

NATURALLY SHED DNA: THE FOURTH AMENDMENT
IMPLICATIONS IN THE TRAIL OF INTIMATE INFORMATION
WE ALL CANNOT HELP BUT LEAVE BEHIND

I. INTRODUCTION

What if you were a suspect in a criminal investigation? An alleged rape has confounded the state police for years, and after looking into dozens of leads and suspects, troopers have exhausted their options, hitting a dead end at every turn. Suddenly, they have a new suspect: you. You agree to come in for questioning but refuse to provide a DNA sample without a court-issued warrant. But the moment you sit in that chair, police have all the DNA they need. Left behind are millions of microscopic cells we all cannot help but constantly shed. Police take swabs of those cells and analyze the DNA.

A few years ago, the government could not carry out such a strategy; the technology was not advanced enough.¹ Today, they can and they do. They did it to Glenn Joseph Raynor, a forty-year-old man from Forest Hill,² a rural hamlet in northern Maryland.³ A jury convicted Raynor of first-degree rape, second-degree rape, first- and second-degree sex offenses, and burglary, among other charges, and a judge sentenced Raynor to 100 years in prison.⁴ Without the DNA evidence, the State had no case.⁵

The DNA evidence should have been suppressed because it violated the Fourth Amendment's protection against unreasonable searches and seizures.⁶ Courts have consistently decided that when a person leaves DNA on an object and then discards that object, the person abandons not only the object but also his DNA, and police are

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1. See Erika Butler, *Man Facing Life for Rape Conviction*, THE AEGIS, June 17, 2009, at A1.
 2. See *id.*
 3. 21050 Zip Code Profile, NEIGHBORHOOD LINK, <http://neighborhoodlink.com/zip/21050> (last visited Dec. 1, 2011).
 4. Maryland Sentencing Guidelines Worksheet, *Maryland v. Raynor*, No. 12K081527 (Har. Cir. Ct. Sept. 1, 2009).
 5. See Butler, *supra* note 1.
 6. *United States v. Calandra*, 414 U.S. 338, 347 (1974) (noting the judicial adoption of the exclusionary rule to preserve Fourth Amendment rights).

free to take and analyze that DNA without a warrant.⁷ But courts have never faced the question of whether a person abandons DNA by shedding it with little or no action or intention.⁸ Collection and analysis of such “naturally shed DNA”⁹ implicates the Fourth Amendment and demands a per se reasonable expectation of privacy.

Raynor’s case was one of first impression in Maryland and the rest of the country.¹⁰ With cases like Raynor’s, courts will finally be forced to confront the issue of how recent technological improvements in DNA analysis implicate the Fourth Amendment.

This comment aims to present and analyze the Fourth Amendment issues involved when the government seizes and analyzes naturally shed DNA, and in particular, whether advancements in technology call for a new approach to the abandonment doctrine.¹¹ Part II explains the evolution of Fourth Amendment jurisprudence and how courts thus far have approached DNA analysis in the Fourth Amendment context.¹² Part III explains why naturally shed DNA represents a unique challenge for courts and is different from fingerprints and the DNA evidence considered in past cases.¹³ Part IV proposes a solution—a statute declaring a per se reasonable expectation of privacy in naturally shed DNA.¹⁴

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7. See, e.g., *Williamson v. State*, 413 Md. 521, 535–37, 993 A.2d 626, 634–35 (2010) (obtaining DNA from a cup from which the suspect drank during questioning and subsequently left behind); *Commonwealth v. Bly*, 862 N.E.2d 341, 356–57 (Mass. 2007) (obtaining DNA from cigarette butts and a water bottle left after an interview with police); *State v. Athan*, 158 P.3d 27, 37 (Wash. 2007) (setting up a ruse to obtain DNA from an envelope the suspect licked).
 8. Brief of Appellant at 2–3, *Raynor v. State*, No. 01629 (Md. Ct. Spec. App. July 16, 2010).
 9. “Naturally shed DNA” refers to genetic material that all people naturally slough off, even without any movement. It also includes, for instance, DNA shed when a person’s skin rubs against another’s clothing or skin. See discussion *infra* Part III.
 10. See Brief of Appellant, *supra* note 8, at 2–3.
 11. See discussion *infra* Parts III and IV.
 12. See discussion *infra* Part II.
 13. See discussion *infra* Part III.
 14. See discussion *infra* Part IV.

II. DNA ANALYSIS AND THE FOURTH AMENDMENT: THE CURRENT APPROACH

A. *DNA Analysis: A Quickly Advancing Crime-Fighting Technique*

With recent advances in technology, DNA analysis has grown extraordinarily prevalent as a crime-fighting tool.¹⁵ Police have huge incentives to use DNA evidence because the analysis is nearly conclusive and the DNA is easily obtainable.¹⁶

In 1985, an English researcher first discovered that DNA could be used to fight crime.¹⁷ A year later, DNA analysis was introduced in the United States.¹⁸ At the time, the technique met stiff criticism from the media, legal experts, and the scientific community,¹⁹ but it quickly overcame this skepticism and went on to revolutionize forensic science.²⁰ There are four methods of analyzing DNA, each extremely complex and with its own advantages and disadvantages for different types of cases.²¹ Today, more than 150 public forensic

15. Donald E. Shelton, *Twenty-First Century Forensic Science Challenges for Trial Judges in Criminal Cases: Where the "Polybutadiene" Meets the "Bitumen"*, 18 WIDENER L. SYMP. J. 309, 310 (2009).

16. *Id.* at 320.

17. Alec J. Jeffreys, John F.Y. Brookfield & Robert Semeonoff, *Positive Identification of an Immigration Test-Case Using Human DNA Fingerprints*, NATURE, Oct. 31, 1985, at 818.

18. NORAH RUDIN & KEITH INMAN, AN INTRODUCTION TO FORENSIC DNA ANALYSIS 25 (2d ed. 2002).

19. See, e.g., Marjorie Maguire Shultz, *Reasons for Doubt: Legal Issues in the Use of DNA Identification Techniques*, in DNA ON TRIAL: GENETIC IDENTIFICATION AND CRIMINAL JUSTICE 19, 19–21 (Paul R. Billings ed., 1992); Janet C. Hoeffel, Note, *The Dark Side of DNA Profiling: Unreliable Scientific Evidence Meets the Criminal Defendant*, 42 STAN. L. REV. 465, 465–66 (1990); Gina Kolata, *Some Scientists Doubt the Value of 'Genetic Fingerprint' Evidence*, N.Y. TIMES, Jan. 29, 1990, at A1.

20. See JOHN M. BUTLER, FORENSIC DNA TYPING: BIOLOGY, TECHNOLOGY AND GENETICS OF STR MARKERS 2–3 (2d ed. 2005).

21. NAT'L INST. OF JUSTICE, U.S. DEP'T OF JUSTICE, SPECIAL REPORT NO. 194197, USING DNA TO SOLVE COLD CASES 6–7 (2002). Polymerase Chain Reaction analysis replicates copies of an extremely small sample of DNA without affecting the original, allowing scientists to analyze DNA from degraded evidence as long as the DNA itself is not contaminated. *Id.* Short Tandem Repeat analysis examines thirteen specific regions, or loci, on DNA to identify an individual, providing a core set of loci for government databases to use to compare and match people's DNA. *Id.* Mitochondrial analysis is useful in cold cases because it analyzes DNA from a different part of the cell than what the other analyses use, so when blood or semen is too degraded to analyze, mitochondrial analysis can analyze DNA from bone or a hair shaft. *Id.* Y-chromosome analysis targets genetic markers on only the male portion of

laboratories and several dozen private paternity-testing laboratories in the United States conduct hundreds of thousands of DNA tests every year.²²

Scientists are constantly making new strides in DNA research. In 2003, they completed mapping the entire human genome.²³ With continued research, scientists will soon be able to use DNA to unlock information about a person's heredity, health, propensity for diseases, and perhaps even tendencies to act in certain ways.²⁴ DNA can already be used to trace a person's family history,²⁵ and an identical twin can be identified using the other twin's DNA.²⁶

In addition, scientists in recent years have been able to analyze DNA using fewer cells than ever before.²⁷ When a suspect handles a gun in a shooting or touches the steering wheel of a stolen car, for instance, police can collect the microscopic cells left behind to analyze the DNA.²⁸ Experts have coined such DNA samples "touch DNA."²⁹

DNA analysis is extremely complex.³⁰ Short tandem repeat analysis, the most common method of DNA analysis in criminal investigations, examines thirteen specific regions—so-called "junk DNA"—that solely identify a person.³¹ When scientists conduct the analysis, they first run a test to identify a DNA sequence and make

a biological sample and is helpful in differentiating between multiple male contributors to the same DNA sample. *Id.*

22. BUTLER, *supra* note 20, at 3.

23. 2003: *Human Genome Project Completed*, NAT'L HUMAN GENOME RES. INST., <http://www.genome.gov/25520492> (last updated Oct. 4, 2010).

