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Recommended Citation

Shane Padilla, *Defining Genetic Information Under GINA*, 71 Clev. St. L. Rev. 103 (2022)
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DEFINING GENETIC INFORMATION UNDER GINA

SHANE PADILLA*

ABSTRACT

The Genetic Information Nondiscrimination Act (GINA) was enacted to prevent discrimination based on an employee's genetic information. Although GINA undoubtedly provides employees protection from unjust genetic discrimination by employers, varying interpretations of what constitutes "genetic information" has raised legal uncertainties in how GINA is applied. Consequently, the genetic information of an employee's family may be unduly placed at risk as a result of misinterpreting the statutory language and legislative intent of GINA. It is of the utmost importance that the definition of "genetic information" be construed with respect to the Act's legislative history, which supports a broad interpretation and application of the term "genetic information." By improperly narrowing the scope of what constitutes "genetic information," the genetic privacy of an employee's family is unnecessarily jeopardized. Furthermore, employers are offered a safe harbor when committing discriminatory acts based on genetic information that are difficult, if not impossible, to prove.

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I. INTRODUCTION

Americans have increasingly struggled to maintain ownership of personal data and privacy rights. Consumer data has become an invaluable commercial commodity, as evidenced by the \$200 billion annual revenue generated by the data brokerage industry.¹ While nearly all aspects of an individual’s identity, such as political affiliations or vacation preferences, may be identified through data tracking, arguably no type of information is more intimate and deserving of protection than genetic data.² Genetic data can reveal information that cannot be captured through traditional methods of data tracking; an individual’s ancestry, behavioral propensities, and medical predispositions may be provided, among other things, using genetic analysis.³ It is of the utmost importance that access to an individual’s genetic data is sufficiently restricted and, if known, cannot be used in a discriminatory manner.

Congress recognized the need for genetic data protections in 2008 with its passage of the Genetic Information Nondiscrimination Act (GINA).⁴ Generally, GINA prohibits health insurers and employers from discriminating against insurance applicants and potential or current employees based on that person’s genetic

¹*How Much Money is Data Brokering Worth?*, INT’L CTR. FOR SETTLEMENT INV. DISP., <https://www.icsid.org/uncategorized/how-much-money-is-data-brokering-worth/> (last visited Aug. 30, 2022).

² INST. MED. (US) COMM. ON ASSESSING GENETIC RISKS, *ASSESSING GENETIC RISKS: IMPLICATIONS FOR HEALTH AND SOCIAL POLICY 250* (Lori B. Andrews et al. eds., 1994), <https://www.ncbi.nlm.nih.gov/books/n/nap2057/pdf/>.

³ *Id.* at 254.

⁴ Genetic Information Nondiscrimination Act (GINA) of 2008, Pub. L. No. 110-233, § 2(4)-(5), 122 Stat. 881, 882–83 (codified as amended at 42 U.S.C. §§ 2000ff-2000ff11).

information.⁵ Additionally, GINA prevents employers from requesting genetic information about an employee or the employee's family.⁶ The Act undoubtedly provides much-needed protection from genetic discrimination. However, it has also been the subject of controversy in its judicial interpretation.⁷ Courts have differed in how the term "genetic information" is construed, leading to inconsistent applications of the law in litigation.⁸ This Article will discuss two differing interpretations of the term "genetic information" and advocate for a broad application of the term.

The first Part will provide a background of GINA, including its purpose, protections, and limitations. The second Part will briefly outline two interpretations of the statutory language. The third Part will provide case studies that illustrate the narrow interpretation and its implications. The fourth Part will provide arguments in favor of a broad interpretation of "genetic information." Lastly, the fifth Part will offer a brief counter-analysis and rebuttal.

II. GINA BACKGROUND

As previously stated, GINA is a federal law that prohibits health insurers and employers from discriminating against an individual because of their genetic makeup.⁹ GINA consists of two primary parts. Title I prohibits health insurers from discriminating based on genetics and Title II prohibits employment discrimination based on genetics.¹⁰ In addition to preventing employment discrimination, Title II also prohibits an employer from requesting, requiring, or purchasing genetic information, with some exceptions.¹¹ In 2010, the Equal Employment Opportunity Commission (EEOC) published final regulations for Title II that are substantially similar to the statutory language of GINA.¹² For the purposes of this Article, the analysis will focus on Title II employment discrimination.

Unlike other anti-discrimination acts, such as the Americans with Disabilities Act (ADA) and Title VII of the Civil Rights Act of 1964, GINA was preemptively enacted

⁵ *Id.* at 881.

⁶ *Id.* § 202(b), at 907–08.

⁷ Barbara J. Evans, *The Genetic Information Nondiscrimination Act at Age 10: GINA's Controversial Assertion that Data Transparency Protects Privacy and Civil Rights*, 60 WM. & MARY L. REV. 2017 (2019).

⁸ See *Poore v. Peterbilt of Bristol, L.L.C.*, 852 F. Supp. 2d 727, 731 (2012); *But see Allen v. Verizon Wireless*, 2013 U.S. Dist. LEXIS 80228 at *75 (D. Conn. June 6, 2013); *But see Maxwell v. Verde Valley Ambulance Co.*, 2014 U.S. Dist. LEXIS 127370 at *45 (D. Ariz. Sept. 11, 2014).

⁹ Genetic Information Nondiscrimination Act (GINA), 42 U.S.C. § 201 (2008).

¹⁰ Amanda K. Sarata et al., *The Genetic Information Nondiscrimination Act Of 2008 And The Patient Protection And Affordable Care Act Of 2010: Overview And Legal Analysis Of Potential Interactions*, CONG. RSCH. SERV. RL41314, 1, 1–3 (2011).

¹¹ Genetic Information Nondiscrimination Act (GINA), 42 U.S.C. § 202(b) (2008).

¹² Equal Employment Opportunity Commission, *Regulations Under the Genetic Information Nondiscrimination Act of 2008*, 75 Fed. Reg. 68912 (final rule at November 9, 2010).

to prevent discrimination that was not widely recognized or prevalent at the time.¹³ Advancements in genetic testing and knowledge also encouraged legislators to provide protections against genetic discrimination.¹⁴ Congress explicitly noted that advancements in genetics “give rise to the potential misuse of genetic information to discriminate in health insurance and employment.”¹⁵

Regarding employment protections, GINA prohibits employers from discriminating against employees based on genetic information, requesting genetic information about an employee or the employee’s family, and retaliating against an employee for exercising their rights under the Act.¹⁶ The familial protections offered extend to fourth-degree relatives, which includes great-great grandparents, great-great-grandchildren, and first cousins once-removed.¹⁷ Importantly, the term “family member” is also defined to include “[a] person who is a dependent of that individual as the result of marriage, birth, adoption, or placement for adoption.”¹⁸ This definition will be a primary point of discussion when applying the statutory language.

