MEMORANDUM

To: **General Counsel, AB Consumer Loan Corp.**
From: **X, legal intern at AB Consumer Loan Corp.**
Re: **Usage of Genetic Information for Credit Scoring**

PART I: SUMMARY

The company's loan underwriting division has recently reviewed a study by Jan-Emmanuel De Neve, of the London School of Economics, and James Fowler, of the University of California which has found that the likelihood of a person carrying one or both "low efficiency" alleles of the MAOA gene to have credit card debt increases by 7.8% and 15.9%, respectively. The rising availability of DNA analyses is now making it possible for scientists to try to link specific genes to specific behaviors. De Neve and Fowler looked at a genetic database of more than 2,500 young adults (18 to 26 year-olds) who had been tracked since high school in the National Longitudinal Study of Adolescent Health, and predicted that those in the database with the low-efficiency MAOA genes would report higher incidence of carrying credit card debt. Their studies corroborate that finding, though the authors state, that it would be better to look at older adults and to have verifiable information about their actual amount of credit card debt. The implications of this study however are far-reaching. The underwriting division is constantly looking for ways to more accurately peg credit scores for their clients. The underwriting division of this company believes that access and information to a database containing information regarding the MAOA genetic component of their clients and potential clients would help the company's risk management strategies. While the company already gathers credit history, earnings and other socio-economic data for credit scoring, access to a client's genetic information based on the MAOA gene would be an added advantage to predict a client's credit risk. This would not only benefit the company, it would also benefit low risk customers through lower interest rates since the company could then more accurately shift risk burden through higher rates to its high risk customers.

There has been much discussion on how genetic information could be misused to discriminate against persons whether at the work place, in respect of access to health insurance. The underwriting division would like to know whether they are prohibited from accessing and using genetic information by law.

This memorandum, provides the initial assessment of the law in this area for the purpose initiating further discussion on the course of action the company should take as regards access and utilization of genetic information for the company's risk management. The memorandum also provides a link to the Genetic Information Nondiscrimination Act, 2008 as Exhibit 1, a bill which President George W. Bush signed into law two years ago.

PART II: BACKGROUND AND ANALYSIS

(a) The MAOA Gene and its implications

MAOA[1] has been linked to antisocial and criminal behavior in adolescents, to the risk of developing major depression, to vulnerability to such environmental stressors as abusive treatment in childhood, to impulsivity, and to aggression following provocation – which is the reason why MAOA has been dubbed "the warrior gene" in some studies.[2] Every person has two copies of the MAOA gene (one from each parent), a person can therefore have two low-efficiency forms, or alleles, two high-efficiency alleles, or one of each. DeNeve and Fowler's study found that having one or both MAOA alleles of the low-efficiency type raises the average likelihood of having credit card debt by 7.8% and 15.9% respectively. Other clinical studies show that this gene can influence one's behaviour since it has been established to affect neurotransmitters, which in turn impacts brain activity.[3] Increased levels of this gene have been linked to criminal and delinquent behaviour in young teens.[4] This gene could also induce aggression which is why some scientists labelled it as the warrior gene.

With the existing extensive risk profiling practices that looks into a person's age, gender, and occupation, credit history and credit score, credit card companies and financial institutions constantly looking out for more sophisticated ways of measuring a person's risk profile. The genetics tests and the findings of De Neve and Fowler's study could be used to distinguish responsible shoppers from irresponsible shoppers and more accurately determine people who present elevated risks of deviant spending behaviour and habits.

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[1] Monoamine Oxidase A

[2] McDermott, Tingley, Cowden, Frazzetto and Johnson, *Monoamine oxidase A gene (MAOA)Predicts Behavioral Aggression Following Provocation,* PNAS February 17, 2009 vol. 106 no. 7 2118-2123, available at http://www.pnas.org/content/106/7/2118.full

[3] Id

[4] Id.

However, many have also pointed out that having a specific genetic component does not accurately predict behavioural patterns. There is complex relationship between genes and behavior, unlike with physical characteristics behavioral traits arise from a complex interplay of brain systems and environment.[5] De Neve and Fowler state in their study that [n]ot all studies show a direct relationship between genetic variation and behavior. Instead, developmental or concurrent environments may moderate an association between genes and observed social behavior.[6] However The authors also conclude that "[a]lthough the environment is extremely important in shaping financial and other economic decisions, perhaps even more so than genes, we can no longer act as if genes do not matter at all. Genetic differences are likely to have important consequences for a whole range of economic behaviors."

(b) **Privacy Laws on Genetic Information**

CODIS: The Combined DNA Index System ("CODIS") is a federally funded computer system which contains identifying DNA records or analyses of persons convicted of crimes, persons charged in an indictment or information with a crime, persons whose DNA samples are collected under the jurisdiction of applicable legal authorities, analyses of DNA samples recovered from crime scenes and analyses of DNA samples voluntarily contributed from relatives of missing persons for the purposes of law enforcement.[7] CODIS can only include information on DNA identification records and DNA analyses that are based on analyses performed by or on behalf of a criminal justice agency in accordance with specified standards and the law also places restrictions on the use of results of DNA tests for specific enforcement purposes. 32 states have enacted laws dealing directly with privacy of genetic information[8] however the scope and extent of these laws vary significantly between states. Federally, other than the GINA discussed later, there no overarching laws which ensure that genetic information collected outside of CODIS remains private.

GINA: Increasingly, genetic testing presents opportunities to reduce morbidity and mortality. However, fear of dissemination of genetic information and consequent discrimination prevents people from undergoing beneficial genetic tests. The fears pertained in part to genetic information being used

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[5] Ryan Sager, *Overspending: Blame it on your Debt Gene?*, SmartMoney, November 6, 2009. Available at http://www.smartmoney.com/personal-finance/debt/blame-it-on-your-debt-gene/?print=1

[6] De Neve, Jan-*Emmanuel* and Fowler, James H., *The MAOA Gene Predicts Credit Card Debt*, November 10, 2009 at pg 7. Available at SSRN: http://ssrn.com/abstract=1457224.

