GUILTY UNTIL PROVEN INNOCENT: THE FAILURE OF DNA EVIDENCE

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ABSTRACT

The manner that law enforcement uses DNA evidence in the United States has solidified a feeling of a dragnet search, whereby law enforcement views the public as guilty of a crime before its commission. In this country we enjoy certain freedoms, liberties, and protections against unwanted government intrusion, and we believe—without knowing any better—that a person is innocent of a crime until proven guilty. The reality, however, suggests otherwise. This Note sheds light on the current fallacy that is the Presumption of Innocence standard in the United States. The cause for concern is multi-faceted, but this Note addresses issues such as new DNA testing regulations, the lack of uniform DNA record and sample expungement when someone is found innocent of a crime, and how the current statutes allow the innocent until proven guilty standard to go the way of the Dodo bird. This Note explains how recent DNA testing laws place innocent and guilty into the same category, proposes an amendment to current expungement law that would ensure complete expungement for all eligible, and considers how we can resuscitate once again the idea that an accused is innocent until proven guilty.

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INTRODUCTION

When he began his murder spree in the late 1970s, DNA evidence was nearly a decade away from being used in US criminal court,[1] and nearly two decades away from being collected by law enforcement.[2] But his crimes would not remain

1. *See* Lisa Calandro et al., *Evolution of DNA Evidence for Crime Solving – A Judicial and Legislative History*, Forensic Mag. (Jan. 6, 2005, 10:31 AM), http://tools.thermofisher.com/content/sfs/brochures/cms_042067.pdf (noting the first criminal trial in the U.S. that used DNA evidence took place in 1987).

2. *See* Office of the Inspector General, Combined DNA Index System Operational and Laboratory Vulnerabilities (May 2006), https://oig.justice.gov/reports/FBI/a0632/laws.htm [hereinafter OIG Audit Report].

an unsolved mystery forever.[3] In April 2018, police in California arrested retired police officer Joseph James DeAngelo by comparing evidence from the many unsolved cold cases to DNA profiles on the publicly accessible genealogy website GEDmatch. Police were able to use the open-source website[4] to partially match a DeAngelo relative and DNA from the crime scene.[5] After police zeroed in on DeAngelo by a process of elimination of all people connected to the partial match,[6] they obtained a DNA sample he discarded in his trash.[7] That discarded morsel of genetic information matched the cold case DNA.[8]

In 1992, Raymond Rowe thought he got away with Christy Mirack's murder.[9] And he did for more than twenty-five years, until law enforcement, working with the genetic forensics lab Parabon,[10] matched the unknown DNA sample from the crime scene to a sample uploaded to GEDmatch by Rowe's half-sister,

3. *See* Sarah Zhang, *How a Genealogy Website Led to the Alleged Golden State Killer*, ATLANTIC (Apr. 27, 2018 12:45 PM), https://www.theatlantic.com/science/archive/2018/04/genlden-state-killer-east-area-rapist-dna-genealogy/559070/; Evan Andrews, *Who Invented the Internet?*, HISTORY.COM, https://www.history.com/news/who-invented-the-internet (last updated Oct. 28, 2019); *see also* GEDMATCH, www.gedmatch.com (last visited Feb. 27, 2020).

4. An "open-source" website is an online website or webpage where users can pool their own uploaded DNA profiles with others who publicly share their DNA information to find relatives. A "closed-source" DNA website only allows users who sign up using their own sample to see information relating to their sample. It is not publicly available. Examples of closed-source websites are *Ancestry.com* and *23andMe.com*. *See DNA Used in Hunt for Golden State Killer Previously Led to Wrong Man*, NBC NEWS (Apr. 28, 2018, 3:45 PM), https://www.nbcnews.com/news/us-news/dna-used-hunt-golden-state-killer-previously-led-wrong-man-n869796 [hereinafter *DNA Led to Wrong Man*].

5. *See* Zhang, *supra* note 3.

6. *See DNA Led to Wrong Man*, *supra* note 4 (noting how investigators mistakenly took an Oregon man's DNA sample at his nursing home without first notifying his family).

7. *Id.*

8. Justin Jouvenal, *To Find Alleged Golden State Killer, Investigators First Found his Great-Great-Great-Grandparent*, WASH. POST (Apr. 30, 2018, 6:22 PM), https://www.washingtonpost.com/local/public-safety/to-find-alleged-golden-state-killer-investigators-first-found-his-great-great-great-grandparents/2018/04/30/3c865fe7-dfcc-4a0e-b6b2-0bec548d501f_story.html.

9. *See* KC Baker, *Wedding DJ who Killed, Raped Teacher in 1992 Caught After Sister Uploads DNA to Genealogy Site*, PEOPLE (Jan. 9, 2019 1:29 PM), https://people.com/crime/wedding-dj-pleads-guilty-rape-murder-christy-mirack/.

10. *Raymond 'DJ Freez' Rowe Pleads Guilty to Raping, Murdering Christy Mirack in 1992*, WGAL (Jan. 9, 2019 7:27 AM), https://www.wgal.com/article/hearing-scheduled-for-raymond-dj-freeze-rowe-accused-killer-of-christy-mirack/25780588.

whom he had never met.[11] Police traced the match to Rowe.[12] Law enforcement in Lancaster County, Pennsylvania then collected Rowe's DNA from a piece of gum he discarded at a musical event in Lancaster and were able to match that DNA to the unidentified sample from the 1992 murder.[13]

Despite these success stories, advancements in genetic testing are ripe for law enforcement abuse. In *Varriale v. State*, Maryland's highest court validated police pushing the envelope.[14] In 2012, there was an alleged rape near where George Varriale was living.[15] After police questioned him near his makeshift living space, he agreed to provide a DNA sample to prove his innocence in connection to the rape investigation.[16] A couple months later, his DNA sample came back as a non-match for the alleged rape.[17] Following this conclusion, however, Varriale's DNA sample was marked as a "suspect" sample and uploaded into the state and county's *suspect* index for analysis, which matched it to an unsolved burglary from 2008.[18]

Law enforcement agencies across the country have a "minimum mandate," based in federal law, to guide them on whom they can take a DNA sample from.[19] But, federal law is only the floor, and states can implement their own additional measures for DNA sample procurement.[20] This leaves people without certainty about what state law enforcement can and

11. *See* Jeff Hawkes & Lindsey Blest, *Raymond 'DJ Freez' Rowe Pleads Guilty to 1992 Rape, Slaying of Teacher Christy Mirack*, LANCASTERONLINE (Jan. 9, 2019), https://lancasteronline.com/news/local/raymond-dj-freez-rowe-pleads-guilty-to-rape-slaying-of/article_a0b409e8-12d9-11e9-99fb-57dbbd0efb0c.html (admitting Rowe "did not know" his half-sister).

12. Baker, *supra* note 9.

13. *Id.*

14. Varriale v. State, 119 A.3d 824 (Md. 2015), *cert. denied*, Varriale v. Maryland, 136 S. Ct. 898 (2016).

15. *See id.* at 827.

16. *Id.*

17. *Id.* at 827–28.

18. *Id.* at 828.

19. *See* 34 U.S.C. § 40702(a)(1)(A), (d) (2018).

20. *See, e.g.*, MD. CODE ANN., PUB. SAFETY § 2-504 (LexisNexis 2019) (providing a statutory rule for DNA testing distinct from the federal standard above).

cannot force them to do.[21] For example, law enforcement can validly take a DNA sample from a person without a warrant.[22] At least one state even allows DNA swabs to be taken from someone who merely enters a police station for questioning.[23] This practice has raised policy concerns over how innocent people are seen as guilty by law enforcement, because law enforcement can seemingly do whatever it wants without any clear standard to follow.[24] States are not in accord about a removal or expungement provision for DNA samples collected and uploaded to their own, state-run Combined DNA Index System (CODIS) databank.[25] That raises the concern that even after people are found innocent by the court, their DNA is held "hostage" by the state, depending on what the expungement provision provides.[26] Some states do not even provide guidance or requirements for removing or expunging DNA

21. *See, e.g.*, Heather Murphy, *Coming Soon to a Police Station Near You: The DNA 'Magic Box,'* N.Y. TIMES (Jan. 21, 2019), https://www.nytimes.com/2019/01/21/science/dna-crime-genetechnology.html (explaining that people are generally unaware of their rights) [hereinafter Murphy I]. Murphy's conclusion is based on the fact that nearly ninety percent of those arrested in Pennsylvania consented to law enforcement officials swabbing their mouths for DNA. *See id.* In Pennsylvania, law enforcement *must* obtain permission prior to a DNA mouth swab. *Id.* If not granted, law enforcement generally cannot forcibly take a sample. *See id.*

22. Jill Lawless, *Is Your DNA in a Police Database?*, NBC NEWS (July 12, 2013, 11:44 AM), https://www.nbcnews.com/news/world/your-dna-police-database-flna6C10617124; *see, e.g.*, Maryland v. King, 569 U.S. 435, 446–48, 465–66 (2013) (holding law enforcement can take a DNA sample upon arrest even if there is no warrant out on that person).

23. *See* Spencer S. Hsu, *Maryland High Court Rules Police Can Use Volunteered DNA in Other Cases*, WASH. POST (Aug. 16, 2015), https://www.washingtonpost.com/local/crime/maryland-high-court-rules-police-can-use-volunteered-dna-in-other-cases/2015/08/16/f02cdd24-4294-11e5-8e7d-9c033e6745d8_story.html; *see also* Raynor v. State, 99 A.3d 753, 766–68 (Md. 2014) (holding valid police using DNA taken from a sweat stain left by a person who came to the police station for questioning).

24. *See* Lawless, *supra* note 22 ("[I]f it's not regulated and the police can do whatever they want. . . . They can use your DNA to infer things about your health, your ancestry, whether your kids are your kids." (quoting MIT geneticist Yanniv Erlich)); *see, e.g.*, Jeremy Sharon, *'Who Is a Jew?' Can Now be Answered by Genetic Testing*, JERUSALEM POST (Oct. 3, 2017, 9:42 AM), https://www.jpost.com/Israel-News/Politics-And-Diplomacy/New-law-says-genetic-test-valid-for-determining-Jewish-status-in-some-cases-506584 (noting how citizenship questions for many in Israel are being decided based on genetic testing markers).

25. *See, e.g.*, MD. CODE ANN., PUB. SAFETY § 2-511 (LexisNexis 2019) (demonstrating how the criminal expungement process is clear, but a civilian who volunteers a DNA sample and is not charged as a result of the investigation has no avenue for the DNA sample's removal).

26. *See, e.g.*, *id.* Maryland's expungement process is clear, but it is not equal for everyone.

information.[27] And even where a person's DNA should have been expunged but was not, only a handful of states ban the future use of that DNA sample.[28]

The federal government needs to step in and provide a uniform code for DNA sample regulation better suited to protecting the presumption of innocence. Genetics is a continuously evolving field of medicine, and with each passing day there are new advancements and discoveries.[29] Creating stringent regulatory boundaries would outdate the rules before the ink has time to dry. As more "secrets" of the human genome are unearthed, this burgeoning medical field will continue to grow and become even more accessible to law enforcement than it is today.

Additionally, the judiciary is an important gatekeeper for ensuring the law is not violated by those who are sworn to protect. This Note will explain both why a federal amendment to current law is needed and the important role judges play as the court's "gatekeeper" to ensure law enforcement complies with the proposed regulatory amendment. Judges, often, can be unaware of the strong possibility that lab error exists in the DNA setting.[30] Laboratories should be unbiased. But, as evidenced by the Houston lab scandal,[31] even those working in labs may try to zealously placate law enforcement's desire to

27. *See, e.g.*, MD. CODE ANN., PUB. SAFETY § 2-511 (Lexis Nexis 2019) (providing a clear process for criminal DNA record expungement, but not clear avenue for removal of a civilian's previously-volunteered DNA sample).

28. *See* Alexandra Nieto, Note, *Familial Searching: How Implementing Minimum Safeguards Ensures Constitutionally-Permissible Use of This Powerful Investigative Tool*, 40 CARDOZO L. REV. 1765, 1800 n.158 (2019) (explaining how in 2015 there were only five states that banned the use of such DNA samples).

29. *See, e.g.*, Rongqin Ke et al., *Fourth Generation of Next-Generation Sequencing Technologies: Promise and Consequences*, 37 HUMAN MUTATION 1363 (July 13, 2016), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5111608/pdf/HUMU-37-1363.pdf (describing developments in DNA sequencing's "fourth generation" more recent than Rapid DNA technology).

30. *See* discussion *infra* Section II.A.5.

31. *See* Rosanna Ruiz & Robert Crowe, *HPD Closes Crime Lab's DNA Unit in Wake of Cheating Probe*, HOUS. CHRON. (Jan. 26, 2008, 6:30 AM), https://www.chron.com/news/houston-texas/article/HPD-closes-crime-lab-s-DNA-unit-in-wake-of-1536283.php (reporting that an audit found scores of convictions may have been based on flawed or incomplete testing).

match a suspect's DNA.[32] In their role as gatekeepers,[33] when considering all the factors related to law and public policy, judges should consider this and other possibilities for "tainted" DNA corroboration, like the *CSI Effect*.[34] Or that the prosecution has an unfair advantage by often being the only side with the requisite funds to submit expert opinions.[35]

This Note will first address the genesis, so to speak, of the presumption of innocence standard,[36] then move into the rise of genetics-related testing, and related statutes and case law.[37] Thereafter, this Note will discuss the evolution of the innocent until proven guilty standard and how changes in technology have led to corresponding changes in the standard. Lastly, this Note will posit a solution for breathing life back into the notion that one is innocent until proven guilty. The solution calls for an amendment to current federal law regarding procurement and expungement of DNA samples, and sheds light on the role the courts can play. Strategically promulgating new regulations for law enforcement to follow and reminding judges of their gatekeeping roles will provide for a less biased legal system and improve protections for those who need it most: the innocent suspected of guilt.

32. Boaz Sangero, *Safety from Flawed Forensic Sciences Evidence*, 34 GA. ST. U. L. REV. 1129, 1196 (2018).

33. This judiciary proposal applies to both *Frye* and *Daubert* hearings, depending on what the specific jurisdiction follows. *See infra* 329–30.

34. The *CSI Effect* is posited as a bias by jurors toward scientific evidence, and to be unduly influenced by such evidence in giving it more weight, in large part due to the success of the TV show franchise, *CSI*. Judith Fordham, *The CSI Effect: Are Jurors Starstruck by Forensic Evidence?*, CONVERSATION (Aug. 18, 2011, 3:57 PM), https://theconversation.com/the-csi-effect-are-jurors-starstruck-by-forensic-evidence-2066 (explaining that "the jury's still out" on whether jurors are able to rightfully place weight and truly understand DNA evidence).

35. Sangero, *supra* note 32, at 1198.

36. Although this Note will touch on areas related to privacy and Fourth Amendment concerns, this Note's focus is on the fallout of DNA's current procurement and use by law enforcement and how that erodes the presumption of innocence.