There are numerous ways in which an employer can violate GINA. The law prohibits discrimination on the basis of genetic information for all aspects of employment, including hiring decisions, financial compensation, work assignments, promotions, benefits, and any other term or condition of employment.¹⁹ A simple yet illustrative example would be if an employer were to refuse to hire a prospective employee because the employee has a mutation in the HTT gene, which causes Huntington’s disease. While it is obviously not illegal to deny an individual an employment opportunity, doing so on the basis of their genetic information is indeed prohibited by GINA.²⁰

Not all employment practices prohibited under GINA are so blatant. Genetic discrimination can occur for already existing employees in subtle ways. For instance, it is unlawful for an employer to segregate an employee’s desk or office from others

¹³ Bradley A. Areheart, *GINA, Privacy, and Antisubordination*, 46 GA. L. REV. 705, 707 (2012).

¹⁴ Genetic Information Nondiscrimination Act of 2008, Pub. L. No. 110-223, § 2(2), 122 Stat. 881, 882 (2008).

¹⁵ Genetic Information Nondiscrimination Act of 2008, Pub. L. No. 110-223, § 2(1), 122 Stat. 881, 881–82 (2008).

¹⁶ Genetic Information Nondiscrimination Act of 2008, Pub. L. No. 110-223, § 202(b)(1)–(6), 122 Stat. 881, 907–08 (2008).

¹⁷ 29 C.F.R. § 1635.3(a)(2) (2011).

¹⁸ 29 C.F.R. § 1635.3(a)(1) (2011).

¹⁹ *Genetic Information Discrimination*, U.S. EQUAL OPPORTUNITY EMP. COMM’N, <https://www.eeoc.gov/genetic-information-discrimination#:~:text=Title%20II%20of%20the%20Genetic,applicants%20because%20of%20genetic%20information> (last visited Aug. 28, 2022).

²⁰ *Id.*

on the basis of their genetics.²¹ Similarly, it is unlawful for an employer to assign work assignments to employees based on their genetic information.²² While it may be difficult in these scenarios to prove that such employment decisions were made on the basis of genetic information, the work practices above are nonetheless illegal under GINA.²³

Of particular importance is GINA's retaliation provision. GINA prohibits employers from firing, demoting, harassing, or otherwise "retaliating" against a candidate or employee for filing a discrimination charge or participating in a discrimination proceeding.²⁴ A scenario in which this might occur is if an employee believed that they were discriminated against and subsequently filed a charge against their employer.²⁵ Even if the lawsuit was unsuccessful, the employee is nonetheless protected from retaliation.²⁶ This provision ensures that employees can take necessary legal actions against employers for discrimination without fear of losing their job, being demoted, or facing other negative consequences for their lawsuit.²⁷

Although GINA provides necessary recourse to protect one's genetic information, its prohibition against the improper acquisition and use of genetic information is not absolute. For instance, GINA does not apply to life or other disability insurers.²⁸ Similarly, the Act does not apply to third-party providers, such as long-term care facilities.²⁹ Certain safe harbors exist for employers that inadvertently obtain employee genetic information.³⁰ For instance, it is not a violation for an employer to receive genetic information from a request to an employee in which the employer warns the employee not to provide genetic information.³¹ Furthermore, an employer does not violate GINA if genetic information is obtained from a public or social media

²¹ 42 U.S.C. § 202 (2008).

²² *Id.*

²³ *Id.*

²⁴ *Genetic Information Discrimination*, *supra* note 19.

²⁵ See *Poore v. Peterbilt of Bristol, L.L.C.*, 852 F. Supp. 2d 727, 728 (W.D. Va. 2012); *Allen v. Verizon Wireless*, No. 3:12-CV-482, 2013 U.S. Dist. LEXIS 80228, at *3 (D. Conn. June 6, 2013); *Maxwell v. Verde Valley Ambulance Co.*, No. CV-13-08044-PCT-BSB, 2014 U.S. Dist. LEXIS 127370, at *1 (D. Ariz. Sep. 10, 2014).

²⁶ See *Genetic Emp. Discrimination*, U.S. EQUAL EMP. OPPORTUNITY COMM'N, <https://www.eeoc.gov/genetic-information-discrimination> (last visited Aug. 28, 2022).

²⁷ *Id.*

²⁸ *Id.*

²⁹ *Id.*

³⁰ *Id.*

³¹ See generally *id.*

website, so long as the employer did not affirmatively search for the offending information and does not store or use the information.³²

Though the protections offered and absent from GINA seem clear, implementing the statutory language in litigation is more convoluted. Specifically, the scope of the term “genetic information” has been widely debated and is quite controversial. Two interpretations of what the term genetic information encompasses are at issue.

III. INTERPRETATIONS OF “GENETIC INFORMATION”

Employment claims under GINA typically arise in two scenarios. First, an employee alleges that their employer used genetic information to make discriminatory employment decisions.³³ Second, an employee alleges that their genetic information was improperly acquired by an employer.³⁴ Although the premises of each claim are distinct in their considerations of whether genetic information was used or simply acquired, both require an interpretation of whether the information that was obtained constitutes “genetic information.”

The ambiguous nature of genetic information created a difficult task for Congress in deciding what types of disclosures constitute “genetic information” under GINA.³⁵ Knowledge of genetics is constantly developing.³⁶ Thus, there is no bright-line definition of what comprises genetic versus non-genetic medical information.³⁷ Similarly, genetic discrimination issues typically consider an individual’s predisposition to disease rather than the present manifestation of disease.³⁸ These issues raise a multitude of questions regarding genetic information, such as whether a family member’s genetic data can be considered genetic information for the purposes of discrimination under Title II.³⁹

State laws have varied in interpreting the definition and judicial application of “genetic information.”⁴⁰ Some states have implemented a narrow approach, prohibiting only certain uses of an employee’s genetic testing results.⁴¹ Others have

³² *Id.*

³³ GENETIC INFORMATION NONDISCRIMINATION ACT OF 2008, GINA HELP 8 (Jun. 2010), <http://www.ginahelp.org/GINAhelp.pdf>.

³⁴ *See* 42 U.S.C. § 202(b) (2008).