[7] Serwin, Andrew B., Protecting the Privacy of Genetic Information (November 15, 2008). Available at SSRN: http://ssrn.com/abstract=1302162

[8] Supra note 5

to increase premiums or deny coverage by health insurers and discrimination at the workplace. Consequently after much debate, the Genetic Information Nondiscrimination Act of 2008, (GINA) was enacted to contain limitations on the use of genetic testing for health insurance purposes, including using genetic information to determine eligibility or policyholders' premium or contribution amounts; and except in limited instances, requiring individuals to provide genetic information or to undergo genetic tests. These restrictions are contained in modifications to ERISA, as well as other sections of the United States Code, and they are applicable to group health plans and health insurers, insurers offering insurance to individuals, medigap insurers, as well as other insurers.[9] Employers are also restricted in what information they can obtain from employees. Subject to certain exceptions, employers cannot request, require, or purchase genetic information regarding an employee, or a family member[10] and are prohibited from using such information to discriminate against employees at the workplace.

There is a complicated implementation process on state and federal levels for the implementation of GINA. Its provisions affect three federal agencies, the Secretary of Labor,[11] the Secretary of the Treasury under the Internal Revenue Code; and the Secretary of Health and Human Services (HHS) under the Public Health Service Act. Once developed, federal rules propose to establish metrics for measuring state insurance regulations and determine which, if any, state rules must change their laws to comply. The IRS, the Employee Benefits Security Administration (EBSA), and the Department of Health and Human Services (HHS) have issued temporary, final and proposed regulations implementing Title I of the Genetic Information Nondiscrimination Act of 2008 (GINA) (P.L. 110-233).[12] The regulations are effective on December 7, 2009, for health plan beginning on or after that date. The Department of Health and Human Services (HHS) has issued proposed regulations to implement section 105 of the Title I of the Genetic Information Nondiscrimination Act of 2008 (GINA) (P.L. 110-233).[13] The regulations would modify the HIPAA Privacy Rule to clarify that genetic information is health information and to prohibit the use and disclosure of genetic information by covered health plans for eligibility determinations, premium computations, applications of any preexisting condition exclusions, and any other activities related to the creation, renewal, or replacement of a contract of health insurance or health benefits.[14]

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[9] Id.

[10] Id.

[11] Regulating group insurers under the Employment Retirement Income Security Act of 1974(ERISA)

[12] Benefits Update, Wolters Kluwer, November 2009 available at http://business.cch.com/updates/benefits/november2009.htm

[13] Id

[14] Id

These provisions mean that insurers may not use genetic information for determining eligibility, rate plans, or covered benefits. Insurers may still discriminate against individuals with manifested diseases or conditions, no matter the genetic or non-genetic cause of the ailment.[15] However, if a family member of an individual has a manifested disease or condition, the insurer must treat that information as genetic information and prohibitions apply.[16]

GINA limits insurers' ability to request or require either genetic information or genetic testing. Insurers may not collect genetic information from an individual before or during that individual's application for enrollment.[17] Insurers may possess genetic information in some instances: (a) the insurer may receive genetic information as an incident to other information collection,[18] (b) insurers may ask for the "minimum amount" of genetic information necessary to make "a determination regarding payment[19] for example if a policy holder asks for a certain treatment like a mammogram the insurer may ask for genetic history or trait which may increase the risk of exposure to breast cancer, and (c) in some very limited circumstances, the insurer may ask the policy holder to undergo genetic testing for scientific research.[20] Though an insurer may have legally obtained genetic information, it may not use the information for prohibited practices. However many have raised questions on whether an accurate investigation can be made into whether an insurer had fixed premiums or refused insurance directly as a result of an individual's genetic information.

The GINA stipulates penalties for group insurer who does not exercise reasonable diligence. Substantial financial penalties can accompany individual violations of GINA protections. Insurers may be fined $100 per day per individual policyholder affected by a violation[21] with an overall cap of $2500 fine per policyholder; but if the violation is more than de minimus, the cap rises to $15,000.[22] If the insurer has not demonstrated "willful neglect," the total penalty for any violation, regardless of the number of policyholders, is capped at $500,000.[23] The issue remains as to what constitutes

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[15] Coalition for Genetic Fairness (CGF), *What Does GINA Mean?* , November 10, 2008, available at http://www.geneticalliance.org/ksc_assets/publications/ginapublication111008.pdf

[16] GINA, Pub. L. No. 110-233, sec. 101(d)

[17] Id sec. 102(a)(2), § 2702(d)(2)

[18] Id sec. 102(a)(2), § 2702(d)(3)

[19] Id. 102(a)(2), § 2702(c)(3)(B)

[20] Kurt Chauviere, *Legislation about DNA Testing in Insurance – Evaluation of the Genetic Information Nondiscrimination Act of 2008*, HLS Regulation of Financial Institutions, 21 November 2008

[21] GINA, Pub. L. No. 110-233, sec. 101(e)(3), § 502(c)(9).

[22] Supra note 21.

[23] Id

"reasonable diligence" further, insurers can rectify any violation within a thirty days of notice to escape a fine.[24] Insurers in the individual market face enforcement actions at the state level.

There have been several representations made before the Congress opposing the GINA. The most compelling argument is that by excluding genetic information, GINA forces insurers to use less reliable proxies in pricing models which leads to the distortion of insurance pricing.[25] The Act's definition of "genetic information," is very broad. It includes the obvious, such as the results of genetic tests, but also the broad "manifestation of a disease or disorder in family members" of an individual.[26] Therefore GINA prohibits the use of both genetic test results and all family medical history in underwriting decisions.[27] As a result, health insurers lose the advantage of accurately predicting health costs.

(b) Genetic Information and Credit Scoring

While genetic information has direct determinative impact on a person's health and therefore issues relating to health insurance, its correlation to a person's financial behavior and decisions is less obvious. At present therefore there are no clear regulations prohibiting financial institutions and lenders from accessing and utilizing genetic information to assess the creditworthiness of its clients. As stated earlier in the memo, though genetic information is clearly not the only and definitive factor in credit scoring, its importance cannot be undermined.