24. *United States v. Kincade*, 379 F.3d 813, 842 n.3 (9th Cir. 2004).

25. Mitochondrial analysis can uncover a person's maternal family history, and Y-chromosome analysis can trace family history among males. *See* NAT'L INST. OF JUSTICE, *supra* note 21, at 7.

26. Elizabeth E. Joh, *Reclaiming "Abandoned" DNA: The Fourth Amendment and Genetic Privacy*, 100 NW. U. L. REV. 857, 858 n.5 (2006).

27. Mark Nelson, *Making Sense of DNA Backlogs – Myths vs. Reality*, 266 NIJ J. 20, 21 (2010), available at <https://www.ncjrs.gov/pdffiles1/nij/230409.pdf>.

28. *Id.* at 22.

29. *See id.* Touch DNA gained prominence when it was used in the case of JonBenet Ramsey, the child beauty queen whose 1996 murder captivated the country. Kirk Johnson, *New DNA Technology Clears the Family of JonBenet Ramsey*, N.Y. TIMES, July 10, 2008, at A19. Investigators analyzed DNA scraped from the waistband of the long johns Ramsey wore the night she was killed. *Id.* The discovery exonerated Ramsey's family members, who had been living amid suspicions that they killed the girl. *Id.*

30. *Williamson v. State*, 413 Md. 521, 551 n.3, 993 A.2d 626, 644 n.3 (2010) (Bell, C.J., dissenting).

31. *United States v. Kincade*, 379 F.3d 813, 818 (9th Cir. 2004).

sure the DNA is human.³² The DNA is then run through a machine called a thermocycler, which spends two and a half hours creating millions of copies of the DNA.³³ Tubes of the DNA are then placed in a genetic analyzer, and the number of repeated patterns on the thirteen sites is measured.³⁴ The results are put into a computer to produce an image of colored wave bands showing the repeated patterns.³⁵

Police have significant motives to obtain and analyze DNA. The technique's results are nearly indisputable, ensuring that guilty parties are found guilty and innocent ones go free.³⁶ The chances that short tandem repeat analysis, for example, will identify the wrong person can be as minute as one in one billion.³⁷

B. *Katz and the Changing Contours of the Fourth Amendment*

The Fourth Amendment protects people from unreasonable searches and seizures,³⁸ and warrantless searches or seizures are per se unreasonable.³⁹ A warrant is required so police officers, who may be acting in good faith but are embroiled in an investigation, do not make decisions about whether there is probable cause to invade someone's reasonable privacy expectations.⁴⁰ A neutral and detached judicial officer must make that determination.⁴¹

32. *Williamson*, 413 Md. at 551 n.3, 993 A.2d at 644 n.3 (Bell, C.J., dissenting).

33. *Id.*

34. *Id.*

35. *Id.*

36. *See* NAT'L INST. OF JUSTICE, *supra* note 21, at 6.

37. *Id.*

38. "The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized." U.S. CONST. amend. IV.

39. *United States v. Katz*, 389 U.S. 347, 357 (1967). The Fourth Amendment is composed of two clauses, the warrant clause and the reasonableness clause. U.S. CONST. amend. IV. The warrant requirement has exceptions, but the reasonableness clause always applies. *Katz*, 389 U.S. at 356–57.

40. *Johnson v. United States*, 333 U.S. 10, 13–14 (1948) ("The point of the Fourth Amendment, which often is not grasped by zealous officers, is not that it denies law enforcement the support of the usual inferences which reasonable men draw from evidence. Its protection consists in requiring that those inferences be drawn by a neutral and detached magistrate instead of being judged by the officer engaged in the often competitive enterprise of ferreting out crime.").

41. *Id.*

To implicate the Fourth Amendment, in general, the government must conduct a search or seizure of something in which a person maintains a reasonable expectation of privacy.⁴² That basic framework has remained unchanged, but advancing technology over the past couple decades has forced courts to face more complex questions about the Amendment's applicability.⁴³ The Founders relied on the maxim that a man's home is his castle, and courts have traditionally analyzed Fourth Amendment issues by considering whether government agents physically intruded into an area in which a person maintained a reasonable expectation of privacy.⁴⁴

In *United States v. Katz*,⁴⁵ the Supreme Court departed from its traditional analysis. The case, decided in 1967, involved the government's electronic surveillance of a suspect who was illegally transmitting wagering information from a public phone booth.⁴⁶ The FBI placed an electronic listening and recording device on the outside of the booth and argued that because it was public and open to the public's view, the suspect did not have a reasonable expectation of privacy over his communications.⁴⁷ Faced with the new technology, the Court rejected the idea of constitutionally protected areas.⁴⁸ The Court held that the government violated the Fourth Amendment because the Amendment does not protect places, it protects people and their expectations of privacy.⁴⁹

To maintain Fourth Amendment protection, a person must not only have a privacy expectation, that expectation must be reasonable.⁵⁰ To determine the reasonableness of a person's privacy expectations, *Katz* established a two-prong test: a person must exhibit a subjective expectation of privacy, and that expectation must be one

42. *Katz*, 389 U.S. at 361 (Harlan, J., concurring).

43. *See, e.g.*, *United States v. Maynard*, 615 F.3d 544 (D.C. Cir. 2011) (holding that the warrantless use of a GPS device to track defendant's movements twenty-four hours a day over a period of twenty-eight days constituted a search under the Fourth Amendment), *cert. granted sub nom.* *United States v. Jones*, 131 S. Ct. 3064.

44. *See Weeks v. United States*, 232 U.S. 383, 390 (1914); *Kyllo v. United States*, 533 U.S. 27, 31 (2001) ("[W]ell into the 20th century, our Fourth Amendment jurisprudence was tied to common-law trespass.").

45. *Katz*, 389 U.S. at 353.

46. *Id.* at 348–49.

47. *Id.* at 352.

48. *Id.* at 351–52.

49. *Id.*; *see also United States v. Sparks*, 750 F. Supp. 2d 384, 389 (D. Mass. 2010) ("Because the Fourth Amendment 'protects people, not places,' the courts have tended to de-emphasize physical boundaries and have focused instead on whether the area intruded upon provided any privacy associated with the home." (quoting *Katz*, 389 U.S. at 351)).

50. *Katz*, 389 U.S. at 361 (Harlan, J., concurring).

that society is prepared to recognize as reasonable.⁵¹ What a person knowingly exposes to the public does not warrant the protections of the Fourth Amendment, but what a person seeks to keep private, even in a public area, can be constitutionally protected.⁵²

Since *Katz*, the Court has dealt with advancing technology by consistently reinforcing its shift away from a place-focused analysis. In *Kyllo v. United States*,⁵³ police used thermal imaging to measure the heat emanating from a house and determine if the residents were cultivating marijuana with the help of high-intensity lamps.⁵⁴ The Court held that the police violated the Fourth Amendment.⁵⁵ When the government conducts a search by using specialized technology to perceive what it otherwise could not, and when that search invades a person's home, it is unreasonable and in violation of the Fourth Amendment.⁵⁶ The Court held that people always have a reasonable expectation of privacy in their homes by applying *Katz*'s two-prong test.⁵⁷ In the home, "there is a ready criterion, with roots deep in the common law, of the minimal expectation of privacy that *exists*, and that is acknowledged to be *reasonable*."⁵⁸

C. *Exceptions to the Warrant Requirement*

When a person maintains a reasonable expectation of privacy over something, the warrant requirement mandates that the government obtain a warrant before invading that privacy.⁵⁹ But the warrant requirement has several well-delineated exceptions, such as the

51. *Id.*

52. *Id.* at 351 (majority opinion).