³⁵ Neil C. Manson, *What is Genetic Information, and why is it Significant? A Contextual, Contrastive, Approach*, 23 J. APPLIED PHIL. 1, 2 (2006).

³⁶ 42 U.S.C. § 2(2).

³⁷ Sonia M. Suter, *GINA at 10 Years: The Battle Over ‘Genetic Information’ Continues in Court*, J.L. & BIOSCI. 495, 499 (May 25, 2019).

³⁸ *Id.*

³⁹ *Id.* at 503.

⁴⁰ Sonia M. Suter, *The Allure and Peril of Genetics Exceptionalism: Do We Need Special Genetics Legislation?*, 79 WASH. U. L.Q. 669, 691 (2001).

⁴¹ *Id.* at 694.

utilized a broader approach, expanding protections to include the employee's family members' genetic test results.⁴² Ultimately, and against criticisms, Congress elected to apply a broad definition of "genetic information."⁴³ Congress included "the manifestation of a disease or disorder in family members" when defining "genetic information," thereby providing protections for some aspects of family medical history.⁴⁴ Some legislators criticized this definition as overly broad and an unnecessary expansion beyond the protections that were provided by many states at the time.⁴⁵

For reasons that will be discussed in detail below, opponents of the broad definition sought to narrow what constitutes "genetic information." Challengers to the statutory language employed by Congress opined that, in some circumstances, the consideration of manifested diseases and a lack of clarity in what family members are relevant to a genetic analysis would conflict with the intended purpose of GINA.⁴⁶ These arguments are illustrated in the following case studies which chose to narrowly interpret the statutory language in GINA.

IV. JUDICIAL APPLICATIONS OF THE NARROW INTERPRETATION OF "GENETIC INFORMATION"

Poore v. Peterbilt Bristol, L.L.C., decided in 2012, was the first published case to address whether medical information that is not about an individual's manifested condition is considered "genetic information."⁴⁷ Mark Poore's employer, Peterbilt, provided health insurance to Poore and his family.⁴⁸ As a part of an insurance questionnaire regarding his family's "general medical conditions and medications," Poore disclosed that his wife had been diagnosed with multiple sclerosis.⁴⁹ Poore was then terminated from employment three days later, despite there being no complaints regarding his work performance.⁵⁰ Poore responded by alleging that his employer discriminated after acquiring genetic information, thereby violating GINA.⁵¹ The court dismissed the claim, holding that Poore's wife's multiple sclerosis diagnosis was not genetic information with respect to Poore.⁵²

⁴² *Id.* at 693–94.

⁴³ *Id.* at 699.

⁴⁴ Genetic Information Nondiscrimination Act of 2008, 42 U.S.C. § 2000ff(4)(A).

⁴⁵ Bradley A. Areheart & Jessica L. Roberts, *GINA, Big Data, and the Future of Employee Privacy*, 128 *YALE L. J.* 710, 717 (2019).

⁴⁶ Suter, *supra* note 37, at 523.

⁴⁷ *Id.* at 506.

⁴⁸ *Poore v. Peterbilt Bristol, L.L.C.*, 852 F. Supp. 2d 727, 729 (W.D. Va. 2012).

⁴⁹ *Id.*

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *Id.* at 731.

Relying on its legislative history, the court reasoned that GINA's primary intent was to "prohibit employers from making a 'predictive assessment concerning an individual's propensity to get an inheritable genetic disease or disorder based on the occurrence of an inheritable disease or disorder in [a] family member.'"⁵³ The court recognized Congress' inclusion of family history in the definition of "genetic information" and that it could "be viewed to indicate that the individual himself is at an increased risk for that disease."⁵⁴ However, the court ultimately held that a family member's disease is not genetic information if the information is "taken into account only with respect to the individual in which such disease or disorder occurs and not as genetic information with respect to any other individual."⁵⁵ Stated concisely, Poore's wife's multiple sclerosis diagnosis was not predictive of Poore's genetic propensity to suffer from the disease.⁵⁶ Since the diagnosis was not considered to determine Poore's health status, it did not constitute genetic information.⁵⁷

Based on the supposed purpose of GINA in predictive disease assessment, the *Poore* decision appears to have sound reasoning. GINA prohibits discrimination based on an individual's presymptomatic genetic information, which implies an emphasis on considering an individual's propensity for genetic disease.⁵⁸ In *Poore*, the wife's multiple sclerosis would not be predictive of Poore contracting the same condition because the two do not necessarily share the same genes. It seems reasonable then that this diagnosis should not be considered genetic information.

Nonetheless, the inclusion of non-blood-related family members' medical history as genetic information still aligns with, and is in fact supported, by GINA. The *Poore* court acknowledged that GINA defines "genetic information" to include "the manifestation of a disease or disorder in family members of an individual."⁵⁹ When disallowing a spouse's medical history as genetic information because it is not predictive of genetic disease in the employee, however, the court failed to address whether non-blood relatives are considered family members under GINA.⁶⁰ Although non-blood-relatives' medical history may not be predictive of genetic disease in an employee, GINA nonetheless intended the medical history of these family members be protected as genetic information.⁶¹

⁵³ *Id.* at 730.

⁵⁴ *Id.* (citing H.R. REP. NO. 110-28 pt. 1, at 36 (2007)).

⁵⁵ *Poore*, 852 F. Supp. 2d at 731 (citing H.R. Rep. No. 110-28, pt. 2, at 27 (2007), reprinted in 2008 U.S.C.C.A.N. 101, 105-06).

⁵⁶ *See id.*

⁵⁷ *See id.*

⁵⁸ Suter, *supra* note 37 at 504.

⁵⁹ 42 U.S.C. § 2000ff(4).

⁶⁰ *Poore*, 852 F. Supp. 2d at 731.

⁶¹ Suter, *supra* note 37 at 507.

In its definition of family member, GINA states that dependents, as used in the Employee Retirement Income Security Act (ERISA) of 1974, are included.⁶² The cited ERISA provision further explains that “a person becomes such a dependent of the individual through marriage, birth, or adoption or placement for adoption.”⁶³ Similarly, the Equal Employment Opportunity Commission (EEOC) provided guidance for interpreting GINA, defining a family member as “[a] person who is a dependent of that individual as the result of marriage, birth, adoption, or placement for adoption.”⁶⁴ It is clear that non-blood-relatives are included under the scope of GINA, which begs the question: why do protections exist for genetic information that is not predictive of genetic disease?