It has been argued that access to such information may lead to credit card companies targeting higher risk prone individuals in the hopes of accumulating profits from higher rates and defaults. The same data can be used by financial institutions to deny loans or mortgages to potentially high risk individuals creating greater social imbalances. While fears that such information can be used by financial institutions and lenders to discriminate against or deny credit to persons based on genetic information may be true, it is also necessary to take into considerations the benefits as pointed out by our company's underwriting division. The correlation between genetic traits and behavioral patterns are not absolute and that is well understood, which is why credit scoring comprises of data relating to a number of other socio-economic in respect of each person. Most institutions already have access to data and information regarding an individual's credit and socio-economic history and perhaps those of their immediate families which can predict credit risk. Inaccuracies and incomplete information yield widespread pricing inefficiencies that undermine risk-sharing. Genetic information

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[24] Id

[25] Supra note 20

[26] GINA, Pub. L. No. 110-233, sec. 101(d), § 733(d)(6)(a)(iii)

[27] Supra note 20

may provide an important component to increase accuracy of credit scoring. It may also be used to predict future credit patterns of young adults who may apply for loans, mortgages or credit cards but do not have a substantial financial history. The inclusion of genetic information would only refine the risk assessment tools that our company already has and therefore more accurately allocate interest rates as between high risk and low risk individuals, better monitor high risk customers, and balance the company's risk exposure. This would prove beneficial not only for the company but also for low risk and responsible borrowers.

Exhibit 1.

Link to the Genetic Information Nondiscrimination Act of 2008

http://www.govtrack.us/congress/billtext.xpd?bill=h110-493&show-changes=0&page-command=print

Exhibit 1

One Hundred Tenth Congress of the United States of America

AT THE SECOND SESSION

Begun and held at the City of Washington on Thursday, the third day of January, two thousand and eight

An Act

To prohibit discrimination on the basis of genetic information with respect to health insurance and employment.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the "Genetic Information Nondiscrimination Act of 2008".

(b) TABLE OF CONTENTS.—The table of contents of this Act is as follows:

SEC. 2. FINDINGS.

Congress makes the following findings:

(1) Deciphering the sequence of the human genome and other advances in genetics open major new opportunities for medical progress. New knowledge about the genetic basis of illness will allow for earlier detection of illnesses, often before symptoms have begun. Genetic testing can allow individuals to take steps to reduce the likelihood that they will contract

a particular disorder. New knowledge about genetics may allow for the development of better therapies that are more effective against disease or have fewer side effects than current treatments. These advances give rise to the potential misuse of genetic information to discriminate in health insurance and employment.

(2) The early science of genetics became the basis of State laws that provided for the sterilization of persons having presumed genetic "defects" such as mental retardation, mental disease, epilepsy, blindness, and hearing loss, among other conditions. The first sterilization law was enacted in the State of Indiana in 1907. By 1981, a majority of States adopted sterilization laws to "correct" apparent genetic traits or tendencies. Many of these State laws have since been repealed, and many have been modified to include essential constitutional requirements of due process and equal protection. However, the current explosion in the science of genetics, and the history of sterilization laws by the States based on early genetic science, compels Congressional action in this area.

(3) Although genes are facially neutral markers, many genetic conditions and disorders are associated with particular racial and ethnic groups and gender. Because some genetic traits are most prevalent in particular groups, members of a particular group may be stigmatized or discriminated against as a result of that genetic information. This form of discrimination was evident in the 1970s, which saw the advent of programs to screen and identify carriers of sickle cell anemia, a disease which afflicts African-Americans. Once again, State legislatures began to enact discriminatory laws in the area, and in the early 1970s began mandating genetic screening of all African Americans for sickle cell anemia, leading to discrimination and unnecessary fear. To alleviate some of this stigma, Congress in 1972 passed the National Sickle Cell Anemia Control Act, which withholds Federal funding from States unless sickle cell testing is voluntary.

(4) Congress has been informed of examples of genetic discrimination in the workplace. These include the use of preemployment genetic screening at Lawrence Berkeley Laboratory, which led to a court decision in favor of the employees in that case Norman-Bloodsaw v. Lawrence Berkeley Laboratory (135 F.3d 1260, 1269 (9th Cir. 1998)). Congress clearly has a compelling public interest in relieving the fear of discrimination and in prohibiting its actual practice in employment and health insurance.

(5) Federal law addressing genetic discrimination in health insurance and employment is incomplete in both the scope and depth of its protections. Moreover, while many States have enacted some type of genetic non-discrimination law, these laws vary widely with respect to their approach, application, and level of protection. Congress has collected substantial evidence that the American public and the medical community find the existing patchwork of State and Federal laws to be confusing and inadequate to protect them from discrimination. Therefore Federal legislation establishing a national and uniform basic standard is necessary to fully protect the public from discrimination and allay their concerns about the potential

for discrimination, thereby allowing individuals to take advantage of genetic testing, technologies, research, and new therapies.

TITLE I—GENETIC NONDISCRIMINATION IN HEALTH INSURANCE

SEC. 101. AMENDMENTS TO EMPLOYEE RETIREMENT INCOME SECURITY ACT OF 1974.

(a) NO DISCRIMINATION IN GROUP PREMIUMS BASED ON GENETIC INFORMATION.—Section 702(b) of the Employee Retirement Income Security Act of 1974 (29 U.S.C. 1182(b)) is amended—

(1) in paragraph (2)(A), by inserting before the semicolon the following: "except as provided in paragraph (3)"; and

(2) by adding at the end the following:

"(3) NO GROUP-BASED DISCRIMINATION ON BASIS OF GENETIC INFORMATION.—

"(A) IN GENERAL.—For purposes of this section, a group health plan, and a health insurance issuer offering group health insurance coverage in connection with a group health plan, may not adjust premium or contribution amounts for the group covered under such plan on the basis of genetic information.

"(B) RULE OF CONSTRUCTION.—Nothing in subparagraph (A) or in paragraphs (1) and (2) of subsection (d) shall be construed to limit the ability of a health insurance issuer offering health insurance coverage in connection with a group health plan to increase the premium for an employer based on the manifestation of a disease or disorder of an individual who is enrolled in the plan. In such case, the manifestation of a disease or disorder in one individual cannot also be used as genetic information about other group members and to further increase the premium for the employer.".

(b) LIMITATIONS ON GENETIC TESTING; PROHIBITION ON COLLECTION OF GENETIC INFORMATION; APPLICATION TO ALL PLANS.—Section 702 of the Employee Retirement Income Security Act of 1974 (29 U.S.C. 1182) is amended by adding at the end the following:

"(c) GENETIC TESTING.—

"(1) LIMITATION ON REQUESTING OR REQUIRING GENETIC TESTING.—A group health plan, and a health insurance issuer offering health insurance coverage in connection with a group health plan, shall not request or require an individual or a family member of such individual to undergo a genetic test.