53. 533 U.S. 27 (2001).

54. *Id.* at 29.

55. *Id.* at 40.

56. *Id.*

57. *Id.* at 34–39.

58. *Id.* at 34. Certain details in a home are more intimate than others, and residents surely would not mind the government's knowing some less private details, but the Court determined that limiting its holding to only truly intimate details would be impractical. *Id.* at 38–39. Only after a search has been conducted can police know the type of information uncovered by the search. *Id.*

59. *Katz v. United States*, 389 U.S. 347, 357 (1967).

automobile exception and the inventory search.⁶⁰ Similarly, searches of abandoned objects do not implicate the Fourth Amendment.⁶¹

When people abandon an item, they relinquish any privacy expectation they may have had in that item.⁶² The government can then search or seize the abandoned item without a warrant, while complying with the Constitution.⁶³ In the Fourth Amendment context, abandonment is determined by an objective analysis of act and intent.⁶⁴ This includes a consideration of the person's actions, words, and all other relevant circumstances at the time of the alleged abandonment.⁶⁵

The abandonment exception illustrates the evolution of Fourth Amendment analysis.⁶⁶ In the past, property law had a place in Fourth Amendment analysis.⁶⁷ Courts determined that a search required a physical trespass.⁶⁸ Today, that analysis is different, and the Amendment's applicability turns on whether a person has a reasonable expectation of privacy over the item or place searched.⁶⁹ Similarly, abandonment in the Fourth Amendment context is distinct from abandonment in the property law sense. Property law abandonment focuses on whether a person has given up formal property rights, such as title or possession.⁷⁰ Fourth Amendment abandonment, on the other hand, questions whether a person has maintained a reasonable privacy expectation over the item at issue.⁷¹

60. *See, e.g.*, *Arizona v. Gant*, 129 S. Ct. 1710, 1717 (2009) (explaining search incident to a lawful arrest); *Cooper v. California*, 386 U.S. 58, 61–62 (1967) (explaining the inventory search); *Carroll v. United States*, 267 U.S. 132, 153 (1925) (explaining the automobile exception).

61. *Abel v. United States*, 362 U.S. 217, 241 (1960).

62. *Id.*

63. *Id.*

64. *United States v. Davis*, 657 F. Supp. 2d 630, 648 (D. Md. 2009).

65. *Id.*

66. *Compare* *Kyllo v. United States*, 533 U.S. 27, 31 (2001) (explaining that property law was tied to Fourth Amendment analysis well into the twentieth century), *with* *Williamson v. State*, 413 Md. 521, 535, 993 A.2d 626, 635 (2010) (“The test for determining whether property is abandoned for purposes of the Fourth Amendment differs from the property law concept of abandonment and instead, focuses on whether the owner of the property retained a reasonable expectation of privacy in the property . . .”).

67. *Kyllo*, 533 U.S. at 31.

68. *Id.*

69. *Id.*

70. *Williamson*, 413 Md. at 535, 993 A.2d at 635.

71. *Id.*

The seminal case on abandonment is *California v. Greenwood*.⁷² In that case, the Court held that the defendants abandoned their garbage when they placed it in opaque bags for collection by the trash collector.⁷³ The Court accepted that the defendants had a subjective privacy expectation but refused to recognize that expectation as reasonable.⁷⁴ By placing the garbage in public where any person or animal could easily gain access to it, the defendants sufficiently exposed the trash to the public and relinquished any reasonable privacy expectation.⁷⁵

A number of courts have considered the abandonment of DNA. Despite the intimate information contained in DNA, courts have held that people can abandon their genetic material in a Fourth Amendment context.⁷⁶ Courts have upheld “covert DNA sampling,” a technique often used by police to obtain a suspect’s DNA without a warrant. The government waits for a person to discard genetic material before gathering the evidence without the person’s knowledge.⁷⁷ In *Commonwealth v. Cabral*, for instance, the Massachusetts Appeals Court held that police legally obtained a defendant’s DNA because the defendant abandoned the genetic material when he spit onto a public sidewalk.⁷⁸

Of these abandonment cases, many involve a suspect leaving DNA on an object before abandoning that object. Courts have held that by abandoning the objects, the suspects also abandoned their DNA.⁷⁹ In *Williamson v. State*, the Court of Appeals of Maryland held that a rape suspect abandoned his DNA when he drank from a cup and left the cup in the police interrogation room.⁸⁰ In *State v. Athan*, the Supreme Court of Washington went so far as to condone a ruse orchestrated by police to obtain DNA left on an object. Police sent the defendant a letter inviting him to join a class-action lawsuit and obtained the defendant’s DNA from saliva left on the envelope

72. 486 U.S. 35, 39–40 (1988).

73. *Id.*

74. *Id.*

75. *Id.* at 40.

76. *See Williamson*, 413 Md. at 546–47, 993 A.2d at 641 (2010); *Commonwealth v. Cabral*, 866 N.E.2d 429 (Mass. App. Ct. 2007); *State v. Athan*, 158 P.3d 27, 33–34 (Wash. 2007).

77. *See Williamson*, 413 Md. at 546–47, 993 A.2d at 641.

78. *Cabral*, 866 N.E.2d at 430–31.

79. *See, e.g., Williamson*, 413 Md. at 546, 993 A.2d at 641.

80. *Id.* at 528, 993 A.2d at 630.

after the defendant mailed back the paperwork.⁸¹ The court held that the defendant abandoned his DNA along with the envelope.⁸²

III. NATURALLY SHED DNA IS DIFFERENT

Courts have made clear that people can abandon their DNA.⁸³ None of the above cases, however, dealt with naturally shed DNA. In fact, no court has decided whether the Fourth Amendment applies to DNA a person cannot help but shed.⁸⁴ In exploring that question, the analysis turns to whether naturally shed DNA can be considered sufficiently similar to the DNA and other items found to have been abandoned in past cases.

A. *Naturally Shed DNA Implicates the Fourth Amendment*

1. People Maintain a Reasonable Expectation of Privacy in Naturally Shed DNA

The first step in that analysis is to determine if people maintain a reasonable expectation of privacy in naturally shed DNA.⁸⁵ Under *Katz*, if a person has a subjective privacy expectation that society is prepared to recognize as reasonable, the government must have a warrant to conduct a search or seizure.⁸⁶

The first prong of the test, whether a person exhibited a subjective privacy expectation, turns on the specific facts of each instance and is difficult to determine in a general manner.⁸⁷ Since the test's conception, courts and commentators have criticized the test as circular and counseled against placing too much emphasis on this prong.⁸⁸ About a decade after *Katz*, the Court stated that a subjective exhibition of privacy, at least in some situations, would provide an "inadequate index of Fourth Amendment protection."⁸⁹ Even Justice

81. *Athan*, 158 P.3d at 31.

82. *Id.* at 33–34.

83. *See supra* notes 76–82 and accompanying text.

84. *See* Brief of Appellant, *supra* note 8, at 2. In September 2011, the Court of Special Appeals of Maryland issued an opinion in Raynor's case. *Raynor v. State*, No. 1629, 2011 WL 4495663 (Md. Ct. Spec. App. Sept. 29, 2011). The court in *Raynor* determined that it was bound by the case of *Williamson v. State*, 413 Md. 521, 993 A.2d 626 (2010), in which the Court of Appeals held that a suspect abandoned his DNA by abandoning a cup from which he drank. *Raynor*, 2011 WL 4495663, at *7.

85. *See supra* note 69 and accompanying text.

86. *Katz v. United States*, 389 U.S. 347, 361 (1967) (Harlan, J., concurring).

87. *See Smith v. Maryland*, 442 U.S. 735, 743 (1979).

88. *Id.* at 741 n.5; 1 WAYNE LAFAVE, SEARCH AND SEIZURE § 2.1(d), at 394 (3d ed. 1996).

89. *Smith*, 442 U.S. at 741 n.5.