When implementing Title II, the EEOC relied on GINA’s explicit reference to ERISA in defining family members as dependents.⁶⁵ The EEOC stated that the reference made it “absolutely clear that Congress intended to include such persons in GINA’s definition of ‘family member.’”⁶⁶ Additionally, it is explained that such health information of dependents through adoption or marriage could nevertheless cause discrimination against an employee to avoid health care costs and higher insurance rates.⁶⁷ Congress intended GINA to protect employees from such discrimination, even if the basis for the discrimination is a health condition, or “manifestation of a disease,” of a non-blood related dependent.

Although the health conditions of non-blood-related dependents are not predictive of genetic disease in an employee, the potential for discrimination explained above remains to be of the nature that GINA intends to prohibit. Applying this line of reasoning to *Poore*, the wife’s multiple sclerosis diagnosis constituted genetic information because it was a manifestation of a disease in a family member.⁶⁸

The opinion in *Poore* provided a two-factor analysis for future courts to follow when evaluating whether a family member’s medical history constitutes genetic information.⁶⁹ First, it must be determined whether a family member has been diagnosed with a disease or disorder.⁷⁰ The second determination that must be made, and the one that is at issue, is whether the information is considered only with respect

⁶² *Id.* § 2000ff(3).

⁶³ Employee Retirement Income Security Act (ERISA), 29 U.S.C. § 1181(f)(2)(A)(iii) (1974).

⁶⁴ 29 C.F.R. § 1635.3(a)(1) (2022).

⁶⁵ Genetic Information Nondiscrimination Act (GINA), 42 U.S.C. § 201(3)(A) (2008).

⁶⁶ Equal Employment Opportunity Commission, Regulations Under the Genetic Information Nondiscrimination Act of 2008; Final Rule, 75 Fed. Reg. 68,915 (Nov. 10, 2010) (to be codified at 29 C.F.R. pt. 1635).

⁶⁷ *Id.*

⁶⁸ *See Poore*, 852 F. Supp. 2d at 731.

⁶⁹ *Id.*

⁷⁰ *Id.*

to the afflicted individual and not with respect to the employee.⁷¹ The problematic nature of this framework for evaluating what can be considered genetic information is illustrated in the cases below.

One year after *Poore*, *Allen v. Verizon Wireless* applied analogous reasoning to reject a Title II discrimination claim.⁷² Queen Allen alleged that her employer, Verizon Wireless, considered her mother's confidential medical information when denying her request for short-term disability benefits.⁷³ The court dismissed Allen's claim, stating that she had "failed to allege facts to raise a reasonable inference" that the denial of her request was due to the alleged genetic information.⁷⁴ The court cited *Poore*, explaining that a family member's disease is only genetic information if it is used to determine another individual's disease propensity.⁷⁵ It was further clarified that family medical history is not genetic information if it is only considered with respect to the individual afflicted by the disease.⁷⁶

Two key takeaways are drawn from the opinion. First, as was observed in *Poore*, medical history is not deemed to be genetic information if it is not used to determine disease propensity or the health status of an employee.⁷⁷ It is unclear how, if at all, usage of family medical history can be proven to be a factor in determining an employee's health status. Second, family medical history can be disqualified as genetic information even if the family member is a blood relative. In contrast to *Poore*, the medical history at issue in *Allen* was that of the employee's mother.⁷⁸ Regardless of one's opinion on whether non-blood-relative dependents should be considered family members under GINA, an employee's mother undoubtedly satisfies this criterion, and their medical history can certainly provide predictive insight into an employee's genetic disease propensity.⁷⁹

Maxwell v. Verde Valley Ambulance Co., Inc. provides another example in which a blood relative's medical history was not considered genetic information, despite it being potentially predictive for the employee's disease propensity.⁸⁰ In *Maxwell*, Maxwell alleged that Verde Valley Ambulance Co. (VVAC) improperly required that

⁷¹ *Id.*

⁷² *Allen v. Verizon Wireless*, No. 3:12-cv-482(JCH), 2013 WL 2467923, at *75 (D. Conn. June 6, 2013).

⁷³ *Id.* at *72.

⁷⁴ *Id.* at *74.

⁷⁵ *Id.* at *73.

⁷⁶ *Id.* at *73–74.

⁷⁷ *Id.* at *73.

⁷⁸ *Id.* at *6–7.

⁷⁹ See § 42 U.S.C. 201(3)(B).

⁸⁰ *Maxwell v. Verde Valley Ambulance Co.*, No. CV-13-08044-PCT-BSB, 2014 WL 4470512, at *26 (D. Ariz. Sept. 11, 2014).

he disclose genetic information in his family medical history.⁸¹ VVAC requested a medical evaluation to determine if Maxwell could perform his employment duties after Maxwell disclosed that he had sustained a leg injury prior to employment.⁸² In addition to the requested physician's letter, VVAC received a health form which disclosed that Maxwell's grandfather had suffered from cancer.⁸³ In its opinion, the court considered whether the fact that Maxwell's grandfather had cancer was considered genetic information under GINA.⁸⁴

The court cited *Poore* and emphasized that GINA is intended to prevent discrimination based on predictive factors regarding an individual's propensity to inherit a genetic disease or disorder.⁸⁵ Reflecting the outcome of *Poore*, the court found no evidence that the grandfather's cancer was considered with respect to Maxwell and held that there is a question of fact as to whether the medical history constituted genetic information.⁸⁶

Again, two issues with the court's reasoning are apparent. The court was unwilling to establish that a family history of cancer constitutes genetic information because it was not proven that the employer considered the family medical history to be predictive with respect to the employee.⁸⁷ As previously discussed, the statutory language of GINA plainly states that manifested diseases or disorders in a family member is genetic information; there is no requirement that the condition is predictive with respect to the employee.⁸⁸ Additionally, even if there were a predictive requirement under GINA, *Maxwell* provides an example of a potentially predictive family medical history that was disregarded.⁸⁹

Cancer is a multifactorial condition that is influenced by an individual's genetics and environment.⁹⁰ Although it may be unclear to what degree Maxwell's genetics affect his propensity for cancer, it is highly likely that a family history of cancer is at least minimally predictive of his likelihood of developing the disease.⁹¹ Maxwell's grandfather's medical history thus appears to satisfy both requirements to be

⁸¹ *Id.* at *26.

⁸² *Id.* at *13–14.

⁸³ *Id.* at *13.

⁸⁴ *Maxwell v. Verde Valley Ambulance Co.*, No. CV-13-08044-PCT-BSB, 2014 U.S. Dist. LEXIS 127370, 2 (D. Ariz. Sep. 10, 2014).

