA testing proposal poses less danger of a denial of due process than do many of the other private information scenarios mentioned as potential extensions. This is because the process applies to a discretionary, post-conviction procedure. Also, while prisoners are constitutionally entitled to a trial and allowed the opportunity to adduce evidence in their defense, they are not entitled to good time credits.

Fifth, the use of the good time credits scheme also provides a particularly simple administrative procedure for activating our proposal. Even if states use the varying-penalty option, they would simply have to create a predetermined range of penalties that vary by the length of the sentence the prisoner would otherwise serve. The standard-penalty option would not even require such a process; states would need only to choose the penalty they wished to impose, within the range of penalties we identified as creating perfect screening and give prisoners adequate notice accordingly.

Ultimately, then, while we do not deny the possibility of the application of our ideas to other areas, the application of our proposal to the aspects of the criminal justice system discussed above would be inappropriate. To a large extent, post-conviction DNA testing is special, if not unique, in the identifiable range of penalties that will create perfect screening between the actually guilty and the actually innocent, the ease with which such a screening mechanism can be administered, the unusually low probability of unfairness being created by such a system, and the few constitutional concerns raised by such a proposal. Given the current overwhelmed state of post-conviction DNA testing systems in the states, we conclude that our screening proposal, which uses incarceration penalties to force self-identification among prisoners, is uniquely well-timed and adapted to prisoners petitioning for post-conviction DNA testing.