Harlan, who first described the test,⁹⁰ stated that Fourth Amendment analysis “must . . . transcend the search for subjective expectations”⁹¹ Still, the Court has never explicitly removed the prong.

The subjective-privacy-expectation requirement and naturally shed DNA make an inherently awkward fit. People are hardly aware that they are constantly shedding microscopic cells containing DNA, and they do not go around thinking about the trail of DNA left behind.⁹² No one can exhibit a privacy expectation in something they do not even know they are at risk of abandoning, yet that is exactly what this prong requires.⁹³ Even if people are aware of their naturally shed skin cells, they would have to take fanatical measures to demonstrate a subjective privacy expectation in those cells.⁹⁴ They would have to wear a body suit at all times to keep from leaving cells everywhere, or they would have to carry around cleaning materials to wipe down every place they go.⁹⁵ Because naturally shed DNA cannot cleanly fit the first prong of the *Katz* test, the prong provides an inadequate index and courts should always consider that the prong has been met.⁹⁶ Indeed, “[c]ourts addressing whether DNA analysis comports with the Fourth Amendment in other contexts seem to operate on the premise that individuals *always* have a *subjective* expectation of privacy in their DNA”⁹⁷

Thus, the question becomes, does society recognize privacy expectations in naturally shed DNA to be reasonable?⁹⁸ There is ample evidence that it does.

90. *Katz*, 389 U.S. at 361 (Harlan, J., concurring).

91. *United States v. White*, 401 U.S. 745, 786 (1971) (Harlan, J., dissenting).

92. Edward J. Imwinkelried & D.H. Kaye, *DNA Typing: Emerging or Neglected Issues*, 76 WASH. L. REV. 413, 437–38 (2001).

93. *See id.*

94. *Id.*

Depositing paper in the trash is generally a volitional act. Someone intent on preserving the secrecy of the papers can shred the papers or dispose of them in other ways that would defeat normal police surveillance. . . . The deposition of DNA in public places cannot be avoided unless one is a hermit or is fanatical in using extraordinary containment measures.

Id.

95. *See id.*

96. *See Smith v. Maryland*, 442 U.S. 735, 741 n.5 (1979).

97. *United States v. Davis*, 657 F. Supp. 2d 630, 645 (D. Md. 2009).

98. *See Imwinkelried & Kaye, supra* note 92, at 438. Illustrating the circular nature of the test, it is reasonable to assume that a person would have a subjective privacy expectation if the rest of society deems that expectation to be reasonable, even if the

DNA contains extremely personal information.⁹⁹ The type of information contained in DNA includes information about a person's health, vulnerability to certain diseases, and propensity for certain conduct; further scientific research is sure to make DNA even more revealing.¹⁰⁰ Research is already beginning to show that short tandem repeat analysis, generally thought to have the capacity to unlock only a person's identity, can reveal more private information, such as a person's vulnerability to diabetes.¹⁰¹ Courts have stated that if DNA analysis was advanced enough to show information beyond mere identity, they would reconsider holding that people do not maintain a reasonable expectation of privacy in DNA, even DNA that is intentionally and voluntarily discarded.¹⁰²

The intimate nature of this information is obvious. It is at least as private as the type of information contained in medical records, and many states recognize a cause of action for the unauthorized disclosure of such information.¹⁰³ Suits for violations of doctor-patient confidentiality rest on the grounds that the disclosure invaded the patient's privacy.¹⁰⁴

Police are supposed to use the DNA to determine only a person's identity,¹⁰⁵ but that is of no consequence. Unlike fingerprints, DNA analysis opens people up to the possibility that the government will unreasonably learn intimate details about them.¹⁰⁶ The question is whether society recognizes as reasonable a privacy expectation in such information, not whether police will use DNA to only identify a

individual has not done anything to show the subjective expectation. LAFAVE, *supra* note 88, § 2.1(c), at 386-87, § 2.1(d), at 390-91.

99. See *United States v. Kincade*, 379 F.3d 813, 842 n.3 (9th Cir. 2004) (Gould, J., concurring).

100. *Id.* at 842 & n.3.

101. Justin Gillis, *Genetic Code of Mouse Published: Comparison with Human Genome Indicates "Junk DNA" May Be Vital*, WASH. POST, Dec. 5, 2002, at A1 (reporting that new advances may force scientists to abandon the term "junk DNA"); David Concar, *Fingerprint Fear*, NEW SCIENTIST (May 2, 2001, 7:00 PM), <http://www.newscientist.com/article/dn694-fingerprint-fear.html> (explaining that the "junk" DNA used in short tandem repeat analysis provides a link to a person's susceptibility to type 1 diabetes).

102. See, e.g., *Williamson v. State*, 413 Md. 521, 543, 993 A.2d 626, 639 (2010) ("While there may be debate regarding privacy concerns should technological advances permit testing of DNA to glean more information from acquired DNA than mere identification, that debate does not have 'feet' in the present case.").

103. 61 AM. JUR. 2D *Physicians, Surgeons, and Other Healers* § 148 (2011).

104. See Concar, *supra* note 101.

105. See, e.g., MD. CODE ANN., PUB. SAFETY § 2-503 (LexisNexis 2011).

106. *United States v. Kincade*, 379 F.3d 813, 842 n.3 (9th Cir. 2004) (Gould, J., concurring).

person.¹⁰⁷ Society has shown a discomfort and distrust in placing DNA in the hands of the government.¹⁰⁸ A number of states have enacted laws protecting the privacy of DNA, illustrating society's recognition of a reasonable privacy expectation in DNA.¹⁰⁹ The laws declare that an individual's DNA is the private property of that individual and protect the DNA from misuse in genetic testing.¹¹⁰ They do not necessarily bar courts from holding that naturally shed DNA is abandoned, but they do prevent misuse of genetic material in DNA databases.¹¹¹ The passage of these statutes shows that society is prepared to recognize a reasonable expectation of privacy in DNA.¹¹²

Furthermore, even if officials use DNA only as an identifier, it is not unique to one person.¹¹³ Analysts can identify an identical twin using the other twin's DNA, and although it may seem far-fetched to imagine an evil twin framing another for a crime, such scenarios have happened.¹¹⁴

2. Taking and Analyzing Naturally Shed DNA Constitutes a Search

The next question in determining the Fourth Amendment's applicability is whether the government's actions constitute a

107. Even the *Raynor* court recognized the distinction between what personal information the government is legally permitted to obtain and the privacy expectation people maintain nevertheless. *Raynor v. State*, No. 1629, 2011 WL 4495663, at *6 (Md. Ct. Spec. App. Sept. 29, 2011). The court discussed a statutory restriction against the testing of DNA for information unrelated to identification before stating that "those protections, of course, are little comfort to those who do not believe that the State should have such information at its disposal in the first place." *Id.*

108. *See Nicholas v. Goord*, 430 F.3d 652, 670 (2d Cir. 2005).

109. COLO. REV. STAT. § 10-3-1104.7(1)(a) (2010); FLA. STAT. ANN. § 760.40(2)(a) (LexisNexis 2011); GA. CODE ANN. § 33-54-1(1) (2011); LA. REV. STAT. ANN. § 22:213.7(E) (2011).

110. COLO. REV. STAT. § 10-3-1104.7(1)(a) (2010); FLA. STAT. ANN. § 760.40(2)(a) (LexisNexis 2011); GA. CODE ANN. § 33-54-1 (2011); LA. REV. STAT. ANN. § 22:1023(E) (2011).

111. COLO. REV. STAT. § 10-3-1104.7(1)(a) (2010); FLA. STAT. ANN. § 760.40(2)(a) (LexisNexis 2011); GA. CODE ANN. § 33-54-1 (2011); LA. REV. STAT. ANN. § 22:1023(E) (2011).

112. *See* COLO. REV. STAT. § 10-3-1104.7(1)(a) (2010); FLA. STAT. ANN. § 760.40(2)(a) (LexisNexis 2011); GA. CODE ANN. § 33-54-1 (2011); LA. REV. STAT. ANN. § 22:1023(E) (2011).

113. *See The Prisoner's Dilemma, Evil Twin Edition*, FREAKONOMICS (Mar. 24, 2009, 2:06 PM), <http://www.freakonomics.com/2009/03/24/the-prisoners-dilemma-evil-twin-edition/>.