37. *See generally* Maryland v. King, 569 U.S. 435 (2013) (establishing another way for DNA testing to discriminate against heavily policed population segments through holding DNA testing on an arrestee as merely another identification tool in the law enforcement arsenal). Law enforcement can use cheek swabs for identification, and such use is not a Fourth Amendment infringement; thus, law enforcement can place the citizenry into dragnet "searches" through a court-held identification tool. *Id.*

I. THE HISTORY AND PURPOSE BEHIND THE PRESUMPTION OF INNOCENCE

It is a principle known to nearly all adults in the United States: The Presumption of Innocence. A person is considered innocent in the eyes of the law, unless and until proven otherwise by a judge or jury. In recent years, however, this presumption has gone from a foundational legal principal to an empty truism. This section explains the codification of the presumption of innocence, how this societal pillar was challenged by Justice William Rehnquist, and how his effect on the presumption of innocence is still felt by society today.

Presuming an accused person innocent in modern times can be traced back to late-13th century England.[38] It is a maxim nearly as old as the Magna Carta.[39] The presumption of innocence lies at the heart of what the colonialists took with them across the Atlantic when fleeing England in the Seventeenth and Eighteenth Centuries: to be free from punishment and maintain liberty unless proven otherwise at trial.[40]

The idea was first discussed by the Supreme Court in the 1895 case, *Coffin v. United States*.[41] The *Coffin* Court explained, "[t]he principle that there is a presumption of innocence in favor of the accused is the undoubted law, axiomatic and elementary, and its enforcement lies at the foundation of the administration of our criminal law."[42] This innocence presumption was something separate from criminal procedure during trial,

38. Anthony Davidson Gray, *The Presumption of Innocence Under Attack*, 20 NEW CRIM. L. REV. 569, 598 n.147 (2017) (quoting 2 YEARBOOKS OF THE REIGN OF KING EDWARD THE FIRST: YEARS XXI AND XXII 56-57 (Alfred Horwood ed., 1873) "Felony is never fastened on any person before he is by judgment convicted as guilty of the deed." (citing a 1293 Common Pleas decision)).

39. Kenneth Pennington, *Innocent Until Proven Guilty: The Origins of a Legal Maxim*, 63 JURIST 106, 112 (2003).

40. Shima Baradaran, *Restoring the Presumption of Innocence*, 72 OHIO ST. L.J. 723, 727–28 (2011).

41. Coffin v. United States, 156 U.S. 432 (1895) (reversing the lower court and granting a new trial because the lower court refused to provide a presumption of innocence instruction to the jury).

42. *Id.* at 453.

"holding value as a principle that protected substantive rights beyond a mere allocation of burden."[43] This was the pre-trial protection afforded those accused of a crime for the next eight decades. In *Taylor v. Kentucky*,[44] the Court revisited the criminal law precept for the first time since *Coffin*. It held that the presumption of innocence "cautions the jury to put away from their minds all the suspicions that arise from the arrest, the indictment, and the arraignment, and to reach their conclusion solely from the legal evidence adduced."[45] The *Taylor* Court emphasized that the jury should consider "*nothing but the evidence, i.e.*, no surmises based on the present situation of the accused."[46]

Markedly, Justice Rehnquist dissented.[47] Although he agreed that refusing a separate jury instruction on the presumption of innocence was reversible error, such a penalty for withholding the instruction, however, did not make the presumption of innocence jury instruction "constitutionally required in every criminal trial."[48] Justice Rehnquist's brief but powerful words began chipping away at the substantive pre-trial rights afforded an accused person.[49]

Building on Justice Rehnquist's dissent in *Taylor*, the Court in *Bell v. Wolfish*—in dicta—addressed whether the presumption of innocence was applicable at all to pre-trial detainment.[50] Writing for the majority, Justice Rehnquist continued chipping away at *Coffin* and said the presumption of innocence "has no application to a determination of the rights of a pre-trial

43. Zina Makar, *Displacing Due Process*, 67 DEPAUL L. REV. 425, 439 (2018); *see also Coffin*, 156 U.S. at 453.

44. Taylor v. Kentucky, 436 U.S. 478, 483 (1978).

45. *Id.* at 485.

46. *Id.* (emphasis in original).

47. *Id.* at 491 (Rehnquist, J., dissenting).

48. *Id.*; *see also* Makar, *supra* note 43, at 440.

49. Makar, *supra* note 43, at 440 (noting how Justice Rehnquist viewed the presumption of innocence as limited to rights granted during trial, but that such rights already fell within the confines of the prosecution's burden of proof thereby rendering the "rights" afforded by the presumption of innocence redundant).

50. *See* Bell v. Wolfish, 441 U.S. 520, 523 (1979).

detainee during confinement before his trial has even begun."[51] Further, "[t]he presumption of innocence is a doctrine that allocates the burden of proof in criminal *trials* . . . ."[52] These statements problematized applying the presumption of innocence toward any substantive pre-trial rights of any accused person.[53]

An arrestee enjoying rights that equate to innocent until proven guilty is extremely important for society. Although it seems unlikely that law enforcement will become dystopian in its policing practices,[54] by maintaining the status quo, we run the risk of law enforcement performing its function through a presumed guilty prism; a manner not intended by our country's legal precedent. Without going into the more obvious discussion between a convicted felon—who has less rights—and a pre-trial suspect—who should be enjoying the same rights as anyone off the street—the first important pre-trial stage that distinguishes between a person in the street and someone heading for trial is the probable cause hearing. In *United States v. Pool*, the court explained that when there is a probable cause finding, it is a "watershed event" that begins to separate the suspect detainee from someone in the general public.[55] After the probable cause hearing, a court may restrict the suspect defendant's liberty through various means.[56] But, in more than one instance, a suspect either had a DNA sample taken prior to appearing before a magistrate for a probable cause hearing,[57] or was imprisoned for the crimes alleged before

51. *Id.* at 533.

52. *Id.* (emphasis added) (further stating that the presumption of innocence doctrine reminds juries to only determine a defendant's innocence or guilt based on evidence introduced at trial).

53. *See* Makar, *supra* note 43, at 441.

54. *See, e.g.*, GEORGE ORWELL, 1984 (1st ed. 1949).

55. United States v. Pool, 621 F.3d 1213, 1219 (9th Cir. 2010).

56. *Id.* at 1216–17; *see* Diana R. Donahoe, *Fourth Amendment "Cheeks" and Balances: The Supreme Court's Inconsistent Conclusions and Deference to Law Enforcement Officials in Maryland v. King and Florence v. Board of Chosen Freeholders of the County of Burlington*, 63 CATH. U. L. REV. 549, 564–65 (2014).

57. *See* Donahoe, *supra* note 56, at 576.

probable cause was determined.[58] What Justice Rehnquist started in *Taylor* and *Bell* paved the way to where we are today, post-*King*.[59]

Some legal scholars have called for returning the presumption of innocence to the pedestal it enjoyed for more than eight decades after the *Coffin* decision.[60] These scholarly discussions for reinvigorating the presumption of innocence as a doctrine apart from the prosecution's burden, however, are mostly related to pre-trial bail and do not discuss DNA taken from arrestees.[61] Nevertheless, these scholars and academics worry over the continued fallout from rolling back the presumption of innocence as a core function within our justice system, resulting in "a proliferation of assumptions of guilt" at the pre-trial stages.[62]

One example of a statute that has been called into question is the Maryland law listing all crimes for which a DNA sample shall be provided.[63] If someone is arrested for a crime not listed, it would follow that a DNA sample may not be procured. In Maryland, a DNA sample cannot be tested until after the first scheduled arraignment date.[64] If no probable cause is found against the arrestee, the DNA sample taken is supposed to be destroyed.[65] But, unlike Maryland—that has an automatic expungement provision in the criminal context—many states

58. *Id.* at 577 n.193.

59. Maryland v. King, 569 U.S. 435, 465–66 (2013) (acknowledging that arrestees are afforded less liberty rights than someone who has not been arrested and therefore it is not "unreasonable" for an arrestee to be subjected to such limited liberty rights).

60. *See* Baradaran, *supra* note 40, at 776; Makar, *supra* note 43, at 441; *see generally* William S. Laufer, *The Rhetoric of Innocence*, 70 WASH. L. REV. 329, 420–21 (1995) (discussing the need to revive factual innocence in our criminal justice system).

61. *See* Makar, *supra* note 43, at 441.

62. *Id.*; *see also* Baradaran, *supra* note 40, at 725 ("[T]he number of defendants held pretrial has steadily increased such that the majority of people in our nation's jails have not been convicted of any crime.").

63. MD. CODE ANN., CRIM. LAW §14-101(a) (LexisNexis 2019) (defining "crime[s] of violence"); *see, e.g.*, *King*, 569 U.S. at 447–48 (questioning the procurement and testing of an arrestee's warrantless DNA sample for an unconnected prior crime).

64. MD. CODE ANN., PUB. SAFETY § 2-504(d)(1) (LexisNexis 2019).

65. *Id.* at § 2-504(d)(2).

place their expungement burden on the arrestees.[66] Thus, many who are found innocent, or have their charges dismissed, still have their DNA on file within a DNA databank because they cannot afford expungement,[67] or the digital version is destroyed but the physical sample remains on file and law enforcement is able to test the sample in perpetuity or recreate the digital sample from the physical one.[68] Therefore, law enforcement should not be able to take a warrantless DNA sample until after a finding of probable cause. Even in Maryland where a suspect's sample is automatically expunged when evidence is unsupported by probable cause,[69] the sample procurement and eventual expungement are still needless administrative costs. Permitting the taking of a sample only after the initial hearing would save time, money, and heartache.

Another reason law enforcement views the public through a "guilty until proven innocent" prism is because of former Chief Justice William Rehnquist. Before dissenting in *Taylor* and writing for the majority in *Bell*, Rehnquist drafted the D.C. Preventative Detention Statue[70] on which the Federal Bail Reform Act of 1984 is largely based.[71] Instead of recusing himself on a number of cases dealing with pre-trial detention—as some scholars at the time thought he would—the Chief Justice instead wrote for the majority.[72] Justice Rehnquist

66. *See* Nieto, *supra* note 28, at 1799–1800, 1799 n.156 (explaining that in approximately twenty-one states, the onus is on the arrestee to seek expungement).

67. *See* Elizabeth E. Joh, *The Myth of Arrestee DNA Expungement*, 164 U. PA. L. REV. ONLINE 51, 57 (2015), https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1157&context=penn_law_review_online (displaying a table depicting the stark differences in DNA expungements in states with an automatic process compared to states where the individual must initiate the process).

68. Stephanie Beaugh, Comment, *How the DNA Act Violates the Fourth Amendment Right to Privacy of Mere Arrestees and Pre-Trial Detainees*, 59 LOY. L. REV. 157, 199 (2013).

69. MD. CODE ANN., PUB. SAFETY § 2-504(d)(2) (LexisNexis 2019).

70. D.C. CODE § 23-1322 (2019).

71. Albert W. Alschuler, *Preventive Pretrial Detention and the Failure of Interest-Balancing Approaches to Due Process*, 85 MICH. L. REV. 510, 512 n.3 (1986).

72. *See id.* (noting how the former Assistant Attorney General may be partial to the 1984 Act, and to avoid the appearance of impropriety he would likely recuse himself from hearing United States v. Salerno, 481 U.S. 739 (1987)); *see also* Makar, *supra* note 43, at 442.

"gradually diminish[ed] procedural protections for pre-trial detainees" and methodically chipped away at what the presumption of innocence was understood to stand for.[73]

In his *Salerno* dissent, Justice Marshall lamented Justice Rehnquist's treatment of procedural due process.[74] Justice Marshall recognized the biggest mistake taken by the *Salerno* majority was to limit—and to an extent, dismiss—the presumption of innocence. "[T]he presumption of innocence protects the innocent; the shortcuts we take with those whom we believe to be guilty injure only those wrongfully accused and, ultimately, ourselves."[75]

The erosion of the presumption of innocence has become one of the most significant hurdles surrounding pre-trial scrutiny and reform.[76] Recently, the Supreme Court was presented with another opportunity to address the presumption of innocence in *Nelson v. Colorado*.[77] The Court emphatically reaffirmed that the presumption of innocence is significant in our jurisprudence.[78] The *Nelson* Court addressed misgivings raised by *Bell* years earlier, and clarified that a criminal proceeding could violate a constitutional right if it "offends some principle of justice so rooted in the traditions and conscience of our people as to be ranked as fundamental. The presumption of innocence unquestionably fits that bill."[79] Through *Nelson*, the Court has begun the process of returning the presumption of innocence to its *Coffin* roots—providing protections to all people before trial.[80]

73. Makar, *supra* note 43, at 441–42.

74. United States v. Salerno, 481 U.S. 739, 767 (1987) (Marshall, J., dissenting).

75. *Id.*

76. *See* Makar, *supra* note 43, at 470.

77. *See* Nelson v. Colorado, 137 S. Ct. 1249, 1252 (2017) (addressing the question of whether Colorado must refund fees, court costs, and restitution to a defendant if the conviction is overturned). The state law at issue required the formerly convicted person to file a separate civil suit to determine whether restitution fees could be granted. *Id.*

78. *Id.* at 1255 ("Colorado may not presume a person, adjudged guilty of no crime, nonetheless guilty enough for monetary exactions.").

79. *Id.* at 1256 n.9 (internal citation omitted).

80. Makar, *supra* note 43, at 471.

II. THE EVOLUTION OF THE GUILTY UNTIL PROVEN INNOCENT STANDARD THROUGH AVAILABLE TECHNOLOGY

Technological advancement brings significant benefits to people the world over. It also brings much sorrow, grief, and uncertainty. As technology and science have evolved, so too has the corresponding change in the innocent until proven guilty standard. When the Court denied *certiorari* in two recent Maryland DNA cases, the Court turned a blind eye toward Justice Scalia's concerns in *King*,[81] transforming his worry into reality.

Justice Scalia did not realize when he wrote his terse warning of where the *King* majority decision could lead that reality would go even farther than he forewarned. When the Court denied *certiorari* in *Raynor v. State*,[82] the Court did two things. First, it told the world that police can take a DNA sample off a chair that a person who voluntarily came into the police station for questioning was sitting on, even after he explicitly said he would not submit a DNA sample for analysis.[83] Second, the Court paid credence to Justice Scalia's dissent, because the presumption by law enforcement in its quest for finding a criminal is to presume the person as guilty at first blush.[84]

In *Varriale v. State*, the highest court in Maryland said one who voluntarily gives law enforcement a DNA sample to be tested for one case can also have it tested against an unrelated case.[85] Its reasoning was Maryland law did not provide an expungement avenue from the state's DNA database for voluntarily provided DNA samples.[86] Thus, the court's inferred

81. *See* discussion *infra* Section III.B.

82. Raynor v. State, 99 A.3d 753, 754 (Md. 2014), *cert. denied*, Raynor v. Maryland, 574 U.S. 1192(2015).

83. *Id.* at 767–68.

84. Maryland v. King, 569 U.S. 435, at 481–82 (2013) (Scalia, J., dissenting).

85. Varriale v. State, 119 A.3d 824, 839 (Md. 2015), *cert. denied*, Varriale v. Maryland, 136 S. Ct. 898 (2016); *see also* Hsu, *supra* note 23.

86. *See* MD. CODE ANN., PUB. SAFETY § 2-511(d) (LexisNexis 2019) (allowing for expungement, but not covering that of voluntarily provided samples).

logic was if the sample remains in the state's DNA database, then use it.