⁸⁵ *Id.* at 16.

⁸⁶ *Id.* at 16–17.

⁸⁷ *See id.* at 16–17.

⁸⁸ The Genetic Information Nondiscrimination Act, 42 U.S.C. §2000ff (2008).

⁸⁹ *Maxwell*, 2014 U.S. Dist. LEXIS 127370 at 16.

⁹⁰ *The Genetics of Cancer*, NATIONAL CANCER INSTITUTE (updated Aug. 17, 2022), <https://www.cancer.gov/about-cancer/causes-prevention/genetics>.

⁹¹ *See Maxwell v. Verde Valley Ambulance Co.*, No. CV-13-08044-PCT-BSB, 2014 U.S. Dist. LEXIS 127370, at *14 (D. Ariz. Sept. 11, 2014).

considered genetic information under GINA: it is a manifested disease within a family member and is predictive with respect to the employee's health status.⁹²

The cases described above demonstrate the flawed methodology of applying *Poore's* two-factor analysis for genetic information. The framework provided improperly includes requirements that are not present in the plain language of GINA and wrongly excludes medical history that falls within the confines of genetic information. It is therefore necessary that a narrow reading of genetic information under GINA be rejected in favor of a broad, inclusive approach.

V. SUPPORT FOR A BROAD INTERPRETATION

Three arguments support a broad interpretation for "genetic information" under GINA. First, the plain language of GINA states that the term "genetic information" be broadly interpreted.⁹³ Second, the legislative intent and context of the statutory language advocates for a broad interpretation of "genetic information."⁹⁴ Third, *Poore's* two-factor analysis epitomizes the failures that arise from applying a narrow interpretation of "genetic information."⁹⁵

A. Plain Language

Courts have extensively utilized the "plain meaning" rule as a starting point for statutory construction. The plain meaning rule requires that statutes be generally interpreted by their ordinary meaning, and that plain and unambiguous statutory language be enforced.⁹⁶ Application of the plain meaning rule further dictates that when a statute's language is clear and its construction does not lead to absurd consequences, "legislative history may not be used to support a construction that adds to or takes from the significance of the words employed."⁹⁷ Courts should generally only consult extrinsic materials, such as legislative history, when the statutory language is ambiguous or would otherwise lead to an absurd result.⁹⁸

⁹² See *id.*; see also Suter, *supra* note 37 at 504.

⁹³ See *infra* Part 4.A.

⁹⁴ See *infra* Part 4.B.

⁹⁵ See *infra* Part 4.C.

⁹⁶ *Caminetti v. United States*, 242 U.S. 470, 490 (1917); *Moskal v. United States*, 498 U.S. 103, 108 (1990); *Ingalls Shipbuilding, Inc. v. Director, Office of Workers Compensation Programs, Dep't of Labor*, 117 U.S. 796, 801 (1997). *But see* *Public Citizen v. United States Dep't of Justice*, 491 U.S. 440, 470 (1989) (Kennedy, J., concurring) (explaining that the judiciary may avoid applying a statute's plain meaning if it would lead to an absurd result that could not have been intended); *Green v. Bock Laundry Mach. Co.*, 490 U.S. 504, 527 (1989) (Scalia, J., concurring) (rejecting a literal interpretation of Fed. R. of Evid. 609(a)(1) because it would lead to an absurd and unforeseeable result).

⁹⁷ *United States v. Mo. P. R. Co.*, 278 U.S. 269, 278 (1929); *United States v. Shreveport Grain & Elevator Co.*, 287 U.S. 77, 83 (1932); *Mohamad v. Palestinian auth.*, 566 U.S. 720, 728–29 (2012).

⁹⁸ *Church of the Holy Trinity v. United States*, 143 U.S. 457, 459 (1892); *Helvering v. N.Y. Tr. Co.*, 292 U.S. 455, 464 (1934).

When applying the plain meaning rule to GINA, there is no ambiguity in what constitutes genetic information. GINA very clearly defines both relevant terms at issue.⁹⁹ Genetic information is information about an individual's genetic tests, the genetic tests of family members of the individual, or the manifestation of a disease or disorder in family members of the individual.¹⁰⁰ "Family members" are defined as up to a fourth-degree relative of the employee or a *dependent* of the employee.¹⁰¹ "Dependent" is defined by reference to ERISA and guidance provided by the EEOC, clarifying an employee's dependents may include their spouse or children, including children through birth, adoption, or placement for adoption. The statutory language provided by GINA is thus sufficiently clear to enforce the Act without unintended, absurd results.¹⁰²

The court in *Poore* nonetheless disputed whether the term "family member" should apply to spouses, largely based on an improperly added requirement that family medical history be predictive of an employee's disease propensity to be considered genetic information.¹⁰³ This dispute is wholly unnecessary based on the plain language of the Act, which explicitly defines dependents through marriage to be "family members."¹⁰⁴ The court did not state whether this definition was ambiguous. Instead, the *Poore* opinion cited GINA's legislative history as evidence that "family member" was not intended to include non-blood-related family members.¹⁰⁵ As previously discussed, legislative history cannot be used for statutory construction unless the language is ambiguous or would lead to an absurd result.¹⁰⁶ To determine whether statutory language is plain, the Supreme Court explained that courts must read the words "in their context and with a view to their place in the overall statutory scheme."¹⁰⁷ GINA's statutory language with respect to the overall statutory scheme and in context with its legislative history nonetheless supports the statutory definition of "dependents" to include non-blood-relatives.¹⁰⁸

⁹⁹ See Equal Employment Opportunity Commission, Regulations Under the Genetic Information Nondiscrimination Act of 2008; Final Rule, 75 Fed. Reg. 68912 (Nov. 9, 2010).

¹⁰⁰ 42 U.S.C. § 2000ff(4).

¹⁰¹ 42 U.S.C. § 2000ff(3).

¹⁰² See Equal Employment Opportunity Commission, Regulations Under the Genetic Information Nondiscrimination Act of 2008; Final Rule, 75 Fed. Reg. 68912 (Nov. 9, 2010).

¹⁰³ *Poore*, 852 F. Supp. 2d at 731.

¹⁰⁴ 29 U.S.C. § 1181(f)(2)(A)(iii) (2022); 29 C.F.R. § 1635.3(a)(1) (2022).

¹⁰⁵ *Poore*, 852 F. Supp. 2d at 731.