114. *Id.*

search.¹¹⁵ In general, taking and analyzing DNA is considered a search under the Fourth Amendment.¹¹⁶

In *Schmerber v. California*, the taking of a blood sample was considered a search.¹¹⁷ Surely there is a reasonable privacy expectation when a person's body is physically intruded upon, but *Katz* held that physical areas are not the focus of the Fourth Amendment's protections.¹¹⁸ Rather, the Amendment protects those things in which people have a subjective expectation of privacy, so long as society is prepared to recognize that expectation as reasonable.¹¹⁹ Thus, physical intrusion is not necessary to make the collection of DNA a search; the privacy invasion comes from obtaining the DNA and the vast amount of personal information contained therein.¹²⁰

That police may collect only a few cells makes no difference.¹²¹ Collecting and analyzing DNA is a search because of the private information revealed by the analysis,¹²² and thanks to advancing technology, a large amount of cells is no longer needed to conduct that analysis.¹²³ The Amendment looks to the qualitative, not quantitative, nature of the search.¹²⁴ When police obtain and analyze only a few cells, they learn the same information as if they used a great many more cells.¹²⁵ The qualitative nature of the search has not changed, and that is what matters.¹²⁶

In holding unconstitutional the government's thermal imaging surveillance of a home, the *Kyllo* Court emphasized how the technology was not generally available to the public.¹²⁷ The Court also spent considerable time discussing how the state could not use

115. See *United States v. Davis*, 657 F. Supp. 2d 630, 643 (D. Md. 2009).

116. See *id.* at 644.

117. *Schmerber v. California*, 384 U.S. 757, 767 (1966).

118. *Katz v. United States*, 389 U.S. 347, 351–52 (1967). This, of course, is not to say that people do not maintain a high expectation of privacy in areas like their homes. People maintain a very high expectation of privacy in their homes, but that is justified by the *Katz* test. People generally have a subjective privacy expectation in their homes, and society recognizes that expectation as reasonable. See *Kyllo v. United States*, 533 U.S. 27, 34–37 (2001).

119. *Katz*, 389 U.S. at 361 (Harlan, J., concurring).

120. See *Davis*, 657 F. Supp. 2d at 647–50; *State v. Martin*, 955 A.2d 1144, 1151 (Vt. 2008).

121. See *United States v. Sparks*, 750 F. Supp. 2d 384, 393 (D. Mass. 2010).

122. *Davis*, 657 F. Supp. 2d at 657–58.

123. See NAT'L INST. OF JUSTICE, *supra* note 21, at 6.

124. See *Sparks*, 750 F. Supp. 2d at 392–93.

125. See NAT'L INST. OF JUSTICE, *supra* note 21, at 6.

126. See *Sparks*, 750 F. Supp. 2d at 392–93.

127. *Kyllo v. United States*, 533 U.S. 27, 34, 40 (2001).

the technology without intruding on legal activities as well as illegal activities.¹²⁸ Both points hold true when considering the technology used in DNA analysis. The general public clearly has no access to the technology used to collect and analyze naturally shed DNA, and before police use the technology, they cannot know for sure whether they are invading the privacy of someone who has engaged in illegal activities or someone who has engaged in only legal activities.¹²⁹

The Court in *Kyllo* based its decision in large part on how thermal imaging technology had no analogue in the time when the Fourth Amendment was created.¹³⁰ Some investigatory techniques, such as dog sniffs, do have such an analogue.¹³¹ Even in *Katz*, the dissent found such an analogue.¹³² Although the Founders could not have foreseen the listening device at issue in *Katz*, there was an analogue because at the time of the Fourth Amendment's adoption, people could eavesdrop and overhear other people's conversations.¹³³ But the Founders could not have known that law enforcement would some day have the technology to use heat to see into a person's home.¹³⁴ In the same way, the Founders could never have fathomed that the government would have the technology to analyze a person's genetic material.¹³⁵ There was no analogue for DNA analysis when the Fourth Amendment was created.¹³⁶

Courts have held that taking DNA is one search and analyzing it is another,¹³⁷ but distinguishing between the two is a moot point.¹³⁸ Merely possessing the DNA serves no purpose in an investigation.¹³⁹

128. *Id.* at 38.

129. *See Williamson v. State*, 413 Md. 521, 551 n.3, 993 A.2d 626, 644 n.3 (2010) (Bell, C.J., dissenting).

130. *See Kyllo*, 533 U.S. at 33–40.

131. *United States v. Broadway*, 580 F. Supp. 2d 1179, 1190–91 (D. Colo. 2008).

132. *Katz v. United States*, 389 U.S. 347, 366 (1967) (Black, J., dissenting).

133. *Id.*

134. *Kyllo*, 533 U.S. at 33–40.

135. *See id.*

136. *See Joh, supra* note 26, at 868–73 (explaining that there are not even modern analogies to DNA analysis).

137. *United States v. Amerson*, 483 F.3d 73, 77 (2d Cir. 2007); *United States v. Davis*, 657 F. Supp. 2d 630, 647 (D. Md. 2009); *United States v. Mitchell*, 681 F. Supp. 2d 597, 600 (W.D. Pa. 2009), *rev'd on other grounds*, No. 09-4718, 2011 WL 3086952 (3d Cir. 2011); *State v. Martin*, 955 A.2d 1144, 1151 (Vt. 2008).

138. *Williamson v. State*, 413 Md. 521, 551 n.3, 993 A.2d 626, 644 n.3 (2010) (Bell, C.J., dissenting) (“Although acquiring DNA is separate and distinct from its analysis and testing, they are critically inextricably related. The acquisition of DNA without analyzing it is virtually meaningless.”).

139. *Id.*

The only reason to have the DNA is to analyze it and find out the information contained within.¹⁴⁰ The possession and analysis are “critically inextricably related.”¹⁴¹

B. Naturally Shed DNA Presents a New Problem for Abandonment Analysis

When the government, without a warrant, conducts a search or seizure that invades a person’s reasonable expectation of privacy, the government’s actions are presumptively unconstitutional.¹⁴² But that is just a presumption.¹⁴³ If one of the few exceptions to the Fourth Amendment applies, and the government has probable cause to believe that the search or seizure will reveal evidence of a crime, the government’s conduct may be justifiable.

1. Naturally Shed DNA Is Different From Abandoned DNA in Past Cases

Abandonment is an exception to the warrant requirement.¹⁴⁴ People abandon something when, based on an objective analysis of act and intent, they relinquish all privacy expectations in an item.¹⁴⁵ Past cases have held that a person can abandon DNA by leaving DNA on an object before abandoning the object.¹⁴⁶ This type of DNA is referred to as “touch DNA.”¹⁴⁷ A person may also abandon DNA by voluntarily and intentionally discarding DNA, for instance by spitting on a public sidewalk.¹⁴⁸

But naturally shed DNA is different from the DNA at issue in those cases.¹⁴⁹ In those cases, people took some type of voluntary action to leave their DNA.¹⁵⁰ DNA is left on a cup, for instance, when a person voluntarily and intentionally drinks from the cup, even though the person is probably not thinking about leaving DNA at that

140. *Id.*

141. *Id.*

142. *Katz v. United States*, 389 U.S. 347, 357 (1967).

143. *Payton v. New York*, 445 U.S. 573, 586–87 (1980).

144. *Abel v. United States*, 362 U.S. 217, 241 (1960).

145. *United States v. Davis*, 657 F. Supp. 2d 630, 648 (D. Md. 2009).

146. *See, e.g., Williamson*, 413 Md. at 544–47, 993 A.2d at 640–41 (citing *Commonwealth v. Bly*, 862 N.E.2d 341, 356–57 (Mass. 2007); *State v. Wickline*, 440 N.W.2d 249, 253–54 (Neb. 1989); *State v. Athan*, 158 P.3d 27, 33–34 (Wash. 2007)).

147. “Touch DNA” is the term coined for the relatively small amount of skin cells that people leave on an item after touching that item. Nelson, *supra* note 27, at 22.

148. *Commonwealth v. Cabral*, 866 N.E.2d 429, 433 (Mass. App. Ct. 2007).