A. *How Law Enforcement Came to View People as Guilty Until Proven Innocent*

Unlike subjective eyewitness testimony, forensic science—especially DNA evidence—is thought to be objective, science-driven, and shielded from uncertainty. The leading cause for overturning false convictions involving the Innocence Project was—unsurprisingly—faulty eyewitness identification.[87] Shockingly, though, the number two reason for false convictions was forensic evidence.[88] Specifically, faulty forensic testimony and testing errors.[89] Why the high false conviction rates? At its core, "forensic science" is more about "forensics" and less about "science."[90] Gun-shot residue (GSR), for example, is a highly discredited forensic "science" that is still used in some jurisdictions.[91] Although rarely used because of the problems attached, the Washington D.C. police department will use GSR analysis when there is "pressure to develop *any* evidence," even if that means using bad evidence.[92] For example, an expert in GSR will look at a couple different metals, including lead, and see whether there is metallic residue on the suspect's clothes or body.[93] The problem with this "science" is in many inner-city neighborhoods, lead paint is all over and

87. Edward J. Ungvarsky, *Remarks on the Use and Misuse of Forensic Science to Lead to False Convictions*, 41 NEW ENG. L. REV. 609, 614 (2007); *see* BARRY SCHECK ET AL., ACTUAL INNOCENCE 263 (2000).

88. *See* Ungvarsky, *supra* note 87, at 614.

89. *Id.*

90. *Id.* (noting how it is more "about the perception of what needs to be done to support the investigation" (courtroom performance and evidence presentation) and less about objectivity).

91. *Id.* at 616.

92. *Id.* (emphasis in original); *see, e.g.*, United States v. Cooper, 91 F. Supp. 2d 79, 88 (D.C. Cir. 2000) (ordering the government to provide gunshot residue test results involving defendant Blanton to the defense, even though Blanton was released in relation to the relevant case, but was incarcerated at the time of this order for an unrelated crime).

93. Ungyarsky, *supra* note 87, at 616.

traces of lead are not uncommonly found on innocent people.[94] DNA is but another avenue law enforcement is using to view people as guilty at first blush.

Admittedly, DNA has its benefits. It has gone through a degree of scientific rigor unlike any other forensic science, and it is "an excellent resource to exclude and to exonerate."[95] Organizations like the Innocence Project use collected DNA to fight to free those who were wrongfully convicted and incarcerated.[96] The non-profit seeks to overturn verdicts with DNA evidence that was not previously used.[97] Since 1989, 500 wrongfully convicted people have been exonerated through DNA testing across forty-five states as of October 2019.[98]

Despite the recent convictions resulting from familial genealogy and DNA sample comparisons,[99] many problems persist when law enforcement forgoes traditional investigative methods and leans heavily on familial genealogy to try cracking cold cases,[100] or even a case not yet cold.[101] Michael Usry's case

94. *Id.*

95. *Id.* at 617; *see also* SCHECK ET AL., *supra* note 87.

96. *About*, INNOCENCE PROJECT, https://www.innocenceproject.org/about/ (last visited Feb. 27, 2020).

97. *Id.*; *see, e.g.*, Matthew Shaer, *The False Promise of DNA Testing*, ATLANTIC (June 2016), https://www.theatlantic.com/magazine/archive/2016/06/a-reasonable-doubt/480747/ (discussing how even someone convicted through an error-laden DNA sample analysis could still be exonerated).

98. NATIONAL REGISTRY OF EXONERATIONS, https://www.law.umich.edu/special/exoneration/Pages/Exonerations-in-the-United-States-Map.aspx (last visited Feb. 27, 2020).

99. *See, e.g.*, Jouvenal, *supra* note 8 (describing how the Golden State killer was found using familial DNA analysis of distant relatives); *see also* Baker, *supra* note 9 (describing how DNA uploaded to a genealogy site led to a conviction for rape and murder).

100. Jim Mustian, *New Orleans Filmmaker Cleared in Cold Case Murder; False Positive Highlights Limitations of Familial DNA Searching*, NEW ORLEANS ADVOC. (Mar. 12, 2015, 7:20 AM), https://www.theadvocate.com/new_orleans/news/article_1b3a3f96-d574-59e0-9c6a-c3c7c0d2f166.html.

101. Katie Worth, *Framed for Murder by His Own DNA*, FRONTLINE (Apr. 19, 2018), https://www.pbs.org/wgbh/frontline/article/framed-for-murder-by-his-own-dna/ [hereinafter Worth I]; *see also* Ally Donnelly, *Law Enforcement and Privacy Advocates Weighing Risks and Benefits of Familial DNA Searches*, NECN (May 3, 2018, 6:31 PM), https://www.necn.com/news/new-england/Law-Enforcement-and-Privacy-Advocates-Weighing-Risks-and-Benefits-of-Familial-DNA-Searches-481686521.html.

is a prime example of these problems.[102] In December 2014, law enforcement showed up at Usry's door in New Orleans and asked him to accompany them to the local police station to answer questions about a recent hit-and-run crime in the area.[103] Certain he had not committed any crime, he agreed.[104] An FBI agent asked Usry to take a DNA swab but would not explain why it was needed.[105] Usry refused, even though the FBI agent told Usry he legally could not refuse because they had a warrant.[106] Usry soon learned the real reason local and federal law enforcement arrived at his door: he was a suspect in a 1996 cold case murder in Idaho, even though another person had already been convicted of the crime.[107]

Law enforcement arrived at Usry's door through familial genealogy[108] courtesy of *Ancestry.com*.[109] The recreational DNA testing company did not account for law enforcement looking for cold-case leads in the database *Ancestry* acquired through a Mormon church genealogy project.[110] Usry spent more than a month in limbo until his DNA could be analyzed.[111] He was

102. *See* Mustian, *supra* note 100; *see also* Brendan I. Koerner, *Your Relative's DNA Could Turn You into a Suspect*, WIRED (Oct. 13, 2015, 6:45 AM), https://www.wired.com/2015/10/familial-dna-evidence-turns-innocent-people-into-crime-suspects/.

103. *See Who Murdered Idaho Teen Angie Dodge?*, FORTY EIGHT HOURS, https://www.cbsnews.com/news/the-dna-of-a-killer-who-murdered-idaho-teen-angie-dodge/ (last updated June 16, 2018).

104. Mustian, *supra* note 100.

105. *See* Koerner, *supra* note 102.

106. *See* Mustian, *supra* note 100.

107. *See* Koerner, *supra* note 102. The DNA of the individual who was convicted did not match that found at the crime scene. *Id.*

108. This technique allows investigators to find supposed "first-time offenders"—suspects who have not had their DNA entered into a law enforcement DNA database—through a close family member whose genetic profile has been catalogued through a publicly accessible genealogy website. *See id.*

109. *See id.* The Idaho Falls crime scene DNA bore many similar features to that of Usry's father, who had previously donated a DNA sample to a Mormon genealogy project in another state. *Id.* The database produced by that project was eventually purchased by Ancestry.com and made it publicly searchable for anyone to use it for familial leads. *Id.* Ancestry.com has since removed this feature from its public offerings. *Who Murdered Idaho Teen Angie Dodge?*, *supra* note 102.

110. *See* Koerner, *supra* note 102.

111. *See* Mustian, *supra* note 100.

eventually cleared of his role in the 1996 murder when he received an email from a sergeant at the local Idaho police department saying his DNA did not match the crime scene DNA.[112] Even though he was cleared of any wrongdoing,[113] his name is forever tainted in today's internet-based society because the internet will always connect him to the murder he was accused of committing.[114] Because there are no clearly delineated lines for law enforcement to follow when it comes to using familial genealogy, once someone is falsely arrested, it often is difficult to completely clear your name.[115]

DNA evidence is only as good as the people working on it. From the law enforcement officials involved in procuring a sample, storing, shipping, and testing the sample, to forensic experts testifying in court, all DNA evidence is subject to the biases of the people working with it.[116]

DNA evidence is perceived as infallible and airtight.[117] And although it should not be the case, DNA evidence alone often tends to sway juries.[118] We have seen this in the past, too, with

112. *See id.*

113. *DNA Report Clears Usry Family of Involvement in Angie Dodge Homicide Case*, EAST IDAHO NEWS (July 12, 2017 9:19 AM), https://www.eastidahonews.com/2017/07/dna-report-clears-usry-family-involvement-angie-dodge-homicide-case/.

114. As of February 27, 2020, a Google search of "Michael Usry" yielded eight out of the ten first-page results consisting of stories that relate Usry to the Dodge cold case. Only the last two mentioned in the headline that he was cleared of the crime.

115. *See e.g.*, *id.*

116. *See* Mark Joseph Stern, *Forensic Science Isn't Science*, SLATE (June 11, 2014), https://slate.com/technology/2014/06/forensic-science-is-biased-and-inaccurate-but-juries-believe-it-and-convict-the-innocent.html; *see infra* Section IV.C. (discussing how courts can encourage neutral forensic expert testimony).

117. *See* Christine D. Salmon, *DNA is Different: Implications of the Public Perception of DNA Evidence on Police Interrogation Methods*, 11 RICH. J. L. & PUB. INT. 51, 71 (2008) (explaining how the public procures its view of DNA-as-infallible from both news and entertainment media); Katie Worth, *The Surprisingly Imperfect Science of DNA Testing*, FRONTLINE (June 24, 2015), https://www.pbs.org/wgbh/frontline/article/the-surprisingly-imperfect-science-of-dna-testing-2/ (citing a Gallup poll where eighty-five percent of those surveyed believed DNA evidence to be "very or completely reliable.") [hereinafter Worth II]. Multiple studies done by researchers from Yale and the University of Nevada saw jurors rate DNA evidence as "95 percent accurate." *Id.*

118. *See* Laurie Meyers, *The Problem with DNA*, AM. PSYCHOL. ASS'N (June 2007), https://www.apa.org/monitor/jun07/problem; *see also* Tamara Lebrecht, *The Myth that DNA Testing is Infallible*, FORENSIC GENETICS POL'Y INITIATIVE (Apr. 14, 2016), http://dnapolicyinitiative

other "new" evidentiary techniques that have come and gone the way of fallibility. "Ballistics, polygraph[] [testing], blood splatter and burn pattern analysis []: All have been revealed to be vulnerable to varying degrees to the human biases they were meant to inoculate against."[119] To wit, forensic examiners would use the marks on a bullet to match the bullet to a specific gun, but errors are common.[120] Fingerprinting, too, leaves many question marks.[121] There is no clear study that has proven "definitively that fingerprints are unique."[122] Even DNA testing, "supposedly airtight in its ability to place someone at the scene of the crime, can mislead."[123]

Imagine a person who maliciously uploads a fake DNA profile to an open-source DNA website like GEDMatch to intentionally mislead investigators or to blackmail someone. This is not a hypothetical. This was a study done by computer scientists at the University of Washington who explained how such a website could be manipulated.[124] The study concluded by suggesting that companies should "mitigate some of the risks" by creating ways to authenticate DNA data.[125]

.org/the-myth-that-dna-testing-is-infallible/; Thaddeus Hoffmeister, *Did 'CSI' Effect Sway Anthony Jury?*, CNN (July 7, 2011, 5:57 AM), http://www.cnn.com/2011/OPINION/07/06/hoffmeister.anthony.jury/index.html.

119. Drake Bennett & Kristen V. Brown, *Your DNA Is Out There. Do You Want Law Enforcement Using It?*, BLOOMBERG (Oct. 27, 2018, 5:00 AM), https://www.bloomberg.com/news/features/2018-10-27/your-dna-is-out-there-do-you-want-law-enforcement-using-it.

120. *See* Brad Reagan, *The Truth About 4 Common Forensic Methods*, POPULAR MECHANICS (Dec. 18, 2009), https://www.popularmechanics.com/science/health/a4548/4325797/ (citing a State of Michigan audit of the Detroit Police Department's crime lab finding a ten percent error rate in ballistics identification).

121. *See id.*; *see, e.g.*, Jennifer L. Mnookin, Op-Ed, *A Blow to the Credibility of Fingerprint Evidence*, BOS. GLOBE, Feb. 2, 2004, at A14 (explaining how fingerprint evidence is not as credible as those who use it make it out to be, and how "fingerprints cannot possibly be as perfect a technique as the experts . . . claim.").

122. *Id.* ("[I]t is unclear if prints change over time or vary depending on the amount of pressure applied."); *see also* Ungvarsky, *supra* note 86, at 610–11.

123. Bennett & Brown, *supra* note 119.

124. *Id.*

125. Yaniv Erlich et al., *Identity Inference of Genomic Data Using Long-Range Familial Searches*, 362 SCI. 690, 692–93 (Nov. 9, 2018), http://science.sciencemag.org/content/362/6415/690. Genetic laboratory Parabon critiqued the Erlich paper as based on "faulty premises," saying familial genealogy is an "extraordinarily complex" process. Ellen McRae Greytak et al., *Re: Identity Inference of Genomic Data Using Long-Range Familial Searches, Erlich et al.*, SCI. LETTERS (Oct. 29,

Additionally, using such resources without any regulatory oversight could lead investigators to identify, for example, women who have had illegal abortions[126] or civilians who committed a simple transgression like trespassing.[127]

The use of DNA evidence in TV shows—like Crime Scene Investigators (CSI)—can cause jurors to overlook possible holes in the DNA evidence.[128] Further, as such on-screen delights increase in nature and scope, the weight a juror places on the DNA evidence—perhaps subconsciously—also increases.[129] Although it is but one piece of evidence, it tends to get a significant amount of weight as the sometimes single-deciding factor for someone's guilt.[130]

B. *Secondary Transfers of DNA*

These fears do not even address wholly separate problems with DNA evidence and juries: DNA math[131] and the false-

2018), http://science.sciencemag.org/content/362/6415/690/tab-e-letters); Bennett & Brown, *supra* note 118.

126. *See* Bennett & Brown, *supra* note 119.

127. *See id.*

128. *See* Laurie Meyers, *supra* note 118; *see also* Stern, *supra* note 116; *cf.* Fordham, *supra* note 34 (explaining "the jury's still out" on whether jurors are able to properly weigh and truly understand DNA evidence).

129. *See* John Alldredge, *The "CSI" Effect and Its Potential Impact on Juror Decisions*, THEMIS: RES. J. JUST. STUD. & FORENSIC SCI., Spring 2015, at 118–19 (noting studies that observed heavy viewers of TV crime shows like *CSI* showing less confidence in non-DNA evidence); *see* Hoffmeister, *supra* note 118.

130. *See* Meyers, *supra* note 118; *see also* Hoffmeister, *supra* note 118.