"(2) RULE OF CONSTRUCTION.—Paragraph (1) shall not be construed to limit the authority of a health care professional who is providing health care services to an individual to request that such individual undergo a genetic test.

"(3) RULE OF CONSTRUCTION REGARDING PAYMENT.—

"(A) IN GENERAL.—Nothing in paragraph (1) shall be construed to preclude a group health plan, or a health insurance issuer offering health insurance coverage in connection with a group health plan, from obtaining and using the results of a genetic test in making a determination regarding payment (as such term is defined for the purposes of applying the regulations promulgated by the

Secretary of Health and Human Services under part C of title XI of the Social Security Act and section 264 of the Health Insurance Portability and Accountability Act of 1996, as may be revised from time to time) consistent with subsection (a).

"(B) LIMITATION.—For purposes of subparagraph (A), a group health plan, or a health insurance issuer offering health insurance coverage in connection with a group health plan, may request only the minimum amount of information necessary to accomplish the intended purpose.

"(4) RESEARCH EXCEPTION.—Notwithstanding paragraph (1), a group health plan, or a health insurance issuer offering health insurance coverage in connection with a group health plan, may request, but not require, that a participant or beneficiary undergo a genetic test if each of the following conditions is met:

"(A) The request is made, in writing, pursuant to research that complies with part 46 of title 45, Code of Federal Regulations, or equivalent Federal regulations, and any applicable State or local law or regulations for the protection of human subjects in research.

"(B) The plan or issuer clearly indicates to each participant or beneficiary, or in the case of a minor child, to the legal guardian of such beneficiary, to whom the request is made that—

"(i) compliance with the request is voluntary; and

"(ii) non-compliance will have no effect on enrollment status or premium or contribution amounts.

"(C) No genetic information collected or acquired under this paragraph shall be used for underwriting purposes.

"(D) The plan or issuer notifies the Secretary in writing that the plan or issuer is conducting activities pursuant to the exception provided for under this paragraph, including a description of the activities conducted.

"(E) The plan or issuer complies with such other conditions as the Secretary may by regulation require for activities conducted under this paragraph.

"(d) PROHIBITION ON COLLECTION OF GENETIC INFORMATION.—

"(1) IN GENERAL.—A group health plan, and a health insurance issuer offering health insurance coverage in connection with a group health plan, shall not request, require, or purchase genetic information for underwriting purposes (as defined in section 733).

"(2) PROHIBITION ON COLLECTION OF GENETIC INFORMATION PRIOR TO ENROLLMENT.—A group health plan, and a health insurance issuer offering health insurance coverage in connection with a group health plan, shall not request, require, or purchase genetic information with respect to any individual prior to such individual's enrollment under the plan or coverage in connection with such enrollment.

"(3) INCIDENTAL COLLECTION.—If a group health plan, or a health insurance issuer offering health insurance coverage in connection with a group health plan, obtains genetic information incidental to the requesting, requiring, or purchasing of other information concerning any individual, such request, requirement, or purchase shall not be considered a violation

of paragraph (2) if such request, requirement, or purchase is not in violation of paragraph (1).

"(e) APPLICATION TO ALL PLANS.—The provisions of subsections (a)(1)(F), (b)(3), (c), and (d), and subsection (b)(1) and section 701 with respect to genetic information, shall apply to group health plans and health insurance issuers without regard to section 732(a).".

(c) APPLICATION TO GENETIC INFORMATION OF A FETUS OR EMBRYO.—Such section is further amended by adding at the end the following:

"(f) GENETIC INFORMATION OF A FETUS OR EMBRYO.—Any reference in this part to genetic information concerning an individual or family member of an individual shall—

"(1) with respect to such an individual or family member of an individual who is a pregnant woman, include genetic information of any fetus carried by such pregnant woman; and

"(2) with respect to an individual or family member utilizing an assisted reproductive technology, include genetic information of any embryo legally held by the individual or family member.".

(d) DEFINITIONS.—Section 733(d) of the Employee Retirement Income Security Act of 1974 (29 U.S.C. 1191b(d)) is amended by adding at the end the following:

"(5) FAMILY MEMBER.—The term 'family member' means, with respect to an individual—

"(A) a dependent (as such term is used for purposes of section 701(f)(2)) of such individual, and

"(B) any other individual who is a first-degree, second-degree, third-degree, or fourth-degree relative of such individual or of an individual described in subparagraph (A).

"(6) GENETIC INFORMATION.—

"(A) IN GENERAL.—The term 'genetic information' means, with respect to any individual, information about—

"(i) such individual's genetic tests,

"(ii) the genetic tests of family members of such individual, and

"(iii) the manifestation of a disease or disorder in family members of such individual.

"(B) INCLUSION OF GENETIC SERVICES AND PARTICIPATION IN GENETIC RESEARCH.—Such term includes, with respect to any individual, any request for, or receipt of, genetic services, or participation in clinical research which includes genetic services, by such individual or any family member of such individual.

"(C) EXCLUSIONS.—The term 'genetic information' shall not include information about the sex or age of any individual.

"(7) GENETIC TEST.—

"(A) IN GENERAL.—The term 'genetic test' means an analysis of human DNA, RNA, chromosomes, proteins, or metabolites, that detects genotypes, mutations, or chromosomal changes.

"(B) EXCEPTIONS.—The term 'genetic test' does not mean—

"(i) an analysis of proteins or metabolites that does not detect genotypes, mutations, or chromosomal changes; or

"(ii) an analysis of proteins or metabolites that is directly related to a manifested disease, disorder, or pathological condition that could reasonably be detected by a health care professional with appropriate training and expertise in the field of medicine involved.

"(8) GENETIC SERVICES.—The term 'genetic services' means—

"(A) a genetic test;

"(B) genetic counseling (including obtaining, interpreting, or assessing genetic information); or

"(C) genetic education.

"(9) UNDERWRITING PURPOSES.—The term 'underwriting purposes' means, with respect to any group health plan, or health insurance coverage offered in connection with a group health plan—

"(A) rules for, or determination of, eligibility (including enrollment and continued eligibility) for benefits under the plan or coverage;

"(B) the computation of premium or contribution amounts under the plan or coverage;

"(C) the application of any pre-existing condition exclusion under the plan or coverage; and

"(D) other activities related to the creation, renewal, or replacement of a contract of health insurance or health benefits.".