¹⁰⁶ *Caminetti*, 242 U.S. at 490; *Moskal*, 498 U.S. at 108; *Ingalls*, 519 U.S. at 255–56; *Public Citizen*, 491 U.S. at 470; *Green*, 490 U.S. at 527.

¹⁰⁷ *King v. Burwell*, 576 U.S. 473, 486 (2015) (citing *FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 133 (2000)).

¹⁰⁸ *Suter*, *supra* note 37 at 507–08.

B. *Statutory Context*

Despite erroneous claims that GINA's primary purpose is to prevent discrimination based on predictive assessments of an individual's propensity for an inheritable disease,¹⁰⁹ its actual purpose is not so narrow. Congress explicitly stated that federal legislation is "necessary to fully protect the public from discrimination and allay their concerns about the potential for discrimination."¹¹⁰ Full protection from discrimination includes protections from increased health care or insurance costs that may arise from manifested diseases or disorders in family members that are not predictive of disease propensity in an employee.¹¹¹ To achieve this goal, Congress chose to broadly define "family members" as it relates to genetic information.¹¹²

Legislators could have easily narrowed the scope of the term "family member" to exclude those who are not genetically related to the employee.¹¹³ However, this would have been antithetical to the stated purpose of GINA and therefore no such limitation was imposed. Likewise, "family history" was not defined to only consider inheritable diseases or disorders. "Genetic information" was defined to include the manifestation of any disease or disorder in family members rather than only those conditions which were predictive of a future health risk.¹¹⁴

The EEOC's issuance of final regulations for GINA lends further support to a broad statutory construction of "genetic information." Some employer groups argued that GINA did not apply to certain non-inheritable diseases and urged the EEOC to include the word "inheritable" before "disease or disorder" when defining family medical history.¹¹⁵ A concern was raised that, without the inclusion of "inheritable," GINA would inadvertently apply to conditions such as the cold or flu.¹¹⁶ The EEOC rejected these requests, explaining that the regulation's language was to be consistent with the plain language of the statute and that it is unlikely that "questions about whether a family member has a cold, the flu, or similar conditions will often result in charges being filed under GINA."¹¹⁷

Additionally, compliance and enforceability issues were foreseeable given the rate at which the field of genetics advances.¹¹⁸ Although the scientific community has a well-established knowledge of genetics and disease corollaries, an understanding of

¹⁰⁹ *Poore*, 852 F. Supp. 2d at 731.

¹¹⁰ 42 U.S.C. § 2000ff(4).

¹¹¹ *Suter*, *supra* note 37 at 504.

¹¹² *Id.* at 499.

¹¹³ *Id.* (discussing the debate in legislation over how genetic information is defined).

¹¹⁴ 42 U.S.C. § 2000ff(4)(A)(iii).

¹¹⁵ Equal Employment Opportunity Commission, Regulations Under the Genetic Information Nondiscrimination Act of 2008; Final Rule, 75 Fed. Reg. 68915 at 4 (Nov. 9, 2010).

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.*

how every gene in the human genome affects disease predisposition is far from complete.¹¹⁹ The inherent nature of scientific inquiry requires constant revision and correction of theories that were previously thought to be fact.¹²⁰ Entities liable under Title II and EEOC investigators would struggle to determine what particular conditions are inheritable or have a genetic basis due to the constant influx of genetic knowledge, as was seen in the *Maxwell* cancer analysis.¹²¹ Including “inheritable” in the definition of “family medical information” would make compliance with GINA nearly impossible. It is unreasonable to expect employers to incessantly monitor genetic discoveries to determine whether or not diseases are genetically linked.

It is evident that the court in *Poore* failed to rely on the plain language of the statute and established inaccurate conclusions regarding the legislative intent of GINA.¹²² In addition to these shortcomings, the two-factor analysis established in *Poore* improperly imposes requirements that exceed the evidentiary hurdles necessary to succeed in a Title II discrimination claim.¹²³

C. Two-Factor Analysis Issues

The analysis in *Poore* to determine whether family medical history constituted “genetic information” considered two factors.¹²⁴ First, a family member must have a manifested disease or disorder.¹²⁵ Second, the information must be “taken into account” with respect to the employee and not only considered with respect to the afflicted family member.¹²⁶ The first requirement was contentious due to interpretations of the terms “family member” and “disease or disorder.”¹²⁷ Even if these terms were narrowly construed to only apply to inheritable diseases from genetically related family members, the second factor nevertheless limits the protections intended for genetic information. To satisfy the requirements of the second factor and enjoy protections for genetic information, it must be shown that the employer utilized the genetic information specifically with respect to the employee’s health when committing the alleged discriminatory act.

¹¹⁹ See generally *What Does it Mean to Have a Genetic Predisposition to Disease?*, NAT’L LIBR. OF MED.: MEDLINEPLUS (May 14, 2021), <https://medlineplus.gov/genetics/understanding/mutationsanddisorders/predisposition/>.

¹²⁰ W.B. Gallie, *What Makes a Subject Scientific?*, 8 BRIT. J. PHIL. SCI. 118, 118 (1957).

¹²¹ *Maxwell*, 2014 WL 4470512, at *16; Regulations Under the Genetic Information Nondiscrimination Act of 2008, 75 Fed. Reg. at 68915.

¹²² See *Poore*, 852 F. Supp. 2d at 731.

¹²³ See *id.*

¹²⁴ *Id.*

¹²⁵ *Id.*

¹²⁶ *Id.*

¹²⁷ 42 U.S.C. § 2000ff(3); Mark A. Rothstein, *GINA, the ADA, and Genetic Discrimination in Employment*, 36 J. LAW MED. ETHICS 837, 838–39 (2008).

The court in *Poore* failed to explain what action or contemplation is necessary for an employer to “take into account” a family member’s disease or disorder with respect to an employee.¹²⁸ Regardless of what standard was contemplated in the opinion, this requirement effectively eliminates any objectivity in whether a family member’s condition is predictive of an employee’s disease propensity or health status. Instead, the court seems to suggest that the dispositive element is whether the employer *perceived* the family medical condition to be predictive of a future health risk for the employee. This analysis is not necessarily problematic under the facts of *Poore* where the condition at issue is non-predictive for the employee but is highly problematic in cases involving genetically related family members.¹²⁹

In *Maxwell*, the plaintiff alleged that his employer discriminated based on a family history of cancer.¹³⁰ It is objectively impossible to claim that an employee’s grandfather’s cancer has no predictive value for the health of the employee. Although genetics may sometimes only play a minor role in cancer development, it cannot be definitively claimed that the grandfather’s cancer has no predictive value for the employee’s cancer propensity. Without comprehensive testing or perhaps even advancements in oncological genetics, it is likely a family history of cancer is at least minimally predictive with respect to the employee. Even under a narrow interpretation of the statutory language, the grandfather’s cancer would certainly be considered genetic information because it is a manifested disease in a family member that is predictive of future health complications.