131. *See, e.g.*, Jason Felch & Maura Dolan, *FBI Resists Scrutiny of 'Matches'*, L.A. TIMES (July 20, 2008, 12:00 AM), http://articles.latimes.com/2008/jul/20/local/me-dna20 (explaining how a DNA analyst discovered 'impossible' matches within CODIS, clouding 'definitive' DNA match conclusions promulgated by the FBI).

positives it presents,[132] laboratory error,[133] and DNA shopping.[134]

Lukis Anderson is another person who, like Michael Usry, fell victim to a DNA false-positive, though his was because of secondary DNA transfer. When his DNA results came back, it would not have been difficult to conclude that Lukis Anderson had committed murder.[135] The twenty-six-year-old homeless man had been linked to a murder a few miles and many socioeconomic rungs away when his DNA was found under the victim's fingernails.[136] Except, on the night of the murder, Anderson was in an area hospital detoxing from consuming the equivalent of twenty-one beers.[137] How did Anderson's DNA wind up on the fingernails of a victim miles away from where he was lying in hospital bed? Through DNA transferred by another person's touch.[138] In Anderson's case, the paramedics who took him to the hospital to detox were the ones who transferred Anderson's DNA onto the victim via an oxygen monitoring device.[139] That happened because the same paramedics involved with Anderson arrived at the murder

132. *See, e.g.*, Geesche Jacobsen, *Blinded by Science: How DNA Evidence can Confuse Jurors*, SYDNEY MORNING HERALD (Mar. 29, 2010, 3:00 AM), https://www.smh.com.au/national/blinded-by-science-how-dna-evidence-can-confuse-jurors-20100328-r59e.html.

133. *See, e.g.*, NATIONAL RESEARCH COUNCIL, *DNA Evidence in the Legal System*, *in* THE EVALUATION OF FORENSIC DNA EVIDENCE 179–185 (1996), https://www.ncbi.nlm.nih.gov/books/NBK232607/; Jason Schklar & Shari Seidman Diamond, *Juror Reactions to DNA Evidence: Errors and Expectancies*, 23 L. & HUM. BEHAV. 159, 178–81 (1999), http://www.law.northwestern.edu/faculty/fulltime/diamond/papers/JurorReactionsDNAEvidence.pdf (discussing potential implications of laboratory errors for the legal system).

134. *See, e.g.*, Worth II, *supra* note 117 (explaining a National Institute of Standards and Technology survey finding the disparity between two DNA labs can be the difference between one-in-one-billion and a one-in-two chance of the sample proving accurate).

135. *See* Worth I, *supra* note 101.

136. *Id.*

137. *Id.*

138. *See generally* Roland A.H. van Oorschot & Mariya Goray, *The Complexities of DNA Transfer During a Social Setting*, 17 LEGAL MED. 82 (2015) (explaining how DNA can be transferred between people through touch and even proximity); Melinda Matte et al., *Prevalence and Persistence of Foreign DNA Beneath Fingernails*, 6 FORENSIC SCI. INT'L: GENETICS (2012) (finding nearly 20% of people have foreign DNA under their fingernails); *see also* Worth I, *supra* note 101.

139. *See* Shaer, *supra* note 97.

scene a few hours later to provide medical assistance.[140] This inadvertent DNA transfer cost Anderson five months behind bars "while lawyers and investigators pondered how he could have committed the crime."[141]

In an article written in 1997, Australian scientist Roland van Oorschot explained this very phenomenon and signaled to the criminal justice system to proceed with caution when it came to what has since been called "secondary transfers."[142] While the paramedics transferred Anderson's DNA to the victim more than three hours after Anderson was taken to the hospital, Anderson was not the first or last case where law enforcement found what it thought was a DNA match, then tried piecing together proof as confirmation bias.[143]

C. *Confirmation Bias and DNA Contamination*

A DNA sample is only as good as the people who handle it from collection through processing the analysis. DNA evidence is also only as good as the separation between law enforcement and the crime lab analysts testing the DNA sample. For a DNA sample to be truly tested objectively, the analyst must be cabined off from law enforcement or other prosecutorial influences. Most crime labs, however, "routinely compare the evidence profiles and suspects' profiles at the same time."[144] Most of the time this happens because police officers send the crime lab a sample for analysis but attached to the sample is a

140. Henry K. Lee, *How Innocent Man's DNA Was Found at Killing Scene*, SFGATE (June 26, 2013, 11:07 PM), https://www.sfgate.com/crime/article/How-innocent-man-s-DNA-was-found-at-killing-scene-4624971.php.

141. Worth II, *supra* note 117.

142. Ronald A.H. von Oorschot & Maxwell K. Jones, *DNA Fingerprints from Fingerprints*, 387 NATURE 767, 767 (1997), https://www.nature.com/scitable/content/DNA-fingerprints-from-fingerprints-11782; *see also* Worth I, *supra* note 101.

143. *See, e.g.*, William Langley, *The Case Against DNA*, TELEGRAPH (Mar. 6, 2012, 11:30 AM), https://www.telegraph.co.uk/news/science/9115916/The-case-against-DNA.html (explaining how cabdriver David Butler's DNA transferred to a woman's fingernails because he shed skin cells); *see also* Worth I, *supra* note 100 (discussing how the more a person sheds, the more likely DNA is transferred to another person nearby, even without actual person-to-person contact).

144. *See* Ungvarsky, *supra* note 87, at 619.

cover letter with information unnecessary for the analyst to conduct the analysis.[145] Heart-wrenching information, whether in the form of a cover letter describing a gruesome or appalling piece of "extra" information about the case, or in another form, can—sometimes, subconsciously—cause the analyst to try making the DNA profile and evidence profile fit.[146] Lab analysts "do not presume innocence, they do not assume innocence. They are looking to have the biological evidence support all the rest of the evidence. [T]hat leads to false convictions."[147] In examining the confirmation bias phenomenon, when lab technicians revisited samples they looked at years earlier, they reneged on their initial "positive match" assessment when told prior to testing the sample that "there may not be a connection between sample and suspect."[148]

DNA evidence contamination is also becoming more common even in a lab setting.[149] DNA evidence collection and analysis must be handled with extreme caution to mitigate these contamination concerns.[150] One glaring reason for the contamination uptick is that as the science used to analyze DNA evidence has become more sensitive, the ability for the devices used to analyze this evidence to pick up "foreign" DNA has also increased.[151] Additionally, DNA samples in a lab are subject to possible contamination through humans. Law enforcement officials can take their own precautions to an extreme, but once

145. *Id.* at 618 (adding that the police officer may include unnecessary information such as the rape victim was a six-year-old girl, or some other grisly piece of extra information).

146. *See* John Rafael Peña Perez, *Confronting the Forensic Confirmation Bias*, 33 YALE L. & POL'Y REV. 455, 459 (2015); *see also* Shaer, *supra* note 96, at 618.

147. Perez, *supra* note 146, at 459 n.11.

148. *Id.* at 460.

149. Duncan Taylor et al., *Observations of DNA Transfer Within an Operational Forensic Biology Laboratory*, 23 FORENSIC SCI. INT'L 33, 41 (2016) (reporting the results of a study where seventy-five percent of law enforcement case files tested contained DNA from persons who had not handled them).

150. Ane Elida Fonneløp et al., *Contamination During Criminal Investigation: Detecting Police Contamination and Secondary DNA Transfer from Evidence Bags*, 23 FORENSIC SCI. INT'L 121, 121–22 (2016) (reporting the results of a Norwegian study that found contaminated DNA evidence at police stations by officers not even involved in a specific case).

151. *Id.* at 121.

DNA samples arrive at a lab for testing, contamination in even the cleanest parts of a lab still transpires.[152]

Although labs—albeit few—outside the United States have embraced the concept of "Secondary Transfers," the shift from asking to "whom" the DNA belongs to "how" the DNA got there is virtually nonexistent in the United States.[153] This shortcoming is partly because forensic scientists in the United States lack the data to confidently testify *how* the DNA moves from place to place.[154]

Funding is partially to blame.[155] The National Academy of Sciences urged Congress to create a new, independent federal agency to oversee the field of forensics.[156] Nothing happened until 2013, when President Obama created a forty-member National Commission on Forensic Science and filled it with people who saw the field from radically different perspectives.[157] The members, however, were constrained by a rule that all action must be approved of by a supermajority.[158] Although their recommendations lacked the teeth of an administrative body, the Justice Department was obligated to respond to them.[159] One of the key findings was on June 21, 2016, when the Commission adopted a proposal that "all forensic science methodologies should be evaluated by an independent scientific body that will characterize the

152. *See* Worth I, *supra* note 101.

153. *Id.* (quoting a Los Angeles County Public Defender saying forensic scientists who veer away from "facts" when testifying often employ "confirmation bias" to the jury).

154. *Id.* (citing forensic scientists interviewed were unaware of "*any* lab or university in the U.S. that routinely" tests for Secondary Transfers (emphasis added)).

155. *See id.*

156. *Strengthening Forensic Science in the United States: A Path Forward: Hearing Before the Subcomm. on Tech. & Innovation of the H. Comm. on Sci. & Tech.*, 111th Cong. (2009) (statement of Peter M. Marone, Director, Virginia Department of Forensic Science), http://www.nationalacademies.org/OCGA/111Session1/testimonies/OCGA_149974.

157. *See National Commission on Forensic Science*, DEP'T JUST., https://www.justice.gov/archives/ncfs (last visited Feb. 27, 2020); Worth I, *supra* note 101.

158. National Commission on Forensic Science, *Bylaws as Amended, March 21, 2016*, NAT'L INST. STANDARDS & TECH. 3–5, https://www.justice.gov/archives/ncfs/file/47386/download (last visited Feb. 27, 2020); Worth I, *supra* note 101.

159. Worth I, *supra* note 101.

methodology's capabilities and limitations."[160] A few months later the Commission issued another important recommendation, this time relating to "Facilitating Research on Laboratory Performance."[161]

D. *Rapid DNA: Replacing Law Enforcement's Traditional Investigative Role*[162]

The National Commission on Forensic Science was only beginning to dig into DNA Transfers when then-Attorney General Jeff Sessions announced the Department of Justice would not renew the commission's charter.[163] A few months later, President Donald Trump signed the Rapid DNA Act into law.[164] Two key components of the new law are: (1) it lowers the time it takes to get either a DNA match or DNA sample information from CODIS to approximately two hours, and (2) it allows the integration of a lab's procedure into a police station's booking process.[165] The dangers this new law presents

160. National Commission on Forensic Science, *Reflecting Back—Looking Toward the Future*, NAT'L INST. STANDARDS & TECH. 50 (Apr. 11, 2017), https://www.justice.gov/archives/ncfs/page/file/959356/download.

161. *Id.* (outlining steps that should be taken to "assure the accuracy and reliability of [the laboratories'] analysis and the overall quality of their work.").

162. *See Rapid DNA*, FBI, https://www.fbi.gov/services/laboratory/biometric-analysis/codis/rapid-dna (last visited Apr. 18, 2020); *see* Annie Sciacca, *Rapid DNA Technology Gives Law Enforcement Access to Your DNA in 90 Minutes*, GOV'T TECH. (Aug. 28, 2017), http://www.govtech.com/public-safety/Rapid-DNA-Technology-Gives-Law-Enforcement-Access-to-Your-DNA-in-90-Minutes.html (stating traditional DNA testing could take upward of a few weeks for a sterile lab with a controlled environment to return results). Rapid DNA "labs," although narrowing that DNA return timeline to ninety minutes, are often located in a police station; a place far from "sterile." *Id.*

163. Ariana Costakes, *Department of Justice to End National Commission on Forensic Science*, INNOCENCE PROJECT (Apr. 11, 2017), https://www.innocenceproject.org/department-justice-ends-national-commission-forensic-science/; *see also* Worth I, *supra* note 101 (describing what the Commission was doing prior to Session's announcement).

164. Rapid DNA Act of 2017, Pub. L. No. 115-50, 131 Stat. 1001 (2017); *see also* CBS Staff, *Trump Signed Bipartisan Bill for Faster DNA Testing to Solve Crimes*, KPIX (Aug. 22, 2017, 7:51 AM), https://sanfrancisco.cbslocal.com/2017/08/22/trump-signs-bipartisan-rapid-dna-act-swalwell-feinstein/; *see generally The Emergence of Rapid DNA Technology*, INT'L BIOMETRICS & IDENTITY ASS'N, https://www.ibia.org/download/datasets/4185/The%20Emergence%20of%20Rapid%20DNA%20Technology.pdf (last visited Apr. 18, 2020) (explaining the benefits and limitations of Rapid DNA testing).

165. *Rapid DNA*, *supra* note 162.

are astounding.[166] Scientists have identified concerns about DNA testing in sterile labs,[167] and so it follows that a DNA test run in a police station—a place not as sterile as a traditional laboratory—will not be "clean" and untainted from other DNA sources, such as through secondary transfer of DNA.[168] Further, law enforcement officials have successfully sued to deflect requests for *their* DNA samples to exclude or implicate them as possible suspects.[169] Additionally, one legal expert in genetics opined that having police use Rapid DNA as its investigative approach is the epitome of law enforcement treating citizens as "guilty until proven innocent."[170]

Since the Rapid DNA Act went into effect, in at least one Pennsylvania county, for example, law enforcement officers have already taken at least one DNA sample from someone who committed a minor traffic offense.[171] The law in Pennsylvania is consent.[172] When an officer wants to take DNA from an arrestee in Pennsylvania, the arrestee must give permission for the sample to be drawn.[173] But, because the numbers show nearly ninety percent of arrestees agree to a buccal swab, most Pennsylvania residents are arguably

166. *See* Sciacca, *supra* note 162 (noting that in addition to the DNA return timeline shortening to ninety minutes, Rapid DNA also gives law enforcement access to CODIS where a police officer can match a DNA sample against the FBI's national database containing nearly thirteen million profiles).

167. *See* Taylor et al., *supra* note 149.

168. *See supra* Section II.B (discussing how secondary transfer of DNA works).

169. Dave Collins, *Connecticut Officials Detective Settle DNA Dispute*, BOSTON GLOBE (Feb. 8, 2015, 12:00 AM), https://www.bostonglobe.com/metro/2015/02/08/state-police-settle-detective-lawsuit-over-dna-collection/59PBbvsQk4fsRGwrrF5t7N/story.html (describing how a state police detective sued his department, claiming it demanded he and others submit DNA samples to be granted access to future crime scenes in violation of state law, and how the parties settled out of court).

170. Murphy I, *supra* note 21 (stating that an investigation that "starts with everybody [as] a suspect, and then let's go see if we can find a crime they've committed . . . [is] a deeply problematic inversion of how we do things.").

171. *Id.* (reporting that one Bucks County police detective opined about Rapid DNA's use, "[t]here really are no actual rules written anywhere").

172. 42 PA. CONS. STAT. § 9543.1(c)(1)(ii) (2019).

173. *Id.*; *see* Murphy I, *supra* note 21.

unaware of their right to deny permission.[174] What about law enforcement officials? If the people who are merely accused of a crime can have their DNA swabbed, should it not be that those doing the swabbing also should have their DNA taken? Except law enforcement officials have successfully sued to ensure their DNA remained their own.[175] In Connecticut, for example, a State Police detective sued State Police officials and the Department of Emergency Services and Public Protection alleging his superiors told him and other detectives that they had to give their DNA samples, and that he was retaliated against for refusing to submit a sample.[176] The Connecticut Attorney General's office said that State Police officials allegedly wanted the samples so that unknown DNA found at crime scenes could be identified, making investigations easier.[177] In the suit, the Detective pointed out that State Police had "no policies on the collection, storage, or testing of employees' DNA," and said he feared "what would happen to his DNA information" if he provided a sample.[178]

The argument in favor of Rapid DNA testing is the system was designed to only test cheek swabs, not crime scene evidence.[179] That argument, however, belies reality. Law enforcement officials in at least three states have been using Rapid DNA to test crime scene samples in the hopes of unearthing a suspect.[180] But neither of the two companies producing the Rapid DNA testing device—Thermo Fisher

174. Murphy I, *supra* note 21 (explaining that nearly ninety percent of those arrested consented to law enforcement officials swabbing their cheeks for DNA).