(e) ERISA ENFORCEMENT.—Section 502 of the Employee Retirement Income Security Act of 1974 (29 U.S.C. 1132) is amended—

(1) in subsection (a)(6), by striking "(7), or (8)" and inserting "(7), (8), or (9)";

(2) in subsection (b)(3), by striking "The Secretary" and inserting "Except as provided in subsections (c)(9) and (a)(6) (with respect to collecting civil penalties under subsection (c)(9)), the Secretary"; and

(3) in subsection (c), by redesignating paragraph (9) as paragraph (10), and by inserting after paragraph (8) the following new paragraph:

"(9) SECRETARIAL ENFORCEMENT AUTHORITY RELATING TO USE OF GENETIC INFORMATION.—

"(A) GENERAL RULE.—The Secretary may impose a penalty against any plan sponsor of a group health plan, or any health insurance issuer offering health insurance coverage in connection with the plan, for any failure by such sponsor or issuer to meet the requirements of subsection (a)(1)(F), (b)(3), (c), or (d) of section 702 or section 701 or 702(b)(1) with respect to genetic information, in connection with the plan.

"(B) AMOUNT.—

"(i) IN GENERAL.—The amount of the penalty imposed by subparagraph (A) shall be $100 for each day in the noncompliance period with respect to each participant or beneficiary to whom such failure relates.

"(ii) NONCOMPLIANCE PERIOD.—For purposes of this paragraph, the term 'noncompliance period' means, with respect to any failure, the period—

"(I) beginning on the date such failure first occurs; and

"(II) ending on the date the failure is corrected.

"(C) MINIMUM PENALTIES WHERE FAILURE DISCOVERED.—Notwithstanding clauses (i) and (ii) of subparagraph (D):

"(i) IN GENERAL.—In the case of 1 or more failures with respect to a participant or beneficiary—

"(I) which are not corrected before the date on which the plan receives a notice from the Secretary of such violation; and

"(II) which occurred or continued during the period involved;

the amount of penalty imposed by subparagraph (A) by reason of such failures with respect to such participant or beneficiary shall not be less than $2,500.

"(ii) HIGHER MINIMUM PENALTY WHERE VIOLATIONS ARE MORE THAN DE MINIMIS.—To the extent violations for which any person is liable under this paragraph for any year are more than de minimis, clause (i) shall be applied by substituting '$15,000' for '$2,500' with respect to such person.

"(D) LIMITATIONS.—

"(i) PENALTY NOT TO APPLY WHERE FAILURE NOT DISCOVERED EXERCISING REASONABLE DILIGENCE.—No penalty shall be imposed by subparagraph (A) on any failure during any period for which it is established to the satisfaction of the Secretary that the person otherwise liable for such penalty did not know, and exercising reasonable diligence would not have known, that such failure existed.

"(ii) PENALTY NOT TO APPLY TO FAILURES CORRECTED WITHIN CERTAIN PERIODS.—No penalty shall be imposed by subparagraph (A) on any failure if—

"(I) such failure was due to reasonable cause and not to willful neglect; and

"(II) such failure is corrected during the 30-day period beginning on the first date the person otherwise liable for such penalty knew, or exercising reasonable diligence would have known, that such failure existed.

"(iii) OVERALL LIMITATION FOR UNINTENTIONAL FAILURES.—In the case of failures which are due to reasonable cause and not to willful neglect, the penalty imposed by subparagraph (A) for failures shall not exceed the amount equal to the lesser of—

"(I) 10 percent of the aggregate amount paid or incurred by the plan sponsor (or predecessor plan sponsor) during the preceding taxable year for group health plans; or

"(II) $500,000.

"(E) WAIVER BY SECRETARY.—In the case of a failure which is due to reasonable cause and not to willful neglect, the Secretary may waive part or all of the penalty imposed by subparagraph (A) to the extent that the payment of such penalty would be excessive relative to the failure involved.

"(F) DEFINITIONS.—Terms used in this paragraph which are defined in section 733 shall have the meanings provided such terms in such section.".

(f) REGULATIONS AND EFFECTIVE DATE.—

(1) REGULATIONS.—The Secretary of Labor shall issue final regulations not later than 12 months after the date of enactment of this Act to carry out the amendments made by this section.

(2) EFFECTIVE DATE.—The amendments made by this section shall apply with respect to group health plans for plan years beginning after the date that is 1 year after the date of enactment of this Act.

SEC. 102. AMENDMENTS TO THE PUBLIC HEALTH SERVICE ACT.

(a) AMENDMENTS RELATING TO THE GROUP MARKET.—

(1) NO DISCRIMINATION IN GROUP PREMIUMS BASED ON GENETIC INFORMATION.—Section 2702(b) of the Public Health Service Act (42 U.S.C. 300gg–1(b)) is amended—

(A) in paragraph (2)(A), by inserting before the semicolon the following: "except as provided in paragraph (3)"; and

(B) by adding at the end the following:

"(3) NO GROUP-BASED DISCRIMINATION ON BASIS OF GENETIC INFORMATION.—

"(A) IN GENERAL.—For purposes of this section, a group health plan, and health insurance issuer offering group health insurance coverage in connection with a group health plan, may not adjust premium or contribution amounts for the group covered under such plan on the basis of genetic information.

"(B) RULE OF CONSTRUCTION.—Nothing in subparagraph (A) or in paragraphs (1) and (2) of subsection (d) shall be construed to limit the ability of a health insurance issuer offering health insurance coverage in connection with a group health plan to increase the premium for an employer based on the manifestation of a disease or disorder of an individual who is enrolled in the plan. In such case, the manifestation of a disease or disorder in one individual cannot also be used as genetic information about other group members and to further increase the premium for the employer.".

(2) LIMITATIONS ON GENETIC TESTING; PROHIBITION ON COLLECTION OF GENETIC INFORMATION; APPLICATION TO ALL PLANS.—Section 2702 of the Public Health Service Act (42 U.S.C. 300gg–1) is amended by adding at the end the following:

"(c) GENETIC TESTING.—

"(1) LIMITATION ON REQUESTING OR REQUIRING GENETIC TESTING.—A group health plan, and a health insurance issuer offering health insurance coverage in connection with a group health plan, shall not request or require an individual or a family member of such individual to undergo a genetic test.