149. *Davis*, 657 F. Supp. 2d at 649.

150. *See, e.g., Williamson*, 413 Md. at 544–47, 993 A.2d at 640–41.

time.¹⁵¹ The voluntariness is even more apparent in the situation involving a person's spitting on the sidewalk. The person clearly takes a voluntary, intentional action to expel his saliva to the ground.¹⁵²

A person can do nothing, however, to avoid leaving naturally shed DNA.¹⁵³ No voluntariness or intention is required.¹⁵⁴ A person's clothing could rub against his skin, or someone else could bump into the person to slough off that person's skin cells.¹⁵⁵ Moreover, people constantly shed dead skin cells, even without any movement at all.¹⁵⁶ People shed between 30,000 and 40,000 skin cells every minute.¹⁵⁷

This constant shedding can create a public hodgepodge of genetic material that makes DNA analysis less conclusive than one might initially think.¹⁵⁸ A person's DNA can be spread by people on whom the DNA was shed, and an item or area can contain the DNA of more than one person.¹⁵⁹ To further complicate matters, the person who has the largest amount of DNA on an object or in an area may not be the one who should be primarily linked with that object or area.¹⁶⁰ People shed DNA at different rates.¹⁶¹ When the government analyzes a trail of naturally shed DNA, therefore, they may not identify the perpetrator, just the person who left the most cells or shed them the fastest. But DNA, with its aura of infallibility, can still deliver convictions to prosecutors, even if they target the wrong person.¹⁶²

151. *Id.*

152. *Cabral*, 866 N.E.2d at 433.

153. Imwinkelried & Kaye, *supra* note 92, at 437–38.

154. *Id.*

155. See Kevin Johnson, 'Touch' DNA Offers Hope in Cold Investigations, USA TODAY, (Sept. 23, 2008, 1:01 AM), http://www.usatoday.com/tech/science/2008-09-22-touchdna_N.htm.

156. See Ed Grabianowski, *How Many Skin Cells Do You Shed Every Day?*, DISCOVERY FIT & HEALTH, <http://health.howstuffworks.com/skin-care/information/anatomy/shed-skin-cells.htm> (last visited Dec. 1, 2011) (explaining that dead skin cells constantly fall off as new cells are generated to take their place).

157. *Id.*

158. See ALAN GUNN, *ESSENTIAL FORENSIC BIOLOGY* 103 (2d ed. 2009).

159. *Id.*

160. *See id.*

161. *Id.*

162. See Jonathan J. Koehler, *Error and Exaggeration in the Presentation of DNA Evidence at Trial*, 34 *JURIMETRICS J.* 21, 23–24 (1993).

2. Naturally Shed DNA Is Different from Fingerprints

Many legal experts liken DNA analysis to fingerprint analysis, contending it is nothing more than another way to determine the identity of criminals.¹⁶³ Indeed, DNA was initially called the “genetic fingerprint.”¹⁶⁴ Fingerprints are unique to each person, providing an effective, accurate, and long-accepted method of fighting crime.¹⁶⁵ They generally do not implicate the Fourth Amendment, however, because they are akin to physical characteristics and exposed to the public’s view.¹⁶⁶ One reason that courts have rejected nearly every legal challenge to the federal and state databases storing the DNA of convicted criminals is that the information stored in the databases is limited to the same information that can be gleaned from a fingerprint: the suspect’s identity.¹⁶⁷

Naturally shed DNA, however, is vastly different from fingerprints. Courts have held that people have no reasonable expectation of privacy in their physical characteristics¹⁶⁸ or in what they knowingly expose to the public’s view.¹⁶⁹ Fingerprint analysis requires a simple lifting and comparison of oil ridges, which can be visible to the naked eye.¹⁷⁰ Naturally shed skin cells are hardly

163. See *State v. Raines*, 383 Md. 1, 25, 857 A.2d 19, 33 (2004).

164. See *id.* at 73, 857 A.2d at 62–63 (Bell, C.J., dissenting).

165. Simon A. Cole, *Fingerprint Identification and the Criminal Justice System: Historical Lessons for the DNA Debate*, in *DNA AND THE CRIMINAL JUSTICE SYSTEM: THE TECHNOLOGY OF JUSTICE* 63, 67 (David Lazer ed., 2004).

166. See *United States v. Dionisio*, 410 U.S. 1, 15 (1973) (comparing fingerprinting to the analysis of other physical characteristics, such as voice exemplars, which do not implicate the Fourth Amendment and do not involve probing into a person’s private life).

167. See *Raines*, 383 Md. at 12, 857 A.2d at 25. The Ninth Circuit struck down a DNA collection statute in *United States v. Kincade*, but the court reheard the issue en banc and reversed, upholding the statute. *United States v. Kincade*, 345 F.3d 1095 (9th Cir. 2003), *rev’d en banc*, 379 F.3d 813 (2004), *cert. denied*, 544 U.S. 924 (2005). In *United States v. Weikert*, the U.S. District Court for the District of Massachusetts granted a defendant’s motion to suppress evidence collected in accordance with a DNA statute, but on appeal, the First Circuit reversed. *United States v. Weikert*, 421 F. Supp. 2d 259 (D. Mass. 2006), *rev’d*, 504 F.3d 1 (1st Cir. 2007). In 2007, the Massachusetts District Court granted the same motion in *United States v. Stewart*, but the First Circuit again reversed. *United States v. Stewart*, 468 F. Supp. 2d 261 (D. Mass. 2007), *rev’d*, 532 F.3d 32 (1st Cir. 2008).

168. *United States v. Mara*, 410 U.S. 19, 21 (1973) (compelling a witness to furnish a handwriting exemplar does not implicate the Fourth Amendment); *Dionisio*, 410 U.S. at 13–14 (requiring witness to give a voice exemplar is not a search or seizure under the Fourth Amendment).

169. *Katz v. United States*, 389 U.S. 347, 351 (1967).

170. *United States v. Mitchell*, 365 F.3d 215, 221 (3d Cir. 2004).

similar.¹⁷¹ DNA in skin cells may contain information about a person's physical characteristics, and DNA is microscopic, requiring a complex analysis to unlock the information contained therein.¹⁷²

Perhaps the most cited distinction between DNA and fingerprints is the far greater amount of far more personal information contained in DNA.¹⁷³ The government can determine only a person's identity from a fingerprint.¹⁷⁴ With DNA, researchers will soon be able to unlock information about a person's heredity, health, propensity for diseases, and perhaps even tendencies to act in certain ways.¹⁷⁵ DNA can already be used to trace a person's family history,¹⁷⁶ and scientists can identify an identical twin using the other twin's DNA.¹⁷⁷ DNA information is similar to that protected by state statutory and common law privacy laws.¹⁷⁸

DNA analysis is also much more intricate than fingerprint analysis.¹⁷⁹ Fingerprint analysis requires a simple comparison. Investigators compare oil marks left by a finger's ridges with a print the government has on file for a suspect.¹⁸⁰ Some of the fingerprint may even be visible to the naked eye.¹⁸¹ DNA analysis, on the other hand, demands a complicated and technical examination.¹⁸² For example, polymerase chain reaction analysis uses a minute amount of cells—sometimes only a few skin cells—to replicate millions of exact copies of DNA, much like a copy machine.¹⁸³

171. See *Williamson v. State*, 413 Md. 521, 551 n.3, 993 A.2d 626, 644 n.3 (2010) (Bell, C.J., dissenting).

172. See *id.*

173. See Joh, *supra* note 26, at 869–70; *Williamson*, 413 Md. at 561–65, 993 A.2d at 650–53 (Bell, C.J., dissenting); *United States v. Davis*, 657 F. Supp. 2d 630, 657–58 (D. Md. 2009).

174. See *History of Fingerprinting*, FINGERPRINTING, <http://www.fingerprinting.com/history-of-fingerprinting.php> (last visited Dec. 1, 2011).

175. *United States v. Kincade*, 379 F.3d 813, 842 n.3 (9th Cir. 2004).

176. Mitochondrial analysis can uncover a person's maternal family history, and Y-chromosome analysis can trace family history among males. See NAT'L INST. OF JUSTICE, *supra* note 21, at 6–7.