175. *See, e.g.*, Collins, *supra* note 169 (a state police detective sued his department after it allegedly demanded detectives submit DNA samples or exclude them from future crime scenes).

176. *Id.*

177. *Id.*

178. *Id.*

179. *Rapid DNA*, *supra* note 162.

180. Murphy I, *supra* note 21 (stating how law enforcement in Utah, Delaware, and Pennsylvania test DNA samples extracted from guns, gum, and cigarette butts with Rapid DNA).

Scientific[181] and ANDE Corporation[182]—say their device has been validated to test such samples.[183] At least one scientist agrees, Rapid DNA should be used only to test cheek swab samples.[184]

Bringing the context of *King* into the picture, where the *King* Court said the search was only related to "junk DNA,"[185] as science continues to constantly move forward and improve, such a justification by the Court should have been viewed as stale by the time the ink dried on the *King* opinion. To prove this point, it took a few weeks until law enforcement was able to identify King when he was detained,[186] and so Justice Scalia believed it was incredulous to think that Maryland law enforcement truly did not know who was in its custody when Alonzo King was arrested.[187] But, the time consuming process of DNA use in 2013 makes the comparison between DNA "identification" and fingerprints weak and problematic.[188] Rapid DNA makes similarly quick turn-around times possible now for DNA samples.[189]

If science can make a traditional laboratory as efficient as fingerprinting, it is only a matter of time before the thirteen loci "junk DNA" testing provides law enforcement with reputable

181. *See Thermo Fisher Scientific Acquires IntegenX, Provider of Leading Rapid DNA Technology for Human Identification*, THERMO FISHER SCI. (Mar. 16, 2018), http://thermofisher.mediaroom.com/2018-03-16-Thermo-Fisher-Scientific-Acquires-IntegenX-Provider-of-Leading-Rapid-DNA-Technology-for-Human-Identification.

182. *See About*, ANDE, https://www.ande.com/about-ande-rapid-dna/ (last visited Apr. 18, 2020).

183. Murphy I, *supra* note 21 (citing one ANDE senior application scientist who noted not being valid "doesn't mean it's an inappropriate use of the technology").

184. *Id.* ("[P]rocessing DNA from a cheek swab was like reading the children's book 'Run Spot Run,' whereas reading crime scene DNA was like 'reading Shakespeare in Old English,'" explained Dr. Michael Coble).

185. *See* Mark J. Becker, *U.S. Supreme Court Upholds Collecting DNA from Arrestees*, INT'L ASS'N PRIVACY PROFESSIONALS (Aug. 27, 2013), https://iapp.org/news/a/u.s-supreme-court-upholds-collecting-dna-from-arrestees/.

186. Maryland v. King, 569 U.S. 435, 472 (2013) (Scalia, J., dissenting).

187. *Id.* at 476.

188. *See, e.g.*, *id.* at 472, 478 (explaining the process in *King* took nearly three months from when he was arrested until his DNA sample was tested and the results came back, and noting how in 2013 the average fingerprint identification response time was twenty-seven minutes).

189. *See Rapid DNA*, *supra* note 162.

information.[190] First, look at the Violent Crime Control and Law Enforcement Act[191] and how the FBI treats it.[192] Although the Act does not specifically state what part(s) of the DNA strand is to be used when creating the profile for CODIS, the FBI "established an in-house policy of examining and analyzing only 'junk DNA.'"[193] The problem with an "in-house" policy is that, because it was not court-issued or statutorily mandated, it can be changed just as quickly as it was established.

Second, researchers have begun to discover that even non-coding DNA—"junk DNA"—reveals more than previously thought. Scientists have begun to find links between the "junk DNA" regions of a person and "a host of genetic disorders . . . [and being able] to detect such intimate information may complicate even this [junk DNA] analysis."[194] Further, today, DNA data points being tested are many more than when *King* was decided, and this makes genealogical analysis "far more searching than the traditional forensic analysis" the *King* Court faced.[195]

A final quandary for Rapid DNA proponents rests on the international stage. A 2017 Swedish study produced results that included a high mis-identification rate.[196] The problem with this

190. *See* James Rainey, *Familial DNA Puts Elusive Killers Behind Bars. But Only 12 States Use It*, NBC NEWS (Apr. 28, 2018, 6:00 AM), https://www.nbcnews.com/news/us-news/familial-dna-puts-elusive-killers-behind-bars-only-12-states-n869711 (noting how in 2018 law enforcement tested twenty loci (non-identifying genetic markers)). In *King*, law enforcement only tested thirteen loci. *King*, 569 U.S. at 464.

191. 34 U.S.C. § 12592 (2019). This section of the Violent Crime Control and Law Enforcement Act was originally enacted under Title 42 (codified prior to amendment at 42 U.S.C. § 14132).

192. *See* Beaugh, *supra* note 68, at 172.

193. *Id.* (citations omitted).

194. Natalie Ram, *Genetic Privacy After* Carpenter, 105 VA. L. REV. 1357, 1379 (2019).

195. *Id.* at 1382 & n.141 (explaining how in 2013, the thirteen loci tested came from forty data points, but today the data points tested are significantly more); *see* Kashmir Hill & Heather Murphy, *Your DNA Profile is Private? A Florida Judge Just Said Otherwise*, N.Y. TIMES (Dec. 30, 2019), https://www.nytimes.com/2019/11/05/business/dna-database-search-warrant.html (describing how a Florida judge granted a search warrant of a direct-to-consumer recreational DNA website, which means law enforcement now has precedent for access to potentially millions more DNA profiles than with only criminal databases like CODIS).

196. *See* SAMUEL BOISO ET AL., NATIONELLT FORENSISKT CENTRUM, EXPERIENCES FROM OPERATING THE RAPIDHIT® SYSTEM AND IDENTIFIED ISSUES PROCESSING CRIME SCENE SAMPLES

high rate is the Rapid DNA device used in the test "did not warn or display any errors."[197] Even Rapid DNA models containing a single-sample cartridge loading system[198] could suffer from Secondary Transfer.[199] Putting such a device in the hands of law enforcement only highlights the issues both prosecutorial and confirmation biases produce.[200]

E. *When Your DNA Sample Is Not Enough*

The lack of uniform regulation and, specifically, lack of controls over how DNA information is procured is a cause for concern.[201] The failure by the federal government to enact uniform regulatory devices not only creates privacy concerns,[202] but lands unknowing, innocent civilians into the law enforcement dragnet in law enforcement's search for criminal justice.[203] Further, problems persist when investigators go to

3 (the RapidHIT® system was an IntegenX product). *See generally Thermo Fisher Scientific Acquires IntegenX, Provider of Leading Rapid DNA Technology for Human Identification*, *supra* note 180 (press release announcing the IntegenX purchase).

197. BOISO ET AL., *supra* note 196, at 21 (explaining how "the incorrect DNA profile could in a real case have been accepted and used in casework or uploaded to the DNA database.").

198. *Cf. id.* at 3 (using a RapidHIT® DNA testing model containing multiple slots per cartridge).

199. *See generally* Fonneløp et al., *supra* note 150, at 125.

200. *See* Tyler Rudick, *$3 Million for a Life Shattered by a Wrongful Conviction: Houston Finally Pays Man Hurt by Crime Lab*, CULTURE MAP (Nov. 3, 2012, 12:36 AM), http://houston.culturemap.com/news/city-life/11-03-12-3-million-for-a-life-shattered-by-a-wrongful-conviction-houston-finally-pays-man-hurt-by-crime-lab/.

201. *See, e.g.*, *Rapid DNA*, *supra* note 162 (noting how implementing "[s]tandards" and "[p]rocedures" were both still "[i]n progress").

202. *See* Hill & Murphy, *supra* note 195.

203. *See generally* Jennifer Lynch, *State Courts Strike Blows to Criminal DNA Collection Laws in 2014–What to Look for in 2015*, ELECTRONIC FRONTIER FOUND. (Jan. 5, 2015), https://www.eff.org/deeplinks/2015/01/state-courts-strike-blows-criminal-dna-collection-laws-2014-what-look-2015 (explaining how "[twenty percent] of all people arrested" in 2012 for a felony crime in California "were never even charged with, much less convicted of a crime."); *see also ACLU of Louisiana Raises Constitutional Concerns in Police use of DNA Dragnets to Hunt Serial Killer*, AM. CIV. LIBERTIES UNION (Jan. 15, 2003), https://www.aclu.org/news/aclu-louisiana-raises-constitutional-concerns-police-use-dna-dragnets-hunt-serial-killer (arguing law enforcement tactics in dragnet searches amount to targeting people as if they "are guilty until proven innocent").

multiple labs to get the results they want.[204] This "shopping" procedure prompted an attorney for the California Innocence Project to ask how two labs can "get entirely different answers from the same DNA test."[205] The disparity between the results can arise when the DNA sample is too small to render an accurate reading, per the manufacturer's recommendations.[206] When lab technicians raise the amplifiers reading a DNA sample to beyond the recommended number, the reading device can easily produce error-laden results on a Low Copy Number (LCN) DNA sample.[207] The results occur when loci markers on a DNA sample either disappear from where they once were or only first appear after testing amplifiers are raised.[208] One San Francisco resident spent nearly six years incarcerated because of LCN data implicating him in a drug distribution crime, and he was only freed upon a reversal by the Ninth Circuit, which chastised the District Court judge.[209]

In the eyes of law enforcement, people are guilty until proven innocent. As evidenced by the Houston Police Department crime lab scandal,[210] once a DNA sample is provided to forensic technicians, it is "tainted" in the technicians' eyes.[211] This "soiled" sample can be blamed on prosecutorial or confirmation

204. *Cf.* Worth II, *supra* note 117 (noting how the DNA shopping problem is prevalent on both sides of the Bar).

205. *Id.* (quoting attorney Mike Semanchik).

206. *Id.*

207. *See id.* (explaining how although the LCN DNA test "is the most controversial practice in forensic biology," it is still used in at least one public lab).

208. *See generally id.* (explaining how these loci "spikes" are affected by the calibration change).

209. *See* United States v. Young, 571 F. App'x 558, 559 (9th Cir. 2014) (unpublished opinion) (overturning the District Court' admission of the prosecution's expert witness testimony that was only shown to be not "ridiculous," explaining "[n]ot being ridiculous is not synonymous with being reliable"); *see also* Worth II, *supra* note 116 (noting how certainty rates in LCN DNA tests are far from certain, as they are inconsistent and sometimes lack any benchmarks for statistical confidence).

210. *See* Brian Rogers, *Conviction Reversed Because Houston Crime Lab Analyst, Supervisor Did Not Disclose Evidence Problems*, HOUS. CHRON. (Sept. 12, 2018, 2:12 PM), https://www.chron.com/news/houston-texas/houston/article/Conviction-reversed-because-Houston-crime-lab-13221897.php.

211. *See* Murphy I, *supra* note 21 (discussing how aggressive DNA data collection by police can distort forensic analysis because of pre-existing biases).

bias.[212] Additionally, the Rapid DNA testing method could further exacerbate the already-tense racial strains on policing in the United States.[213] Having police in an urban neighborhood process DNA samples its own officers procure is a recipe for disaster. New York University law professor Erin Murphy explained when police approach an investigation starting with "everybody's a suspect," and then go see if they "can find a crime the ["suspect"] committed," it is "a deeply problematic inversion" of how things are done.[214] Although the director of public safety for the Bensalem, Pennsylvania police department scoffs at the notion that police are profiling minority communities for DNA samples, the proof is there.[215]

212. *See generally* Rudick, *supra* note 200 (explaining the need for an independent forensic testing lab).

213. Murphy I, *supra* note 21 (discussing the concern of NYU Professor Erin Murphy that policing centered on aggressive use of Rapid DNA technology "was likely to exacerbate racial biases in the criminal justice system."); *see also, e.g.*, Christina Caron, *A Black Yale Student Was Napping, and a White Student Called the Police*, N.Y. TIMES (May 9, 2018), https://www.nytimes.com/2018/05/09/nyregion/yale-black-student-nap.html?module=inline (reporting an instance of police considering an African American woman "suspicious" for sleeping in a dorm common room); Matt Stevens, *Starbucks C.E.O. Apologizes After Arrests of [Two] Black Men*, N.Y. TIMES (Apr. 15, 2018), https://www.nytimes.com /2018/04/15/us /starbucks-philadelphia-black-men-arrest.html?action=click&module=inline&pgtype=Article (reporting that police arrested two African American men deemed "suspicious" while waiting at Starbucks for their business associate); @_ayeeeitsKK, TWITTER (Apr. 25, 2018, 6:22 AM), https://twitter.com/_ayeeeitskk/status/989132611854524417?lang=en (recounting how police allegedly suspected an African American man to have acted illegally after he gave a homeless man change).

214. Murphy I, *supra* note 21.

215. *Compare id.* (Mr. Fred Harran explaining people "have nothing to fear if [they are] not going to be a criminal"), *with* Caron, *supra* note 213 (police considering a sleeping African American woman "suspicious" for sleeping in a dorm common room) (emphasis added), *and* Stevens, *supra* note 213 (police arrest two African American men deemed "suspicious" while waiting at Starbucks for their business associate).

III. THE RISE OF GENETIC TESTING

A. *The History Behind the DNA Laws We Have Today*

Just like the Court has started to reverse the course Justice Rehnquist put it on,[216] Congress—having acted in the public's best interest in the past[217]—must again do the same.

Looking into a person's genome can determine the mysteries of man.[218] Since its formative years at the turn of the twentieth century, genetic testing has spread from the making "'better babies' movement" in Indiana,[219] to now being able to test what wine to drink based on our genetic makeup.[220] DNA testing has also been used in criminal justice since the mid-1980's,[221] and has helped to convict thousands of people.[222]

216. *See* Nelson v. Colorado, 137 S. Ct. 1249, 1256 (2017) ("[The state] may not presume a person, adjudged guilty of no crime, nonetheless guilty enough for monetary exactions.").

217. *See generally* 42 U.S.C.S. § 300b-1 (2019) (allowing for the Secretary to enter into contracts with public and private entities for projects relating to training counselors and physicians, diagnosing, and treating genetic diseases); 42 U.S.C.S. § 2000ff (2019) (prohibiting employment discrimination based on genetic information); Genetic Information Nondiscrimination Act of 2008, Pub. L. No. 110-233, 122 Stat. 881 (2008) (protecting individuals from discrimination based on genetic information in health insurance and employment).

218. *See generally* Becker, *supra* note 186 (explaining how DNA testing works: DNA has "coding" and "non-coding" regions). Although they do not reflect on potential health predispositions, the non-coding regions—also known collectively as "junk" DNA because of their minimal usefulness—can identify their owner. *Id.* DNA is nearly identical between any two unrelated people. *See id.* But, in regions where the DNA code varies, there exist short tandem repeats (STRs)—repetitive sections of DNA that vary in number among people. *See id.* The size and frequency of the STR, known as "alleles," makes particular STRs unique to each person. *Id.* Law enforcement compares thirteen locations (loci) of the STR alleles to create a DNA profile. *Id.* The possibility for two unrelated individuals having the same STR alleles in a sample is one in one hundred trillion. *Id.*

219. *Indiana Eugenics: History & Legacy 1907-2007*, IND. U. PURDUE U., INDIANAPOLIS, http://www.iupui.edu/~eugenics/ (last visited Apr. 18, 2020).