Despite what should obviously be considered genetic information, the two-factor analysis provides an avenue for employers to circumvent liability in two ways. First, an employer may fail to “take into account” an employee’s family’s medical history with respect to the employee, even when they objectively should have done so. For example, imagine an employer improperly receives an employee’s family medical history that included a disease known to be inheritable but did not take that condition into account with respect to the employee. Under the plain language of GINA, the acquisition of the medical history would be improper because the medical history is genetic information; there is no provision that requires whether it was taken into account with respect to the employee. In contrast, there would be no GINA violation under the two-factor analysis because the employer did not consider the history with respect to the employee, thereby circumventing the necessary criteria to constitute genetic information. The perception of the employer thus becomes the crux of the analysis. Relying on the two-factor analysis causes family medical history that would otherwise be genetic information under GINA to instead depend on the employer’s subjective perception of the medical history with respect to the employee.

Furthermore, imposing such an analysis allows employers to avoid liability even if they did consider family medical history with respect to an employee. *Poore* did not establish an evidentiary standard that proves an employer considered family medical

¹²⁸ See *Poore*, 852 F. Supp. 2d at 731.

¹²⁹ Compare *Poore*, 852 F. Supp. 2d at 731, with *Maxwell*, 2014 U.S. Dist. LEXIS 127370, at *39.

¹³⁰ *Maxwell*, 2014 U.S. Dist. LEXIS 127370, at *40.

history with respect to an employee.¹³¹ It is entirely plausible that an employer would then discriminate against an employee based on their family medical history but falsely claim that they had not taken the history into account. Despite the employer's dishonesty, the burden of proof would fall on the employee to establish that the employer did, in fact, consider the family medical history with respect to the employee. This may be a difficult evidentiary burden to overcome and would unjustly erode the protections established by GINA.

The two-factor analysis put forth in *Poore* is problematic for several reasons. Nothing in GINA's statutory language suggests that an employer's understanding of a manifested disease's predictive value is relevant to constitute "genetic information." Furthermore, an objectively predictive family medical history may nonetheless not be considered "genetic information" based on the employer's subjective perception of the condition. While these two issues irrevocably damage GINA's protections from discrimination, the two-factor analysis also erodes the privacy protections afforded by GINA.¹³²

Many antidiscrimination statutes, such as the ADA, prohibit discrimination against employees but do not prohibit the acquisition of personal information related to a protected status.¹³³ In contrast, GINA provides inherent privacy protections in addition to its discrimination protections.¹³⁴ Under GINA, "[a] covered entity may not request, require, or purchase genetic information of an individual or family member of the individual."¹³⁵ The privacy language here provides two protective advantages over traditional discrimination statutes.

First, discrimination is comparatively more difficult to prove than privacy violations. A plaintiff must establish discriminatory intent to succeed on a discrimination claim.¹³⁶ Doing so requires that plaintiffs prove the mindset of their alleged discriminator, and that this mindset was the underlying reason for the alleged discriminatory action.¹³⁷ This is particularly problematic in an employment setting.

It is impossible to know with certainty what reasons influenced a given employment decision. An employee's performance, punctuality, professional or educational background, and countless other factors may have been considered by an employer when making employment decisions. Even if an employer indeed had discriminatory intent when making an employment decision, a nearly infinite number of nondiscriminatory explanations can reasonably be believed to justify the alleged

¹³¹ See *Poore*, 852 F. Supp. 2d 727 at 731.

¹³² *Id.*; see Suter, *supra* note 37, at 525 ("This unique treatment of information related to the protected status may, however, limit the potential of GINA to advance some of its underlying goals.").

¹³³ 42 U.S.C. § 12112(b).

¹³⁴ See 29 C.F.R. § 1635.8(a).

¹³⁵ *Id.* (in which an employer is a "covered entity").

¹³⁶ Jessica L. Roberts, *Protecting Privacy to Prevent Discrimination*, 56 WM. & MARY L. REV. 2097, 2149 (2015).

¹³⁷ *Id.*

discriminatory act in question. Moreover, if an employer can establish that they would have made the same employment decision regardless of an employee's protected status, the plaintiff may not be eligible for damages or court-mandated employment actions.¹³⁸ It is thus an arduous endeavor for a plaintiff to definitively prove that the basis for an employment decision was the employee's protected status.

Conversely, intent is irrelevant to prove privacy violations.¹³⁹ A plaintiff must only establish that the employer improperly acquired protected information.¹⁴⁰ This burden of proof is substantially easier to satisfy than proving intent. Determining the underlying factors that motivated a decision is immaterial; a plaintiff must simply show that the employer, through improper means, was in possession of protected information.¹⁴¹ Such a showing can be easily established through correspondence detailing the improper request, receipts showing that the information was purchased, or other internal documents that do not fall under a privacy exemption

Second, the preemptive nature of privacy laws makes subsequent discrimination impossible because it prevents the acquisition of protected information necessary to perform a discriminatory act.¹⁴² As previously explained, a plaintiff must establish discriminatory intent to succeed on a discrimination claim.¹⁴³ However, an employer cannot have discriminatory intent if they are not in possession of protected information. By intervening at the differentiation stage, privacy laws therefore prevent discrimination by prohibiting employers from attaining the protected information necessary to perform a discriminatory act. GINA's privacy protections are thus indispensably valuable in both preventing the acquisition of protected information and discriminating based on protected information. However, it is important to note that this provision specifically prohibits the acquisition of "genetic information," and it does not prohibit the acquisition of family medical history generally.¹⁴⁴

The two-factor analysis undermines the privacy protections established by GINA because of its stringent requirements for genetic information. As previously discussed, an employee faces a difficult standard in proving that the acquisition of family medical history actually constitutes genetic information.¹⁴⁵ An employer's request or

¹³⁸ See Linda Hamilton Krieger, *The Content of Our Categories: A Cognitive Bias Approach to Discrimination and Equal Employment Opportunity*, 47 STAN. L. REV. 1161, 1171 (1995) (discussing where age is a determining factor, there is not a requirement of finding a defendant's state of mind due to the distinction between motive and intent).