"(2) RULE OF CONSTRUCTION.—Paragraph (1) shall not be construed to limit the authority of a health care professional who is providing health care services to an individual to request that such individual undergo a genetic test.

"(3) RULE OF CONSTRUCTION REGARDING PAYMENT.—

"(A) IN GENERAL.—Nothing in paragraph (1) shall be construed to preclude a group health plan, or a health insurance issuer offering health insurance coverage in connection with a group health plan, from obtaining and using the results of a genetic test in making a determination regarding payment (as such term is defined for the purposes of applying the regulations promulgated by the Secretary under part C of title XI of the Social Security Act and section 264 of the Health Insurance Portability and Accountability Act of 1996, as may be revised from time to time) consistent with subsection (a).

"(B) LIMITATION.—For purposes of subparagraph (A), a group health plan, or a health insurance issuer offering health insurance coverage in connection with a group health plan, may request only the minimum amount of information necessary to accomplish the intended purpose.

"(4) RESEARCH EXCEPTION.—Notwithstanding paragraph (1), a group health plan, or a health insurance issuer offering health insurance coverage in connection with a group health plan, may request, but not require, that a participant or beneficiary undergo a genetic test if each of the following conditions is met:

"(A) The request is made pursuant to research that complies with part 46 of title 45, Code of Federal Regulations, or equivalent Federal regulations, and any applicable State or local law or regulations for the protection of human subjects in research.

"(B) The plan or issuer clearly indicates to each participant or beneficiary, or in the case of a minor child, to the legal guardian of such beneficiary, to whom the request is made that—

"(i) compliance with the request is voluntary; and

"(ii) non-compliance will have no effect on enrollment status or premium or contribution amounts.

"(C) No genetic information collected or acquired under this paragraph shall be used for underwriting purposes.

"(D) The plan or issuer notifies the Secretary in writing that the plan or issuer is conducting activities pursuant to the exception provided for under this paragraph, including a description of the activities conducted.

"(E) The plan or issuer complies with such other conditions as the Secretary may by regulation require for activities conducted under this paragraph.

"(d) PROHIBITION ON COLLECTION OF GENETIC INFORMATION.—

"(1) IN GENERAL.—A group health plan, and a health insurance issuer offering health insurance coverage in connection with a group health plan, shall not request, require, or purchase genetic information for underwriting purposes (as defined in section 2791).

"(2) PROHIBITION ON COLLECTION OF GENETIC INFORMATION PRIOR TO ENROLLMENT.—A group health plan, and a health insurance issuer offering health insurance coverage in connection with a group health plan, shall not request, require, or purchase genetic information with respect to any individual prior to such individual's enrollment under the plan or coverage in connection with such enrollment.

"(3) INCIDENTAL COLLECTION.—If a group health plan, or a health insurance issuer offering health insurance coverage in connection with a group health plan, obtains genetic information incidental to the requesting, requiring, or purchasing of other information concerning any individual, such request, requirement, or purchase shall not be considered a violation of paragraph (2) if such request, requirement, or purchase is not in violation of paragraph (1).

"(e) APPLICATION TO ALL PLANS.—The provisions of subsections (a)(1)(F), (b)(3), (c) , and (d) and subsection (b)(1) and section 2701 with respect to genetic information, shall apply to group health plans and health insurance issuers without regard to section 2721(a).".

(3) APPLICATION TO GENETIC INFORMATION OF A FETUS OR EMBRYO.—Such section is further amended by adding at the end the following:

"(f) GENETIC INFORMATION OF A FETUS OR EMBRYO.—Any reference in this part to genetic information concerning an individual or family member of an individual shall—

"(1) with respect to such an individual or family member of an individual who is a pregnant woman, include genetic information of any fetus carried by such pregnant woman; and

"(2) with respect to an individual or family member utilizing an assisted reproductive technology, include genetic information of any embryo legally held by the individual or family member.".

(4) DEFINITIONS.—Section 2791(d) of the Public Health Service Act (42 U.S.C. 300gg–91(d)) is amended by adding at the end the following:

"(15) FAMILY MEMBER.—The term 'family member' means, with respect to any individual—

"(A) a dependent (as such term is used for purposes of section 2701(f)(2)) of such individual; and

"(B) any other individual who is a first-degree, second-degree, third-degree, or fourth-degree relative of such individual or of an individual described in subparagraph (A).

"(16) GENETIC INFORMATION.—

"(A) IN GENERAL.—The term 'genetic information' means, with respect to any individual, information about—

"(i) such individual's genetic tests,

"(ii) the genetic tests of family members of such individual, and

"(iii) the manifestation of a disease or disorder in family members of such individual.

"(B) INCLUSION OF GENETIC SERVICES AND PARTICIPATION IN GENETIC RESEARCH.—Such term includes, with respect to any individual, any request for, or receipt of, genetic services, or participation in clinical research which includes genetic services, by such individual or any family member of such individual.

"(C) EXCLUSIONS.—The term 'genetic information' shall not include information about the sex or age of any individual.

"(17) GENETIC TEST.—

"(A) IN GENERAL.—The term 'genetic test' means an analysis of human DNA, RNA, chromosomes, proteins, or

metabolites, that detects genotypes, mutations, or chromosomal changes.

"(B) EXCEPTIONS.—The term 'genetic test' does not mean—

"(i) an analysis of proteins or metabolites that does not detect genotypes, mutations, or chromosomal changes; or

"(ii) an analysis of proteins or metabolites that is directly related to a manifested disease, disorder, or pathological condition that could reasonably be detected by a health care professional with appropriate training and expertise in the field of medicine involved.

"(18) GENETIC SERVICES.—The term 'genetic services' means—

"(A) a genetic test;

"(B) genetic counseling (including obtaining, interpreting, or assessing genetic information); or

"(C) genetic education.

"(19) UNDERWRITING PURPOSES.—The term 'underwriting purposes' means, with respect to any group health plan, or health insurance coverage offered in connection with a group health plan—

"(A) rules for, or determination of, eligibility (including enrollment and continued eligibility) for benefits under the plan or coverage;

"(B) the computation of premium or contribution amounts under the plan or coverage;

"(C) the application of any pre-existing condition exclusion under the plan or coverage; and

"(D) other activities related to the creation, renewal, or replacement of a contract of health insurance or health benefits.".