220. *See, e.g.*, VINOME, https://www.vinome.com/ (last visited Apr. 18, 2020) (providing wine options to customers "guided by their DNA").

221. *See* Lisa Calandro et al., *Evolution of DNA Evidence for Crime Solving – A Judicial and Legislative History*, FORENSIC MAG. (Jan. 6, 2005, 10:31 AM), http://tools.thermofisher.com/content/sfs/brochures/cms_042067.pdf (noting the first criminal trial in the U.S. that used DNA evidence took place in 1987); Associated Press, *Rapist Convicted on DNA Match*, N.Y. TIMES (Feb. 6, 1988), https://www.nytimes.com/1988/02/06/us/rapist-convicted-on-dna-match.html; *see also* Rob Warden, *First DNA Exoneration*, BLUHM LEGAL CLINIC, http://www.law.northwestern.edu/legalclinic/wrongfulconvictions/exonerations/il/gary-dotson.html (last visited Apr. 18, 2020).

222. *See* Calandro et al., *supra* note 221.

While all states have embraced DNA testing in the criminal setting,[223] not all have done so to the same degree.[224] In 1989, Virginia became the first jurisdiction to create a statewide DNA database.[225] In 1994, the federal government passed the DNA Identification Act that authorized the FBI to begin compiling DNA samples into a centralized database known as the Combined DNA Index System (CODIS),[226] and started funding federal DNA labs.[227] Initially, all fifty states required DNA samples be provided by convicted sex offenders.[228] A decade later, the federal government, through the Justice for All Act of 2004,[229] expanded "the number of crimes that qualified for inclusion in the database."[230]

DNA evidence is the latest frontier law enforcement is using to put people behind bars. And it all begins with viewing the public as guilty. This observation is by no means limited to

223. All fifty states have laws allowing DNA samples to be taken from convicted felons. *See, e.g.*, ALA. CODE § 36-18-25 (2009); CAL. PENAL CODE § 296 (Deering 2009); DEL. CODE. ANN. tit. 29, § 4713 (2009); FL. STAT. ANN. § 943.325 (LexisNexis 2009); GA. CODE. ANN. § 35-3-160 (LexisNexis 2009); MD. CODE ANN, PUB. SAFETY § 2-504 (LexisNexis 2009); MASS. ANN. LAWS ch. 22E, § 3 (LexisNexis 2009); MICH. COMP. LAWS § 750.520m (2009); N.J. REV. STAT. § 53:1-20.20 (2009); N.M. STAT. ANN. § 29-16-3, 6 (LexisNexis 2009); OKLA. STAT. tit. 74, § 150.27a (2009); 44 PA. CONS. STAT. § 2316 (2009); UTAH CODE ANN. §§ 53-10-403, 403.5, 404 (LexisNexis 2009); VT. STAT. ANN. tit. 20, §§ 1932, 1933, 1936 (2009); WASH. REV. CODE ANN. § 43.43.754 (LexisNexis 2009).

224. At the time *Maryland v. King* was decided, only twenty-eight states and the federal government had laws on their books authorizing DNA sample collection from some or all arrestees. *See, e.g.*, 34 U.S.C. § 40702 (2017); ALA. CODE § 36-18-24 (2009); CAL. PENAL CODE §§ 296, 296.1, 299 (Deering 2009); FLA. STAT. ANN. § 943.325 (LexisNexis 2009); MD. CODE ANN., PUB. SAFETY § 2-504 (LexisNexis 2009); MICH. COMP. LAWS § 750.520m (2009); N.M. STAT. ANN. § 29-3-10 (LexisNexis 1978); N.C. GEN. STAT. §§ 15A-266.3A, 502A (2013); N.D. CENT. CODE § 31-13-03 (2009); UTAH CODE ANN. § 53-10-403; VA. CODE ANN. § 19.2-310.2:1 (2009).

225. Michelle Hibbert, *DNA Databanks: Law Enforcement's Greatest Surveillance Tool?*, 34 WAKE FOREST L. REV. 767, 775 (1999) (discussing that by 1998, every state had its own DNA collection statute on its books).

226. *See* 34 U.S.C. § 12592 (2017); *see also OIG Audit Report*, *supra* note 2.

227. *See* 34 U.S.C. § 12592; *Combined DNA Index System (CODIS)*, FBI, https://www.fbi.gov/services/laboratory/biometric-analysis/codis (last visited Apr. 18, 2020).

228. Hibbert, *supra* note 225, at 772–73.

229. Justice for All Act of 2004, Pub. L. No. 108-405, 118 Stat. 2260 (2004).

230. *OIG Audit Report*, *supra* note 2; *The National DNA Database System*, FINDLAW, https://criminal.findlaw.com/criminal-procedure/the-national-dna-database-system.html (last visited Apr. 18, 2020) (noting how an accreditation process was needed for state labs running DNA tests to have access to CODIS).

DNA sample evidence. For a time, bullet lead analysis was all the rage; until it was not.[231] Fingerprinting evidence, too, has raised fallibility concerns.[232] DNA is thought to have withstood the test of time, but even DNA—born through academic scholarship and not through any part of the criminal justice world—is suspect.[233] DNA is thought to have withstood the test of time because it is science-based and, as such, is not susceptible to the failings of man like the other pseudo-science evidentiary analyses have been shown to be.[234]

Part of the problem facing innocent people who are swept up in a law enforcement search is the lack of a clear expungement path to have all DNA samples—digital and physical—removed from all databases upon a finding by a court that warrants such action.[235] Further highlighting the presumption of guilt are the multiple states that allow law enforcement officials to take DNA buccal swabs from those merely arrested but not even charged.[236] Since *Maryland v. King*,[237] states like Maryland have pushed the boundaries of DNA swabbing. In 2014, Maryland's highest court ruled that law enforcement could use the defendant's DNA sample *after* he refused law enforcement's request to take a buccal swab.[238] How did law enforcement get

231. Ungvarsky, *supra* note 87, at 610.

232. *See, e.g.*, *id.* at 610–11 (noting a high-profile FBI error in identifying and jailing an Oregon lawyer as the suspected terrorist who bombed a train in Spain); *see also* Robert B. Stacey, *A Report on the Erroneous Fingerprint Individualization in the Madrid Train Bombing Case*, 7 FORENSIC SCI. COMM. 1, 6 (2005).

233. *See* discussion, *supra* Sections II.B.–C. (explaining holes in DNA evidence include secondary transfer of DNA, confirmation bias, and DNA contamination).

234. *See* Ungvarsky, *supra* note 87, at 617 (describing DNA as "an excellent resource to exclude and to exonerate"); *see also* SCHECK ET AL., *supra* note 87, AT 179–80.

235. *See* Beaugh, *supra* note 68, at 159.

236. *State (sic) that Have Passed Arrestee DNA Database Laws* DNARESOURCE.COM, http://www.dnaresource.com/documents/USStatuteTracking2016.pdf (last updated Sept. 2016) [hereinafter *DNA Database Laws*].

237. Maryland v. King, 569 U.S. 435 (2013) (finding that taking and analyzing a cheek swab of DNA is a legitimate police booking procedure that is reasonable under the Fourth Amendment).

238. *See* Raynor v. State, 99 A.3d 753, 754 (Md. 2014), *cert. denied*, Raynor v. Maryland, 574 U.S. 1192 (2015).

the sample? They took it from his sweat stain on the chair he sat on when he came to a police station for questioning.[239]

In the 2015 case *Varriale v. State*,[240] Maryland's state courts validated police pushing the envelope even further. Maryland's courts ruled a person who voluntarily consents to providing a DNA sample for one case may have the sample compared to other unknown specimen in an unrelated, unsolved case.[241] In *Varriale*, someone on the prosecution labeled the DNA sample as "suspect," even though it did not generate a match for the alleged crime it was initially taken for.[242] This shows how DNA, as the latest method in a statute-created, court-enabled atmosphere—where people are seen by law enforcement as guilty until proven innocent—is here to stay.

Federal laws governing law enforcement using DNA are wide ranging.[243] As DNA information sharing varies from one state to the next,[244] the overall makeup of DNA testing by law enforcement on civilians has far outpaced compliance, governance, and state statutes.[245] While the lack of uniform

239. *Id.* at 756.

240. Varriale v. State, 119 A.3d 824 (Md. 2015), *cert. denied*, Varriale v. Maryland, 136 S. Ct. 898 (2016).

241. *Id.* (holding that the Fourth Amendment does not preclude the State from using voluntarily provided DNA samples for additional and unrelated investigations); *see also* Trent Novak, *Maryland Court Rules Volunteered DNA Can Be Used in Other Cases*, WORLD SOCIALIST WEB SITE (Sept. 11, 2015), https://www.wsws.org/en/articles/2015/09/11/swab-s11.html.

242. Specifically, the CODIS Administrator for the local crime laboratory. *Varriale*, 119 A.3d at 829.

243. *See* 42 U.S.C.A. § 2000ff (2019); *see also* Health Insurance Portability and Accountability Act, Pub. L. No. 104-191, 110 Stat. 1936 (1996) (placing restrictions on the distribution of information including genetic information relating to certain conditions); Violence Against Women and Department of Justice Reauthorization Act of 2005, Pub. L. No. 109-162, § 1004, 119 Stat. 2960, 3085 (codified as amended at 42 U.S.C. § 14135a) (passed as Title X of the Violence Against Women Act Reauthorization of 2005, allowing prosecuting agencies across the United States to buccal swab individuals arrested for violent and/or sex crimes); Rapid DNA Act of 2017, Pub. L. No. 115-50, 131 Stat. 1001 (2017).

244. *See supra* note 28.

245. *See, e.g.*, Hill & Murphy, *supra* note 195 (describing how a Florida judge granted a search warrant to law enforcement for a direct-to-consumer DNA website, and this potentially means "open season" on websites like *Ancestry.com* and *23andMe*); *see also* Evan Sernoffsky, *California Sued Over DNA Database's Inclusion of People Never Convicted of Felony*, S.F. CHRON., https://www.sfchronicle.com/crime/article/CA-Dept-of-Justice-sued-over-DNA-database-of-13454515.php (last updated Dec. 10, 2018, 5:04 PM) (explaining that with no automatic

regulation across the country has left gaping holes in how individual DNA information is collected and disseminated generally,[246] it has also allowed law enforcement access to such personal information not only on persons tested, but even to those related to the person tested.[247] The United Kingdom was the first country to use familial DNA to search for a match and prosecuted the person apprehended.[248] Familial DNA searching is done by law enforcement by combing their databanks for genetic information that links to a relative of the unknown sample.[249] The problem with such a search is it never provides a full match: only partial matches can be obtained in this manner.[250] Such a practice—one that some believe violates the Fourth Amendment because familial DNA searches use the DNA of innocent people purposefully—can likely result in disparate numbers of minority community members targeted.[251] These minority communities have "historically been incarcerated at disproportionally higher rates," so their innocent members will also be subjected to such searches at a higher number than those of non-Hispanic and non-African-American communities.[252] Even those who believe that in the very near future more than ninety percent of Americans of European descent will be identifiable through familial DNA testing,[253] the problem remains the same. Familial DNA testing

expungement, a DNA sample can remain on the California state database even though the person was never convicted of a felony).

246. *See DNA Database Laws*, *supra* note 234 (discussing DNA collection in every state, and consequently, the states that would allow a familial DNA search).

247. *See* Samuel D. Hodge, Jr., *Current Controversies in the Use of DNA in Forensic Investigations*, 48 U. BALT. L. REV. 39, 49 (2018); *see also* discussion *supra* Section II.A. (using the DNA sample from Michael Usry's father to suspect him of murder).

248. Hodge, *supra* note 247, at 49.

249. *Id.* at 50.

250. *See id.* (explaining how the sample used could be that of a sibling, parent, or child, but not the suspect).

251. *Id.* at 52.

252. *Id.*

253. Heather Murphy, *Most White Americans' DNA Can Be Identified Through Genealogy Databases*, NY TIMES (Oct. 11, 2018), https://www.nytimes.com/2018/10/11/science/science-genetic-genealogy-study.html (explaining this vast amount of Americans who could be identified could become reality by 2021) [hereinafter Murphy II].

leads to a higher probability that incorrectly targeted people end up in custody.[254] As of 2018, there were twelve states that allow familial DNA searching,[255] further cementing law enforcement's widening dragnet through its presumption of guilt.[256]

B. *Discussion and Analysis of DNA-Related Case Law*

Although coming years after the Rehnquist Court and its *Bell* and *Salerno* decisions, the *King* Court further diminished the presumption of innocence when it associated a DNA buccal swab with fingerprinting.[257] The seminal question through all this is whether law enforcement should be allowed to forcibly take someone's DNA when the hope is to connect that person to an unrelated, unsolved crime. In *Maryland v. King*, the Supreme Court first tried answering this question.[258]

The Maryland DNA Collections Act allows state and local law enforcement officers to collect DNA samples from those arrested for a violent or attempted violent crime.[259] In 2009, Alonzo King was arrested on first and second-degree battery charges.[260] While under arrest, King's DNA was swabbed from

254. Hodge, *supra* note 247, at 52. (discussing one study that illustrated how although the false identification rate, overall, is a small number, minority community members have "twice the chance of being incorrectly targeted for further investigation.").

255. *Id.* at 50.

256. *See id.* at 54–60 (discussing DNA phenotyping). DNA Phenotyping produces a "suspect pool by examining a person's ancestry and appearance when there is no DNA match in a database" like CODIS. *Id.* at 56. Even according to proponents of this method there is an approximately ten percent chance for error. *See id.* at 55. DNA Phenotyping has not been strenuously vetted, has few peer-reviewed studies supporting it, and puts people who are "innocent of wrongdoing" under suspicion of committing a crime "without any basis in fact or science." *Id.* at 58–59. Considering that DNA Phenotyping only provides a general outline of how the suspect looks, and that a criminal can change their appearance through plastic surgery, it is then understandable how innocent people can be accused of something they did not commit. *See id.* at 60. Yet, more than a dozen states allow this type of genetic search. *Id.* at 60.

257. *See generally* Maryland v. King, 569 U.S. 435, 465–66 (2013) (holding a buccal swab is like a fingerprint even though fingerprinting takes significantly less time to return a result and a cheek swab is an actual search of the body with a person's "essence" seized in the process).

258. *Id.* at 440–41.

259. *Id.* at 443.

260. *Id.* at 440.

the inside of his cheek and put into the state's DNA database.[261] It came back with a match to an unsolved rape case from 2003.[262] Although the DNA match was the only evidence linking King to the crime, and because the trial judge did not allow suppression of this evidence, King was convicted of first-degree rape and sentenced to life in prison.[263]

Federal and state courts had not reached the same conclusion regarding whether collecting and analyzing a DNA sample from a felony arrestee and then using it to solve a different crime violated the Fourth Amendment. Therefore, the U.S. Supreme Court granted *certiorari*.[264]

In an opinion authored by Justice Kennedy, the Court in a 5-4 decision ruled in favor of the state and held the Maryland statute did not violate the Fourth Amendment. The Court reasoned such an innocuous swab of the inside of one's cheek does not constitute an unreasonable bodily invasion.[265] Justice Kennedy opined that the state statute served a legitimate governmental interest: "the need for law enforcement officers in a safe and accurate way to process and identify the persons and possessions they must take into custody."[266] Justice Kennedy concluded that DNA sampling is most akin to

261. *Id.* at 441.