177. See Joh, *supra* note 26, at 858 n.5.

178. See discussion *supra* Part III.A.1.

179. *Williamson v. State*, 413 Md. 521, 551 n.3, 993 A.2d 626, 644 n.3 (2010) (Bell, C.J., dissenting).

180. See *United States v. Mitchell*, 365 F.3d 215, 221–22 (3d Cir. 2004).

181. *Id.* at 221.

182. See *Williamson*, 413 Md. at 562, 993 A.2d at 650 (2010) (Bell, C.J. dissenting); NAT'L INST. OF JUSTICE, *supra* note 21, at 5–7.

183. See NAT'L INST. OF JUSTICE, *supra* note 21, at 6.

Furthermore, people cannot help but slough naturally shed DNA everywhere they go.¹⁸⁴ No voluntariness or intention is necessary to leave a pool of DNA that can mix with others' DNA, creating a public mess of genetic material.¹⁸⁵ Inherent in leaving a fingerprint, however, is the voluntary action of pressing a finger on a surface such that the print can be lifted for comparison.¹⁸⁶ Moreover the public mishmash of fingerprints is reduced because people clearly cannot naturally pass their fingerprints to others who then leave the prints somewhere else.¹⁸⁷

IV. THE SOLUTION: A STATUTE DECLARING A REASONABLE EXPECTATION OF PRIVACY IN NATURALLY SHED DNA

A. *Naturally Shed DNA Cannot Be Abandoned*

Naturally shed DNA, in the Fourth Amendment context, clearly presents a unique challenge for courts.¹⁸⁸ People maintain a reasonable expectation of privacy in the intimate information in their DNA, and the government conducts a search by collecting and analyzing naturally shed DNA, implicating the Fourth Amendment.¹⁸⁹ Thus, for the government to take and analyze naturally shed DNA, an exception to the warrant requirement must apply.¹⁹⁰

Abandonment is a Fourth Amendment exception, and past cases have held that people abandon DNA by voluntarily and intentionally putting DNA on an object before abandoning the object, or by voluntarily and intentionally expelling the DNA in public.¹⁹¹ Naturally shed DNA, however, is shed involuntarily and unintentionally.¹⁹² Can a person relinquish privacy expectations in extremely intimate information that is left without any voluntariness or intention?

184. See Grabianowski, *supra* note 156.

185. See discussion *supra* Part III.B.1.

186. See *United States v. Mitchell*, 365 F.3d 215, 221–22 (3rd Cir. 2004).

187. See *id.*

188. See discussion *supra* Part III.

189. See discussion *supra* Part III.A.

190. See discussion *supra* Part II.C.

191. *Williamson v. State*, 413 Md. 521, 537–38, 993 A.2d 626, 635–36 (2010); *Commonwealth v. Cabral*, 866 N.E.2d 429 (Mass. App. Ct. 2007).

192. See Grabianowski, *supra* note 156; *United States v. Davis*, 657 F. Supp. 2d 630, 648–49 (D. Md. 2009).

The idea is repugnant to the Fourth Amendment and the concept of abandonment.¹⁹³ Abandonment requires an assessment of a person's actions and intentions to determine if the person intended to relinquish privacy rights in an object.¹⁹⁴ If no voluntary action was taken to discard the object, and there was no intention to discard the object, it is difficult to imagine how a person could reasonably be thought to have given up his privacy rights, especially in something as intimate as DNA.¹⁹⁵ By doing nothing to discard skin cells, the cells essentially remain part and parcel of a person's body. And people maintain an extremely high privacy expectation in their bodies.¹⁹⁶ Thus, taking and analyzing naturally shed DNA without a warrant is closely akin to the taking and analyzing of a blood sample without a warrant or warrant exception, an unconstitutional action.¹⁹⁷

The conclusion must be that people maintain a per se reasonable expectation of privacy in naturally shed DNA.¹⁹⁸ A different conclusion would open everyone's intimate medical and genetic information to the government, and because naturally shed DNA is constantly shed, the government can easily obtain the information.¹⁹⁹

*United States v. Davis*²⁰⁰ is instructive. In that case, police took as evidence a shooting victim's blood-covered clothing, stored it for three years so that the DNA could be analyzed, and used it to convict the victim for a subsequent shooting.²⁰¹ The Government claimed that the defendant abandoned his clothes and DNA, but the U.S. District Court for the District of Maryland held otherwise:

Nor does the Court necessarily agree that conscious disposal of an item, or unconscious shedding of hair, saliva, or dermal cells, reasonably supports the conclusion that an individual has manifested an intent to abandon one's privacy interest in the information that can be gleaned from that item or tissue by DNA analysis.²⁰²

193. *Davis*, 657 F. Supp. 2d at 649–50 (“The Court does not believe that intent to abandon or volition can be inferred from passive inaction . . .”).

194. *Id.* at 648.

195. *Id.* at 649–50.

196. *Schmerber v. California*, 384 U.S. 757, 769–70 (1966).

197. *See id.*

198. *See Davis*, 657 F. Supp. 2d at 649–50.

199. *See Grabianowski*, *supra* note 156.

200. 657 F. Supp. 2d 630 (D. Md. 2009).

201. *Id.* at 634–35.

202. *Id.* at 649–50.

The defendant in the case was shot, making his situation slightly different from one involving naturally shed DNA, which is constantly shed, but the case strongly supports the proposition proposed in this comment: DNA that leaves one's body without voluntary action or intent is not automatically abandoned.²⁰³

One might argue that people perform many voluntary actions when they naturally shed skin cells, even if they do not know they are shedding those cells. For instance, when a suspect comes in for police questioning, he voluntarily walks into the interrogation room. Is that level of voluntariness enough to say that any naturally shed skin cells in that room have been abandoned? Can tangentially-related actions qualify as the voluntary actions necessary to abandon DNA?

Where to draw the line could vary depending on the facts of each case. Surely, a "but for" analysis that finds abandonment if a person would not have left his DNA but for some prior voluntary action leading up to the abandonment cannot stand. Under that analysis, all naturally shed DNA would be abandoned because the shedding could be tied to some voluntary action, no matter how unrelated. The other option, a case-by-case approach considering a sort of proximate voluntariness, similar to the torts concept of proximate causation, presents problems as well. That approach would again leave DNA and people's Fourth Amendment rights vulnerable to an abandonment test that is open to interpretation based on the facts and the court.

B. *The Solution*

Courts have never faced the question of the Fourth Amendment's applicability to naturally shed DNA.²⁰⁴ Because such DNA contains extremely private information and is constantly shed, it presents a unique challenge for courts.²⁰⁵ A new approach is needed. Legislatures should enact statutes that declare that people maintain a per se reasonable expectation of privacy in naturally shed DNA.²⁰⁶

A statute is preferable to a court-made rule because legislatures act on behalf of, and are accountable to, their citizens.²⁰⁷ Citizens currently have no guidance about whether their DNA can be collected

203. *Id.* at 649.

204. *See* Brief of Appellant, *supra* note 8, at 2.

205. *See* discussion *supra* Part III.B.

206. *See* Joh, *supra* note 26, at 880–81.

207. *See id.*

and analyzed by merely shedding skin cells.²⁰⁸ Legislatures can clear up the confusion by enacting statutes.²⁰⁹ Or if citizens simply want protection of their naturally shed DNA, legislatures can quickly grant it.²¹⁰ But legislative action is the only way in which citizens can have a direct say in the protection of their genetic information.²¹¹ “If we want unrestricted government access to DNA information, . . . that ought to be the subject of public debate rather than made possible through means such as analogizing DNA to trash. Without meaningful consideration of abandoned DNA, we lose the ability to protect our genetic information.”²¹² Legislatures can act without waiting for an appellate court to hear the appropriate case and issue a correct holding.²¹³

Such statutes would also clear up confusion for law enforcement. With no clear law on the issue, police have no way of knowing if they can gather and analyze the DNA that everyone naturally sloughs off all the time, and it is crucial to provide guidance because police can obtain naturally shed DNA more easily than other types of DNA. Every public place is brimming with naturally shed DNA that could aid investigations.