(5) REMEDIES AND ENFORCEMENT.—Section 2722(b) of the Public Health Service Act (42 U.S.C. 300gg–22(b)) is amended by adding at the end the following:

"(3) ENFORCEMENT AUTHORITY RELATING TO GENETIC DISCRIMINATION.—

"(A) GENERAL RULE.—In the cases described in paragraph (1), notwithstanding the provisions of paragraph (2)(C), the succeeding subparagraphs of this paragraph shall apply with respect to an action under this subsection by the Secretary with respect to any failure of a health insurance issuer in connection with a group health plan, to meet the requirements of subsection (a)(1)(F), (b)(3), (c), or (d) of section 2702 or section 2701 or 2702(b)(1) with respect to genetic information in connection with the plan.

"(B) AMOUNT.—

"(i) IN GENERAL.—The amount of the penalty imposed under this paragraph shall be $100 for each day in the noncompliance period with respect to each participant or beneficiary to whom such failure relates.

"(ii) NONCOMPLIANCE PERIOD.—For purposes of this paragraph, the term 'noncompliance period' means, with respect to any failure, the period—

"(I) beginning on the date such failure first occurs; and

"(II) ending on the date the failure is corrected.

"(C) MINIMUM PENALTIES WHERE FAILURE DISCOVERED.—Notwithstanding clauses (i) and (ii) of subparagraph (D):

"(i) IN GENERAL.—In the case of 1 or more failures with respect to an individual—

"(I) which are not corrected before the date on which the plan receives a notice from the Secretary of such violation; and

"(II) which occurred or continued during the period involved;

the amount of penalty imposed by subparagraph (A) by reason of such failures with respect to such individual shall not be less than $2,500.

"(ii) HIGHER MINIMUM PENALTY WHERE VIOLATIONS ARE MORE THAN DE MINIMIS.—To the extent violations for which any person is liable under this paragraph for any year are more than de minimis, clause (i) shall be applied by substituting '$15,000' for '$2,500' with respect to such person.

"(D) LIMITATIONS.—

"(i) PENALTY NOT TO APPLY WHERE FAILURE NOT DISCOVERED EXERCISING REASONABLE DILIGENCE.—No penalty shall be imposed by subparagraph (A) on any failure during any period for which it is established to the satisfaction of the Secretary that the person otherwise liable for such penalty did not know, and exercising reasonable diligence would not have known, that such failure existed.

"(ii) PENALTY NOT TO APPLY TO FAILURES CORRECTED WITHIN CERTAIN PERIODS.—No penalty shall be imposed by subparagraph (A) on any failure if—

"(I) such failure was due to reasonable cause and not to willful neglect; and

"(II) such failure is corrected during the 30-day period beginning on the first date the person otherwise liable for such penalty knew, or exercising reasonable diligence would have known, that such failure existed.

"(iii) OVERALL LIMITATION FOR UNINTENTIONAL FAILURES.—In the case of failures which are due to reasonable cause and not to willful neglect, the penalty imposed by subparagraph (A) for failures shall not exceed the amount equal to the lesser of—

"(I) 10 percent of the aggregate amount paid or incurred by the employer (or predecessor employer) during the preceding taxable year for group health plans; or

"(II) $500,000.

"(E) WAIVER BY SECRETARY.—In the case of a failure which is due to reasonable cause and not to willful neglect, the Secretary may waive part or all of the penalty imposed by subparagraph (A) to the extent that the payment of such penalty would be excessive relative to the failure involved.".

(b) AMENDMENT RELATING TO THE INDIVIDUAL MARKET.—

(1) IN GENERAL.—The first subpart 3 of part B of title XXVII of the Public Health Service Act (42 U.S.C. 300gg–51 et seq.) (relating to other requirements) is amended—

(A) by redesignating such subpart as subpart 2; and

(B) by adding at the end the following:

"SEC. 2753. PROHIBITION OF HEALTH DISCRIMINATION ON THE BASIS OF GENETIC INFORMATION.

"(a) PROHIBITION ON GENETIC INFORMATION AS A CONDITION OF ELIGIBILITY.—

"(1) IN GENERAL.—A health insurance issuer offering health insurance coverage in the individual market may not establish rules for the eligibility (including continued eligibility) of any individual to enroll in individual health insurance coverage based on genetic information.

"(2) RULE OF CONSTRUCTION.—Nothing in paragraph (1) or in paragraphs (1) and (2) of subsection (e) shall be construed to preclude a health insurance issuer from establishing rules for eligibility for an individual to enroll in individual health insurance coverage based on the manifestation of a disease or disorder in that individual, or in a family member of such individual where such family member is covered under the policy that covers such individual.

"(b) PROHIBITION ON GENETIC INFORMATION IN SETTING PREMIUM RATES.—

"(1) IN GENERAL.—A health insurance issuer offering health insurance coverage in the individual market shall not adjust premium or contribution amounts for an individual on the basis of genetic information concerning the individual or a family member of the individual.

"(2) RULE OF CONSTRUCTION.—Nothing in paragraph (1) or in paragraphs (1) and (2) of subsection (e) shall be construed to preclude a health insurance issuer from adjusting premium or contribution amounts for an individual on the basis of a manifestation of a disease or disorder in that individual, or in a family member of such individual where such family member is covered under the policy that covers such individual. In such case, the manifestation of a disease or disorder in one individual cannot also be used as genetic information about other individuals covered under the policy issued to such individual and to further increase premiums or contribution amounts.

"(c) PROHIBITION ON GENETIC INFORMATION AS PREEXISTING CONDITION.—

"(1) IN GENERAL.—A health insurance issuer offering health insurance coverage in the individual market may not, on the basis of genetic information, impose any preexisting condition exclusion (as defined in section 2701(b)(1)(A)) with respect to such coverage.

"(2) RULE OF CONSTRUCTION.—Nothing in paragraph (1) or in paragraphs (1) and (2) of subsection (e) shall be construed to preclude a health insurance issuer from imposing any preexisting condition exclusion for an individual with respect to health insurance coverage on the basis of a manifestation of a disease or disorder in that individual.

"(d) GENETIC TESTING.—

"(1) LIMITATION ON REQUESTING OR REQUIRING GENETIC TESTING.—A health insurance issuer offering health insurance coverage in the individual market shall not request or require an individual or a family member of such individual to undergo a genetic test.