262. *Id.*

263. *Id.* On appeal, King argued the statute was unconstitutional because it infringed on his Fourth Amendment rights against warrantless searches. *Id.* Maryland's highest court reversed and found for King, explaining King's individual privacy outweighed the state's interest in using his DNA. *Id.*

264. *Id.* at 442. There was a circuit and jurisdictional split on whether a DNA sample collected from a felony arrestee could be analyzed to solve a different, unrelated crime without violating the Fourth Amendment. *Id.*

265. *Id.* at 446, 465–66; *see* Katz v. United States, 389 U.S. 347, 361 (1967) (Harlan, J., concurring) (explaining the Fourth Amendment right to be free from unreasonable intrusion from the government is a two-pronged analysis: (1) a court must determine whether a person has a subjective expectation of privacy, and, if so, (2) whether that expectation is "one that society [] recognize[s] as 'reasonable.'").

266. *King*, 569 U.S. at 449–50 (explaining that arresting officers should know about all aspects of an arrestee's criminal past, because someone detained for something small could reasonably be a person "most devious and dangerous").

fingerprinting insofar as they both attempt to accurately identify the suspect as who he purports to be.[267]

In his dissent, Justice Scalia wrote that the majority's decision was so off-base, it "taxe[d] the credulity of the credulous."[268] Until *King*, whenever the Supreme Court had previously allowed a suspicionless search, it insisted on having an additional "justifying motive apart from the investigation of [the] crime" to avoid violating the Fourth Amendment.[269] The Fourth Amendment is supposed to make certain one is "secured in their *persons* . . . against unreasonable searches and seizures."[270]

The Supreme Court had only allowed "suspicionless" searches when they did not replace ordinary crime detection.[271] Justice Scalia pointed out that the statute provides a valuable tool for investigating unsolved crimes—further displaying how the statute should have been rendered invalid because it allowed law enforcement to conduct a suspicionless search that replaced ordinary crime detection.[272] What makes Scalia's case against the majority even more damning is if the goal was to identify who King was, the sample would not have been checked against the "unsolved crime collection" database—such a check could not confirm the arrestee's identity![273] Testing DNA samples taken today against unknown samples collected yesterday is exactly what at least one Founding Father warned about when the Constitution was formed.[274] Arguing for more

267. *Id.* at 458.

268. *Id.* at 466 (Scalia, J., dissenting).

269. *Id.*

270. U.S. CONST. amend. IV. (emphasis added).

271. *King*, 569 U.S. 435, at 467–68 (2013) (Scalia, J., dissenting).

272. *Id.* at 473 (Scalia, J., dissenting).

273. *Id.* at 473–76 (explaining that law enforcement's goal was *not* identification, because even after the state statute mandated waiting until arraignment for the DNA sample to be tested, which could take months, the sample was (1) not checked against the database that could actually identify a person ("known convicts and arrestees" database versus the "unresolved crimes" database); (2) the statute itself "forbids the Court's purpose (identification)"; and yet (3) the Court "prescribe[d] as its purpose what our suspicionless-search cases forb[a]d" ('official investigation into a crime')").

274. *Id.* at 467.

citizen protection, Patrick Henry explained that the Constitution proposed before the Fourth Amendment was drafted by James Madison would "expose the citizenry to searches and seizures 'in the most arbitrary manner, without any evidence or reason."[275] The response to this charge by Henry was Madison drafting the Fourth Amendment with the Warrant's Clause for added individual protection.[276]

A primary reason for the Fourth Amendment was, therefore, to prevent general warrants, or the ability for law enforcement to search someone without any reason provided.[277] One of the five purposes listed by the Maryland statute for collecting DNA is as part of an "official investigation into a crime" and for no other purpose "than those specified."[278] Collecting a DNA sample, under the statute, is limited to identifying "human remains" and those of "missing individuals" but not for any other purpose.[279] "Identification" does not include identifying a suspect in custody.[280] The *King* Court majority's focus on identification, and limited discussion or reasoning beyond it, caused many critics of *King* to find the decision disingenuous.[281] Further, this limited scope can lead one to believe the *King* Court favored law enforcement going "open season" on the general public,[282] thus cementing the notion that one is guilty until proven innocent.

After *King*, two cases with analogous evidentiary issues presented opportunities ripe for the Court to define legal searches, and perhaps begin to undo the damage it created with

275. *Id.*

276. *See id.*

277. *See* Barry Friedman & Orin Kerr, *The Fourth Amendment*, NAT'L CONST. CTR., https://constitutioncenter.org/interactive-constitution/interpretation/amendment-iv/interps/121 (last visited Apr. 18, 2020).

278. MD. CODE ANN., PUB. SAFETY, § 2-505(a)(2) (LexisNexis 2009).

279. §§ 2-505(a)(3)–(4).

280. *King*, 569 U.S. at 449–50, 476.

281. *See* Steven P. Grossman, *Using the DNA Testing of Arrestees to Reevaluate Fourth Amendment Doctrine*, 49 VAL. U. L. REV. 659, 661 (2015).

282. *Id.*; *see also* Hill & Murphy, *supra* note 195.

King.[283] Although *Riley* and *Carpenter* asked the question in a cell phone-related context—whether law enforcement can take information for possible future evidentiary use—such cellular data should be considered akin to data "stored" on a person's saliva.[284] By not extending their holdings to *King*, the *Riley* and *Carpenter* Courts both seem to have ruled that information stored within an inanimate object deserves greater protection than information contained within one's body.[285]

In *Riley v. California*, the Supreme Court decided police officers could not look through an arrestee's cell phone for information without a warrant.[286] The Court reasoned the search invalid because a cell phone holds "the privacies of life."[287] Although an arrestee has a diminished expectation of privacy, "[n]ot every search 'is acceptable solely because a person is in custody" and a search will sometimes require a warrant.[288] Chief Justice John Roberts—writing for a unanimous Court—explained the data stored on a cell phone cannot itself be used as a weapon against an arresting officer or to aid in the arrestee's escape.[289] Similarly, the *Riley* Court should have begun drawing back its holding in *King* and said the data taken from the buccal swab also could not harm the arresting officer nor aid in the arrestee's escape and should therefore require a warrant before its taking. But the Court did not do this.

The *Carpenter v. United States* case arose when law enforcement requested a phone company turn over information related to a suspected bank robber's movement over a four-

283. Carpenter v. United States, 138 S. Ct. 2206, 2211 (2018); Riley v. California, 573 U.S. 373, 378 (2014).

284. *See supra* note 282 and accompanying text.

285. *Riley* and *Carpenter*—though not DNA-related cases—still align with *King* and its progeny because the Court interprets cell phone data and the information stored therein as "the privacies of life." *Riley*, 573 U.S. at 403; *accord Carpenter*, 138 S. Ct. at 2214. But both *Riley* and *Carpenter* refused to extend their holdings beyond cell phones. *Carpenter*, 138 S. Ct. at 2220; *see Riley*, 573 U.S. at 386–87.

286. *Riley*, 573 U.S. at 403.

287. *Id.*

288. *Id.* at 392 (quoting Maryland v. King, 569 U.S. 435, at 463 (2013)).

289. *See id.* at 374.

month duration.[290] Law enforcement's reasoning was to see whether it could place the suspect at the scene of the crime and possibly show that he planned the robbery well in advance of the crime.[291] The *Carpenter* Court held a person retains an expectation of privacy in his recorded movement as captured by cell site location information (CSLI).[292] Further, a person does not give up his privacy by merely contracting with a cell phone company, and law enforcement cannot get the company records to "ping" the suspect as it relates to his whereabouts at the time of the alleged crime.[293] The Court said that "[m]aping a cell phone's location over the course of 127 days provides an all-encompassing record of the holder's whereabouts."[294]

The Maryland statute at issue in *King* violates more than a person's privacy rights. The statute stands for the seizure of a person's essential makeup, with DNA providing all the secrets of a person.[295] Although we have not yet unlocked all the answers, one day that may change.[296] Currently, the DNA locators (loci) used for CODIS are the loci that do not retain information specific to the person.[297] As character traits are discovered through a mere buccal swab sent to a direct-to-consumer recreational DNA website,[298] it is only a matter of time before significant character traits and health information can also be gleaned from a buccal swab seized in a criminal matter.[299] Although only general information about the person is analyzed now, the future is uncertain. Given law

290. *See* Carpenter v. United States, 138 S. Ct. 2206, 2212–13 (2018).

291. *See id.*

292. *Id.* at 2217.

293. *Id.* (noting how the location information obtained from Carpenter's cell phone carrier "was the product of a search" by law enforcement).

294. *Id.*

295. *See* MD. CODE ANN., PUB. SAFETY, §§ 2-504, 2-505 (LexisNexis 2020).

296. When those answers are unlocked, the government should not be in possession of such information.

297. Beaugh, *supra* note 68, at 167–68; *see* Rainey, *supra* note 190.

298. *See Frequently Asked Questions*, ANCESTRY DNA, https://www.ancestry.com/dna/en/legal/us/faq (last visited Feb. 27, 2020); *Getting Started*, 23ANDME https://customercare.23andme.com/hc/en-us/categories/200196880-Getting-Started (last visited Feb. 27, 2020).

299. *See* Beaugh, *supra* note 68, at 194.

enforcement's continued reliance on forensic evidence, it is not unreasonable to imagine a time in the not-too-distant future when the government—having the samples, and in some jurisdictions keeping them indefinitely—could use the DNA already in its databank to uncover and reveal more pertinent information about a selected individual.

In at least one democratic society, DNA samples are being used to call a person's citizenship into question.[300] If that could happen in another democratic nation, who is to say something similar cannot happen here?

The *Carpenter* Court should have expanded its ruling to overturn *King*. Chief Justice Roberts should have gone the distance to compare *Carpenter* with *King* to say that just as any information taken off a cell phone during a search-incident-to-an-arrest is inadmissible because there is a high expectation of privacy in the phone's contents, a person's DNA—genetic material that contains more personal information than even a cell phone—should even more so be off-limits for law enforcement without a warrant. A DNA sample taken from an arrestee before arraignment should be invalid to use for searching CODIS against any unrelated crime without a warrant, because DNA truly holds *all* of life's secrets; known and unknown.

IV. AMENDING FEDERAL REGULATIONS AND GUIDELINES

A. *Amending Current Federal Collection and Storage Laws*

Although it will not be easy to implement, change is needed. This Note is trying to breathe life back into our laws to make them more useful. The pertinent part of the DNA Fingerprint Act[301] reads:

300. *See* Sharon, *supra* note 24.

301. The DNA Fingerprinting Act of 2005 was passed as Title X of the Violence Against Women Act Reauthorization of 2005. *See* Violence Against Women and Department of Justice Reauthorization Act of 2005, Pub. L. No. 109-162, § 1004, 119 Stat. 2960, 3085 (codified as amended at 42 U.S.C. § 14135a, transferred to 34 U.S.C. § 40702 (2017)).

> (a) Collection of DNA samples.
>
> (1)From individuals in custody.
>
> (A)The Attorney General may, as prescribed by the Attorney General in regulation, collect DNA samples from individuals who are *arrested, facing charges, or convicted* or from non-United States persons who are detained under the authority of the United States. The Attorney General may delegate this function within the Department of Justice as provided in section 510 of title 28 [United States Code] and may also authorize and direct any other agency of the United States that arrests or detains individuals or supervises individuals facing charges to carry out any function and exercise any power of the Attorney General under this section.[302]

The phrase "collect DNA samples from individuals who are arrested" is problematic because it places arrestees, those charged with a crime, and convicts all on equal footing, which is to say they have equally diminished rights.[303] But they are not on equal footing, and the language "collect DNA samples from individuals who are arrested, facing charges, or convicted" should be amended to read: "collect DNA samples from individuals who are facing charges, or convicted." The arrestee has not been formally charged with anything, the other is facing charges, and the third category of person is one who has already been convicted of a crime.[304] Consider the arrestee who has only been accused but not yet charged of a crime because the police investigation is still ongoing to determine whether there is

302. 34 U.S.C. §40702(a)(1)(A) (2018) (emphasis added).

303. *See* Beaugh, *supra* note 68, at 193.

304. *See* 34 U.S.C. § 40702(a)(1)(A).

validity to the accusation levied against the arrestee. The one charged with a crime has yet to put forward any evidence explaining his innocence or mitigating factors. And the convict has gone through the justice system and has been found guilty. These are three distinct categories and should not be lumped together and treated as co-equals.[305] Putting these three classes of people together is further proof law enforcement—here, as enabled by the federal government—views the public, generally, as guilty until proven otherwise. If we want to return to the presumption of innocence standard that ensures certain rights are retained by the accused pre-trial, the statute must be amended[306] to remove any reference to someone who is only arrested.[307] The reasoning behind this—as other scholarship has also recognized—is the government actor can get the same DNA, now available before conviction, post-conviction.[308] And then the added headache of DNA expungement for someone later found innocent is moot.

In 1994, the federal government passed legislation that authorized the FBI to begin compiling DNA samples into CODIS.[309] But, the CODIS regulation allows for DNA samples to be shared when taken from criminals and "other persons whose DNA samples are collected under applicable legal authorities."[310] This wording gives states leeway in the variance within their respective DNA sharing laws resulting in not all

305. *See, e.g.*, United States v. Kincade, 379 F.3d 813, 836 n.31 (9th Cir. 2004) (explaining the careful limitation to holding that the "DNA act implicates only the rights of convicted felons—not free persons or even mere arrestees." (internal citation omitted)).

306. If the statute is amended, it paves the path to return to *Kincade*—as the law pre-*King* provided that arrestees were not included in the category of those who maintain a lower expectation of privacy.

307. Although scholarship exists discussing what rights someone who is charged with a crime retains, it is beyond the scope of this Note.

308. *See, e.g.*, Beaugh, *supra* note 68, at 193; *see also* Baradaran, *supra* note 40, at 775 n.265 (linking the growing number of pre-trial persons held in prison to law enforcement's increasing use of swabbing arrestees for DNA as justified by *King*).

309. *See* 34 U.S.C. § 12592 (2018); *see also OIG Audit Report*, *supra* note 2.

310. 34 U.S.C. § 12592(a)(1)(C).

states having uniform DNA sharing laws on their books.[311] The wording for CODIS is too broad and all-encompassing, and must also be amended. The federal statute should not allow DNA to be taken from someone merely accused of a crime and be kept within CODIS. The statute should be changed to reflect that such information may be kept within CODIS only after the person is charged with a crime that reflects such government action. States must then comply with the new federal language for them to have access to the federal database.[312] If a state is out of compliance, it does not get access to the federal database.[313] One way to ensure the states comply with the proposed amendment to the federal law regulating CODIS—through removing arrestees from the category of persons from whom a DNA sample can be taken—is to tie CODIS access in with the Williams standard:[314] have a neutral barrier between the law enforcement agency providing the DNA sample and the lab analyzing what the agency gave them to mitigate some of the concerns raised by this Note.