¹³⁹ Roberts, *supra* note 136, at 2149.

¹⁴⁰ *Id.* at 2154.

¹⁴¹ U.S. EQUAL EMPLOYMENT OPPORTUNITY COMM'N, THE GENETIC INFORMATION NONDISCRIMINATION ACT, SEC. 202 (2008); see also Regulations Under the Genetic Information Nondiscrimination Act of 2008, 75 Fed. Reg. 216, (Nov. 9, 2010) (to be codified at 29 C.F.R. pt. 1635).

¹⁴² Roberts, *supra* note 136, at 2172.

¹⁴³ *Id.*

¹⁴⁴ See Genetic Information Nondiscrimination Act (GINA), 42 U.S.C. § 202(b) (2008).

¹⁴⁵ Poore v. Peterbilt Bristol, L.L.C., 852 F. Supp. 2d 727(W.D. Va. 2012).

acquisition of an employee's family medical history would not be prohibited unless the employer takes the history into account with respect to the employee.¹⁴⁶ This problematic requirement then forces plaintiffs to prove the employer's subjective perception of family medical history not only to prove that an employment decision was based on protected information, but also to establish that the information at issue is protected as genetic information. Although the discussion of *Poore's* decision has been largely critical, its line of reasoning is not without merit.

VI. COUNTER-ANALYSIS

Proving an employer's improper acquisition of genetic information and subsequent discrimination is problematic when the added element of employer perception is considered. Nonetheless, proposals to narrow the scope of genetic information are not necessarily without merit. An argument can certainly be made that the scope of protected information provided by GINA may be overinclusive, particularly regarding family members that are not genetically related to an employee.¹⁴⁷ Proponents of a narrow interpretation argue that including protections for the family medical history of non-blood-related relatives is in opposition to the purpose of GINA.¹⁴⁸ This argument erroneously contends that the purpose of GINA is to prevent discrimination based on an individual's propensity for inheritable disease manifestation.¹⁴⁹ However, Congress was clear in stating that federal legislation is "necessary to fully protect the public from discrimination and allay their concerns about the potential for discrimination."¹⁵⁰

Although preventing discrimination based on inheritable disease propensity is certainly one of the protections offered by GINA, this form of protection is not its only purpose. To fully "protect the public from discrimination," an employee must also be protected from adverse employment decisions due to familial medical obligations.¹⁵¹ As previously discussed, instances may arise in which an employee may face discrimination based on the genetic information of family members who are not genetically related.¹⁵² An employer could plausibly discriminate against an employee if it was known that their family member's disease or disorder would lead to higher healthcare and insurance costs, even if the employee had no increased risk of disease.

¹⁴⁶ U.S. Equal Emp. Opportunity Comm'n, *Fact Sheet: Genetic Information Nondiscrimination Act*, (Sept. 9, 2014), <https://www.eeoc.gov/laws/guidance/fact-sheet-genetic-information-nondiscrimination-act>.

¹⁴⁷ See Suter, *supra* note 37.

¹⁴⁸ *Id.*

¹⁴⁹ *Id.* at 511.

¹⁵⁰ Genetic Information Nondiscrimination Act (GINA) of 2008, Pub. L. No. 110-233, § 2(5), 122 Stat. 881, 882) *reprinted in* 42 U.S.C. § 2000ff note (Other Provisions).

¹⁵¹ *Id.* at § 2(4).

¹⁵² See *Poore v. Peterbilt of Bristol, L.L.C.*, 852 F. Supp. 2d 727, 729 (W.D. Va. 2012) (providing that the plaintiff was denied health insurance coverage because of his disclosure that wife had been diagnosed with multiple sclerosis).

Furthermore, it is extremely difficult to establish a bright-line rule that differentiates inheritable from non-inheritable diseases.¹⁵³ This distinction would require a multifactorial approach in a field that is constantly advancing. Legislators would have to consider what degree of penetrance is necessary for a disease to be considered inheritable, whether the disease is monogenic or polygenic, and the role of environmental factors in its development, among countless other factors.¹⁵⁴ Additionally, the established standards for inheritability would be likely to constantly fluctuate as new genetic correlates for a particular disease are discovered.¹⁵⁵

VII. CONCLUSION

Imposing an “inheritability” standard for genetic discrimination protections unduly burdens employees, employers, and the courts that must resolve the matters discussed above. Employees and employers would have to rely on the most recent developments in a continuously evolving scientific field to determine what genetic conditions are protected under GINA. This uncertainty would then carry into litigation where courts would be forced to make rulings that definitively answer whether a disease has an inheritable genetic basis. Definitive rulings on a disease’s heritability are contrary to what is understood in the scientific community about many genetic predispositions. Countless diseases are known to have genetic correlates that *can* make an individual at risk of manifesting the disease without conclusively indicating that the individual *will* manifest the disease.¹⁵⁶ The complex nature of genetic abnormalities and disease propensity is thus incompatible with the proposed construction of “familial medical history” that includes the term “inheritable.” There is not a plausible, nor scientifically accurate, means of resolving this incongruity that would allow courts to fairly and consistently adjudicate claims arising under GINA.

Although some might argue that GINA’s statutory language is overly broad, it is necessary to provide the intended protections against genetic discrimination. When considering the plain language and legislative history of GINA, Congress undoubtedly intended that the term genetic information be read inclusively to protect the medical histories of family members who may not be genetically related to the employee. The alternative too narrowly construes the term “genetic information” and unnecessarily mitigates the protections offered, thereby conflicting with the purpose of GINA. Courts should apply the plain language of the statute and avoid implementing the two-factor analysis used in *Poore*.

¹⁵³ Suter, *supra* note 37.

¹⁵⁴ *What are Reduced Penetrance and Variable Expressivity?*, NAT’L LIBR. OF MED.: MEDLINEPLUS, <https://medlineplus.gov/genetics/understanding/inheritance/penetranceexpressivity/> (last updated Apr. 19, 2021); Frauke Becker et al., *Genetic Testing and Common Disorders in a Public Health Framework: How to Assess Relevance and Possibilities*, 19 EUR. J. HUM. GENETICS S6, S9 (2011).

¹⁵⁵ Genetic Information Nondiscrimination Act (GINA) of 2008, Pub. L. No. 110-233, § 2(2).

¹⁵⁶ *The Genetics of Cancer*, NAT’L CANCER INST.: CANCER CAUSES AND PREVENTION, <https://www.cancer.gov/about-cancer/causes-prevention/genetics> (last updated Aug. 17, 2022).