My proposed statute regarding the analysis of naturally shed DNA would mandate that people have a per se reasonable expectation of privacy in naturally shed DNA.²¹⁴ Subsection (a) of the statute would define “naturally shed DNA” as deoxyribonucleic acid that a person leaves behind in skin cells that are shed with little or no movement. The subsection would also define “touch DNA” as deoxyribonucleic acid that a person intentionally and voluntarily leaves on an object by intentionally and voluntarily touching that object. Subsection (b) would make clear that the statute does not apply to touch DNA or DNA left at crime scenes. By leaving touch DNA voluntarily and intentionally, people abandon the DNA, and society does not recognize as reasonable a privacy expectation in such DNA.²¹⁵ Any reasonable privacy expectations in DNA left at crime scenes can be

208. See Brief of Appellant, *supra* note 8, at 2.

209. See Joh, *supra* note 26, at 880–81.

210. See *id.*

211. *Id.*

212. *Id.* at 883.

213. See *id.* at 880–81.

214. See *supra* pp. 190–91.

215. See Joh, *supra* note 26, at 867; *United States v. Davis*, 657 F. Supp. 2d 630, 650 (D. Md. 2009).

overridden by existing Fourth Amendment considerations.²¹⁶ Subsection (c) would announce the mandate of a per se reasonable expectation of privacy in naturally shed DNA, requiring the government to secure a warrant to collect or analyze such DNA. Subsection (d) would provide the remedy for violating a person's per se reasonable expectation of privacy in her naturally shed DNA: exclusion of the DNA evidence from trial.²¹⁷

The statute would accommodate for the fact that naturally shed DNA is constantly sloughed off involuntarily and unintentionally, and ensure that the government does not intrude, without a warrant, on the reasonable privacy expectations maintained in naturally shed DNA.²¹⁸

By the same token, the statute would not alter other areas of abandonment law. DNA left behind at crime scenes would still be open to warrantless collection and analysis by police because people generally do not have a reasonable expectation of privacy in evidence left at crime scenes.²¹⁹ Society would never recognize that expectation as reasonable.²²⁰ That is one reason why narcotics-detecting dog sniffs are constitutional and some more advanced technologies are not: the dog sniffs detect only unlawful activity, in which people do not have a reasonable privacy expectation, whereas technologies such as thermal imaging can intrude on lawful activity as well.²²¹

But even if people have a reasonable privacy expectation in DNA left at crime scenes, perhaps because their activities at the scene were lawful, that expectation can be overcome.²²² Police have probable cause to obtain and analyze DNA at crime scenes, and an exigency

216. See discussion *infra* notes 221–24.

217. See *Elkins v. United States*, 364 U.S. 206, 216–17 (1960) (explaining that the rule excluding evidence obtained in violation of the Fourth Amendment was intended to deter the government from committing constitutional violations).

218. See discussion *supra* Part III.

219. See *Joh*, *supra* note 26, at 867 (“Courts may readily find that criminals have clearly intended to renounce all privacy claims to bags containing illegal firearms or to packages of drug paraphernalia when fleeing the police, but we hardly have a realistic choice in shedding DNA. One can shred private papers or burn garbage so that no one may ever delve into them, but leaving DNA in public places cannot be avoided.”) (footnotes omitted); *Davis*, 657 F. Supp. 2d at 650 (“No one would argue, for example, that a rapist retains a reasonable expectation of privacy in the DNA contained in the semen that he leaves on his victim. Society considers it reasonable that if one has committed a crime, any evidence one leaves behind while doing so is fair game . . .”).

220. See *Illinois v. Caballes*, 543 U.S. 405, 409–10 (2005).

221. See *id.*

222. See discussion *supra* Part II.C.

exception to the warrant requirement would apply because the DNA could be contaminated if police take the time to obtain a warrant.²²³ In the alternative, the act of committing the crime is enough to make clear that the criminal is abandoning DNA left at the scene.²²⁴ Committing any crime requires far more intent and action than what the statute considers for naturally shed DNA, making it reasonable for society to accept the criminal's abandonment of DNA.²²⁵

V. CONCLUSION

Courts have never faced the question of whether naturally shed DNA can be obtained and analyzed without a warrant,²²⁶ but just as the *Katz* Court confronted new technology that could invade people's privacy like never before, so too must today's courts deal with new, invasive technology that can analyze a person's DNA with only a few naturally shed skin cells.²²⁷

DNA analysis is a critical and quickly advancing crime-fighting tool.²²⁸ When obtained correctly, DNA provides tremendous promise because it is sufficient on its own to convict criminals and exonerate the innocent.²²⁹ But DNA analysis also harbors extraordinary dangers.²³⁰ Because a person sheds cells without any voluntary action, those cells are still part and parcel of the person, and that person has not relinquished privacy expectations in the DNA.²³¹ And because DNA contains extremely personal information, society would surely recognize as reasonable a privacy expectation in

223. See *Davis*, 657 F. Supp. 2d at 650.

224. See *id.* (“[T]he intentional, volitional act of committing the crime itself supports the theory that the criminal intends to abandon any privacy interest he has in his blood, fluid, cells, etc. that he may leave behind at the crime scene.”).

225. See *id.* Admittedly, individuals who are not guilty could leave their DNA at crime scenes, and by maintaining crime scenes as an exception to the warrant requirement, police would be free to collect and analyze that DNA. But because society does not recognize a reasonable expectation of privacy in items left at crime scenes, people, whether guilty or not, have relinquished their right to privacy in crime scene DNA. See *Joh*, *supra* note 26, at 867. Society has conceded that because items at crime scenes are so likely to be tied to crime, and because fighting crime is a significant objective of society, the minimal possibility that police may collect and analyze the DNA of individuals who are not guilty is accepted as collateral damage. See *id.*

226. See Brief of Appellant, *supra* note 8, at 2–3.

227. See *Katz v. United States*, 389 U.S. 347, 348 (1967).

228. See discussion *supra* Part II.A.

229. *Id.*

230. See discussion *supra* Part III.

231. See discussion *supra* Part IV.A.

DNA.²³² New technology allows police to uncover the intimate information in DNA with only a few naturally shed cells, leaving all people vulnerable to Fourth Amendment violations.²³³ Short of fanatical measures, people can do nothing to keep from leaving a trail of DNA everywhere they go.²³⁴

Legislatures should not wait for courts to come across the correct case in the hopes that courts will issue the correct holding.²³⁵ They should step in to ensure that people receive the Fourth Amendment protection they deserve in their DNA.²³⁶ As Chief Judge Bell of the Court of Appeals of Maryland stated:

Undoubtedly, there are many crime fighting tools that, if allowed to be used, without restraint or with minimal oversight and unrestrained by the Fourth Amendment, would prove quite effective in detecting and solving crime, yet would wreak havoc with constitutional rights Surely the framers wanted law enforcement to operate in an effective and efficient manner; however, they were wise enough not to adopt a “by any means necessary” stance. In fact, the means and limitations which law enforcement utilized to enforce the law did not, and do not, “just matter,” they became, and remain, key to any well-thought-out legal analysis and correct exposition of the law regarding the Fourth Amendment.²³⁷

MODEL STATUTE

Reasonable expectation of privacy in naturally shed DNA

(a) Definitions – In this section the following words have the meanings indicated.

(1) “Naturally shed DNA” means deoxyribonucleic acid that a person leaves behind in skin cells that are shed with little or no movement.

232. See discussion *supra* Part III.B.1.

233. See discussion *supra* Part II.A.

234. See Imwinkelried & Kaye, *supra* note 92, at 437–38.

235. See discussion *supra* Part IV.B.

236. *Id.*

237. State v. Raines, 383 Md. 1, 75–76, 857 A.2d 19, 64 (2004) (Bell, C.J., dissenting).

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(2) “Touch DNA” means deoxyribonucleic acid that a person intentionally and voluntarily leaves on an object by intentionally and voluntarily touching that object.

(b) Scope – This section does not apply to the following types of DNA.

(1) Touch DNA.

(2) DNA at crime scenes.

(c) Prohibited – People maintain a per se reasonable expectation of privacy in naturally shed DNA. The government cannot collect or analyze naturally shed DNA without a warrant.

(d) Remedy – If this statute is violated, the DNA evidence must be excluded from trial.

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