The federal government can step in like it did with other genetic testing laws and pass amendments to current federal regulations for DNA testing, sample storage, and sample sharing. The federal government can insist that states comply with the amended CODIS guidelines, for example, for states to access the CODIS database.

B. *Amending Current Federal Expungement Law*

Like the "Right to be Forgotten" under the European Union's General Data Protection Regulation (GDPR), the federal

311. *Compare* HAW. REV. STAT. § 844D-91(a)–(b) (2005) *and* IDAHO CODE § 19-5515 (1997) (detailing broad guidelines for DNA data sharing) *with* GA. CODE ANN. § 35-3-163 (2019) *and* 44 PA. CONS. STAT. § 2319 (2019) (detailing narrower directions for DNA data sharing).

312. *See Frequently Asked Questions on CODIS and NDIS*, FBI, https://www.fbi.gov/services/laboratory/biometric-analysis/codis/codis-and-ndis-fact-sheet (last visited Apr. 18, 2020).

313. *Id.*

314. *See infra* IV.C. (discussing Williams v. Illinois, 567 U.S. 50, 57–58 (2012) (plurality opinion), which held a forensic expert can testify as an expert witness about a DNA sample she did not herself handle).

government in the United States can create an all-encompassing expungement statute that will delete the DNA sample—both physically and electronically—once the accused is deemed innocent.

Expungement now is by no means a cakewalk. When a charge leads to a withdrawn prosecution, judgment of acquittal, or other clearing of fault, a formerly-accused person may find it "can be expensive to get the record of their DNA expunged."[315] Uniform expungement guidelines must be carved out for how state and federal law enforcement agencies dispose of both physical DNA samples and its digital counterpart from their respective databases.[316] Sampling one's DNA should not happen on the front end, when one is merely arrested. It should only be taken once that person is convicted, or, at minimum, after arraignment. Otherwise, there is too much risk that innocent DNA will forever remain in a database and not ever be expunged.[317] In the DNA Identification Act, there is no automatic expungement process.[318] By having an expungement process that is time consuming and costs money, those merely accused of a crime will often have their DNA sample remain in the government's possession because they cannot afford the time or money it costs to have their DNA sample expunged.[319]

315. Rebecca Beitsch, *Are States that Require Felony Suspects to Provide DNA Going Too Far?*, COLUMBUS DISPATCH (Jan. 22, 2017, 12:01 AM), https://www.dispatch.com/news/20170122/are-states-that-require-felony-suspects-to-provide-dna-going-too-far; *see, e.g.*, 44 PA. CONS. STAT. § 2322 (2005) (imposing mandatory court cost for expungement).

316. *See* JULIE E. SAMUELS ET AL., URBAN INST., COLLECTING DNA AT ARREST: POLICIES, PRACTICES, AND IMPLICATIONS 104 (2013), https://www.urban.org/sites/default/files/publication/23666/412831-Collecting-DNA-at-Arrest-Policies-Practices-and-Implications.PDF.

317. *Compare* 44 PA. CONS. STAT. § 2321(a) (2005) (the innocent must request expungement), ALA. CODE § 36-18-26 (1994) (expungement does not happen automatically), *and* MD. CODE ANN., PUB. SAFETY § 2-511 (LexisNexis 2009) (no clear expungement process for volunteered DNA), *with* CONN. GEN. STAT. § 45-102l (2011) (expungement is automatically done).

318. 34 U.S.C. § 12592(d) (2017) (describing how a certified final court order must be sent to the CODIS director or the Attorney General, depending on the circumstance).

319. *See* Elizabeth Joh, *The Myth of Arrestee DNA Expungement*, 164 U. PA. L. REV. ONLINE 51, 57 (2015), https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1157&context=penn_law_review_online (displaying a graph depicting the stark differences in DNA

Automatic expungement must happen within the federal system. The federal government often sets the baseline for states to follow. It is recognized that, given society's love for forensics demonstrated by the popularity of television programs like *CSI*, it may be understandable to consider a DNA sample taken from an arrestee as a reasonable intrusion. That consideration, however, is if and only if the expungement process is automatic for an arrestee not found guilty or otherwise released from custody with no future charges pending. Additionally, proponents for taking an arrestee's DNA on the front end can reconcile their position because the person could otherwise continue terrorizing the public without fear of law enforcement.[320] This argument holds water, however, only where there is an automatic expungement-for-all provision written into the statute. Without such a provision, a DNA sample should be taken only after, at minimum, one is indicted.[321]

Lastly, the automatic expungement statute amendment should also include volunteered DNA samples. Currently, not all states have a clear expungement process for DNA samples that were voluntarily turned over to law enforcement for exclusion purposes.[322] Compliance with the proposed amendment to the law governing CODIS should provide another measure of protection for volunteered DNA samples. That is, any state that wants access to the federal CODIS must ensure its state DNA expungement provisions for local databases include a provision for volunteered DNA samples to

expungements in states with an automatic process compared to states where the individual must initiate the process).

320. *See, e.g.*, *Maryland v. King*, 569 U.S. 435, 450 (2013) (discussing how Timothy McVeigh was stopped on the road shortly after the Oklahoma City bombing for driving without a license plate and was released).

321. *See generally* Sernoffsky, *supra* note 245 (explaining that with no automatic expungement, a DNA sample can remain on the California state database even though the person was never convicted of a felony).

322. *See, e.g.*, MD. CODE ANN., PUB. SAFETY § 2-511 (LexisNexis 2009 (offering no clear expungement process for volunteered DNA).

be automatically expunged after being excluded from their associated case.

Although the process of DNA testing is now changing with the Rapid DNA Act, few law enforcement agencies across the U.S. currently have Rapid DNA processing machines in their police stations.[323] Many states still rely on traditional DNA testing methods that can sometimes take more than two months to return a result.[324] A DNA sample, therefore, should only be taken upon arraignment for a charge or multiple charges, not upon arrest when the arrestee may eventually have the charge reduced or dropped completely.[325] Traditional DNA testing should not be performed by prosecution-friendly persons,[326] and even more importantly, Rapid DNA testing should only be conducted (1) by an independent, third-party lab,[327] and (2) upon arraignment or conviction because of the "red flags" posed by the technology.[328]

C. *Judicial Responsibilities*

The courts serve as "gatekeepers" for expert witnesses and evidence.[329] Often, a case will hinge on a single expert opinion or piece of evidence. It is of utmost importance for any court to

323. *See* Maura Dolan, *'Rapid DNA' Promises Breakthroughs in Solving Crimes. So Why Does It Face a Backlash?*, L.A. TIMES (Sept. 25, 2019, 5:00 AM), https://www.latimes.com /california/story/2019-09-24/rapid-dna-forensics-crime-police (explaining how only five states were using Rapid DNA in 2019); *see also* Tom Jackman, *FBI Plans 'Rapid DNA' Network for Quick Database Checks on Arrestees*, WASH. POST (Dec. 13, 2018, 6:00 AM), https://www .washingtonpost.com/crime-law/2018/12/13/fbi-plans-rapid-dna-network-quick-database-checks-arrestees/ (explaining that only six states were using Rapid DNA in 2018).

324. *See* MD. CODE ANN, PUB. SAFETY § 2-504(d)(1) (LexisNexis 2009).

325. *See* Samuels et al., *supra* note 316.

326. *See* Rogers, *supra* note 210.

327. *See Rapid DNA*, *supra* note 162 (stating one of the two acceptable testing sites is a third-party lab).

328. *See* Fonneløp et al., *supra* note 150 (finding DNA evidence at police stations contaminated by officers not even involved in the specific case).

329. *See* FED. R. EVID. 702 (amended in 2000 to better convey the court's role as gatekeeper in assessing whether expert testimony and evidence should be admitted).

remind itself of its function during a *Frye*[330] or *Daubert*[331] expert witness proceeding. If the judge finds the purported "expert" to not be an expert, the judge can toss the expert out of the case and the jury is none the wiser.[332] Admittedly, it is inevitable that law enforcement may be overzealous in its methodology and its prosecutorial bias in a given case will reveal itself. The courts should, nevertheless, recognize this and not dismiss what it may view as "discretionary" or another loophole to allow questionable evidence into court.

In the chain of DNA sample collecting-analyzing-testifying, the people who often are asked to testify as a forensic expert on the validity of a DNA sample often are not the appropriate persons for that job.[333] Properly trained forensic analysts-as-experts are in the best position to provide opinion and guidance on interpreting profiles at the "activity" level.[334] One scientific study proposes that expert testimony should be by those who have "dedicated training and competency testing toward authorisation (sic)."[335]

Further, during a *Frye* or *Daubert* hearing, the courts should consider *Williams* and what the prosecution needs to prove to get around certifying a forensic expert who did not actually handle the DNA sample.[336] The courts should encourage a neutral forensic expert to testify as an expert in the field. The

330. Frye v. United States, 293 F. 1013, 1014 (D.C. Cir. 1923) (explaining a scientific principle as valid when it has been generally accepted in the relevant scientific community).

331. Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 593–94 (1993) (defining the expert witness test as having five factors: (1) whether the theory or technique in question can be and has been tested; (2) whether it has been subjected to peer review and publication; (3) its known or potential error rate; (4) the existence and maintenance of standards controlling its operation; and (5) whether it has attracted widespread acceptance within a relevant scientific community).

332. *See id.* at 595, 597.

333. Roland A.H. van Oorschot et al., *DNA Transfer in Forensic Science: A Review*, 38 FORENSIC SCI. INT'L: GENETICS 140, 140–41, 161 (2019) (finding those requested to provide expert opinion on DNA-related activities "are often insufficiently trained to do so").

334. *Id.* at 161 (advocating for the recognition of DNA activity expertise to be distinct from identification mastery of individuals).

335. *Id.* ("The possibilities for experts to report on activity-related issues will increase as our knowledge increases through further research . . . .").

336. *See* Williams v. Illinois, 567 U.S. 50, 56–58 (2012) (holding that a forensic expert can be certified to testify as an expert witness about a DNA sample that she did not herself handle).

Williams standard encourages the laboratory to send an analyst who is not tainted by conformational or prosecutorial bias.[337]

The Court in *Williams v. Illinois*, explained that an expert forensic witness could testify about a particular DNA test even though she did not perform the test.[338] Scholarship believes one reason behind this conclusion by Justice Alito—writing for the plurality—is because conformational or prosecutorial bias is subconsciously done.[339] Therefore, even when cornered on the witness stand during a cross-examination and asked whether she "*knowingly* committed particular errors or deviated from standard procedures," her answer will always be in the negative.[340]

Justice Alito presented two rationales for allowing such expert testimony.[341] The first plays no role here.[342] The second rationale is that the evidence does not fall within guidelines of the Confrontation Clause because the analyst produced the incriminating report "before any suspect was identified."[343] The only way this rationale can work is if part of the proposed amendment to the CODIS regulation states that all labs processing DNA samples for evidence must maintain a barrier between law enforcement and the forensic analysts who will work on the sample. If this happens, many of the Rapid DNA concerns will also fall by the wayside.[344] Should this barrier not take shape, then all DNA evidence must be treated by courts with suspicion.

337. *See* Perez, *supra* note 146, at 459, 466 (explaining how police departments send cover letters to laboratories together with a DNA sample adding non-DNA related material suggesting a suspect's guilt). The practice establishes subjective conditions for the forensic analyst when reviewing and analyzing the sample. *Id.* at 459.

338. *Williams*, 567 U.S. at 57–58.

339. *See* Perez, *supra* note 146, at 464–65.

340. *Id.* at 464.

341. *Williams*, 567 U.S. at 57–58; Perez, *supra* note 146, at 464.

342. *Williams*, 567 U.S. at 57–58 (explaining that the evidence was not introduced for the truth of the matter asserted and therefore falls outside the Confrontation Clause's purview).

343. *Id.* at 58; *see* Perez, *supra* note 146, at 465.

344. Because it will eliminate prosecutorial bias, or—if it is impossible to eliminate prosecutorial bias because the Rapid DNA machines can only be stored within the law enforcement environment—then it will render void Rapid DNA. *See* Sciacca, *supra* note 162.

Laboratories are incentivized to comply with such a barrier because it will trigger *Williams*, meaning only one analyst will have to travel to testify as an expert. It follows that by only having one analyst going to court, the other analysts will be at the lab testing sample evidence that comes in. Otherwise, if multiple analysts had to go to court simultaneously to testify about the specific samples each one handled, the burden placed on labs and their analysts will remain onerous.[345] In a span of just a few months, labs in Virginia responded to more than 900 subpoena requests by spending more than 360 hours traveling to and testifying in courtrooms across the commonwealth.[346] The incentive to make better use of a laboratory resources will enable labs to relieve a significant burden on staff and the evidence-testing backlog. But, the *Williams* exception—allowing an expert forensic witness to testify about a particular DNA test even though she did not perform the test herself—only kicks in as an incentive if the lab conducts a forensic examination of DNA evidence that is completely independent and free from all prior knowledge about the suspect.[347]

Finally, the fundamental assumptions within the forensic sciences must have support research so the juries can weigh the trustworthiness of the evidence.[348] Such supporting evidence should not wait until after a trial concludes. Laboratories should welcome an "examination of their methods and conclusions" in a courtroom.[349] The courts must encourage openness and thoroughness. A victim also deserves closure, and can only have it "when the verdict [is] accurate."[350]

345. *See* Perez, *supra* note 146, at 466.

346. *See id.*

347. *Id.*

348. *See* Ungvarsky, *supra* note 87, at 621–22.

349. *Id.*

350. *Id.*

CONCLUSION

Leaving in place the current state and federal laws on DNA expungement further erodes our basic understanding of a person being "innocent until proven guilty." The statutes imprison an innocent person's DNA with the government for analysis *ad infinitum* because there is no mechanism for everyone in every jurisdiction who submits to a DNA test—whether voluntarily or otherwise—to have his or her DNA samples expunged from any and all DNA databases.[351] The Maryland statute, for example, only covers people from whom a sample is taken under a cloud of suspicion, even if they are later released.[352] For someone who voluntarily provided a DNA sample, that sample may fall outside the statute's purview and create a situation where state law enforcement will forever have access to it. This, in turn, will cause law enforcement to forever view that person as guilty unless proven otherwise.[353]

We are entitled to confidence in our criminal justice system; that the system will get it right. But our confidence wanes with every laboratory error, failure, and scandal. Flaws in crime labs span the country, and both state and federal governments are not immune to error-laden forensic evidence. Whether it is law enforcement considering everyone a suspect or a crime lab's analyst with confirmation bias, there are ways to clean this mess up. After being on the wrong side of forensic science for far too long, there is a way to breathe life back into DNA evidence. We must do so before DNA evidence, too, is seen through the rear-view mirror of useful courtroom evidence. Our desire to restore the presumption of innocence and to prevent bad outcomes from wrongful arrests depend on it.

351. *See* Beitsch, *supra* note 315; Samuels et al., *supra* note 316, at 104–06; *see also supra* note 319 and accompanying text.

352. *See* MD. CODE ANN., PUB. SAFETY § 2-511.

353. A person's "essence" can be discovered in his or her DNA, and having a person's DNA on file is akin to having the DNA provider on file. *See* Joh, *supra* note 67, at 57.