"(2) RULE OF CONSTRUCTION.—Paragraph (1) shall not be construed to limit the authority of a health care professional who is providing health care services to an individual to request that such individual undergo a genetic test.

"(3) RULE OF CONSTRUCTION REGARDING PAYMENT.—

"(A) IN GENERAL.—Nothing in paragraph (1) shall be construed to preclude a health insurance issuer offering health insurance coverage in the individual market from obtaining and using the results of a genetic test in making a determination regarding payment (as such term is defined for the purposes of applying the regulations promulgated by the Secretary under part C of title XI of the Social Security Act and section 264 of the Health Insurance Portability and Accountability Act of 1996, as may be revised from time to time) consistent with subsection (a) and (c).

"(B) LIMITATION.—For purposes of subparagraph (A), a health insurance issuer offering health insurance coverage in the individual market may request only the minimum amount of information necessary to accomplish the intended purpose.

"(4) RESEARCH EXCEPTION.—Notwithstanding paragraph (1), a health insurance issuer offering health insurance coverage in the individual market may request, but not require, that an individual or a family member of such individual undergo a genetic test if each of the following conditions is met:

"(A) The request is made pursuant to research that complies with part 46 of title 45, Code of Federal Regulations, or equivalent Federal regulations, and any applicable State or local law or regulations for the protection of human subjects in research.

"(B) The issuer clearly indicates to each individual, or in the case of a minor child, to the legal guardian of such child, to whom the request is made that—

"(i) compliance with the request is voluntary; and

"(ii) non-compliance will have no effect on enrollment status or premium or contribution amounts.

"(C) No genetic information collected or acquired under this paragraph shall be used for underwriting purposes.

"(D) The issuer notifies the Secretary in writing that the issuer is conducting activities pursuant to the exception provided for under this paragraph, including a description of the activities conducted.

"(E) The issuer complies with such other conditions as the Secretary may by regulation require for activities conducted under this paragraph.

"(e) PROHIBITION ON COLLECTION OF GENETIC INFORMATION.—

"(1) IN GENERAL.—A health insurance issuer offering health insurance coverage in the individual market shall not request, require, or purchase genetic information for underwriting purposes (as defined in section 2791).

"(2) PROHIBITION ON COLLECTION OF GENETIC INFORMATION PRIOR TO ENROLLMENT.—A health insurance issuer offering

health insurance coverage in the individual market shall not request, require, or purchase genetic information with respect to any individual prior to such individual's enrollment under the plan in connection with such enrollment.

"(3) INCIDENTAL COLLECTION.—If a health insurance issuer offering health insurance coverage in the individual market obtains genetic information incidental to the requesting, requiring, or purchasing of other information concerning any individual, such request, requirement, or purchase shall not be considered a violation of paragraph (2) if such request, requirement, or purchase is not in violation of paragraph (1).

"(f) GENETIC INFORMATION OF A FETUS OR EMBRYO.—Any reference in this part to genetic information concerning an individual or family member of an individual shall—

"(1) with respect to such an individual or family member of an individual who is a pregnant woman, include genetic information of any fetus carried by such pregnant woman; and

"(2) with respect to an individual or family member utilizing an assisted reproductive technology, include genetic information of any embryo legally held by the individual or family member.".

(2) REMEDIES AND ENFORCEMENT.—Section 2761(b) of the Public Health Service Act (42 U.S.C. 300gg–61(b)) is amended to read as follows:

"(b) SECRETARIAL ENFORCEMENT AUTHORITY.—The Secretary shall have the same authority in relation to enforcement of the provisions of this part with respect to issuers of health insurance coverage in the individual market in a State as the Secretary has under section 2722(b)(2), and section 2722(b)(3) with respect to violations of genetic nondiscrimination provisions, in relation to the enforcement of the provisions of part A with respect to issuers of health insurance coverage in the small group market in the State.".

(c) ELIMINATION OF OPTION OF NON-FEDERAL GOVERNMENTAL PLANS TO BE EXCEPTED FROM REQUIREMENTS CONCERNING GENETIC INFORMATION.—Section 2721(b)(2) of the Public Health Service Act (42 U.S.C. 300gg–21(b)(2)) is amended—

(1) in subparagraph (A), by striking "If the plan sponsor" and inserting "Except as provided in subparagraph (D), if the plan sponsor"; and

(2) by adding at the end the following:

"(D) ELECTION NOT APPLICABLE TO REQUIREMENTS CONCERNING GENETIC INFORMATION.—The election described in subparagraph (A) shall not be available with respect to the provisions of subsections (a)(1)(F), (b)(3), (c), and (d) of section 2702 and the provisions of sections 2701 and 2702(b) to the extent that such provisions apply to genetic information.".

(d) REGULATIONS AND EFFECTIVE DATE.—

(1) REGULATIONS.—Not later than 12 months after the date of enactment of this Act, the Secretary of Health and Human Services shall issue final regulations to carry out the amendments made by this section.

(2) EFFECTIVE DATE.—The amendments made by this section shall apply—

(A) with respect to group health plans, and health insurance coverage offered in connection with group health plans, for plan years beginning after the date that is 1 year after the date of enactment of this Act; and

(B) with respect to health insurance coverage offered, sold, issued, renewed, in effect, or operated in the individual market after the date that is 1 year after the date of enactment of this Act.

SEC. 103. AMENDMENTS TO THE INTERNAL REVENUE CODE OF 1986.

(a) NO DISCRIMINATION IN GROUP PREMIUMS BASED ON GENETIC INFORMATION.—Subsection (b) of section 9802 of the Internal Revenue Code of 1986 is amended—

(1) in paragraph (2)(A), by inserting before the semicolon the following: "except as provided in paragraph (3)"; and

(2) by adding at the end the following:

"(3) NO GROUP-BASED DISCRIMINATION ON BASIS OF GENETIC INFORMATION.—

"(A) IN GENERAL.—For purposes of this section, a group health plan may not adjust premium or contribution amounts for the group covered under such plan on the basis of genetic information.

"(B) RULE OF CONSTRUCTION.—Nothing in subparagraph (A) or in paragraphs (1) and (2) of subsection (d) shall be construed to limit the ability of a group health plan to increase the premium for an employer based on the manifestation of a disease or disorder of an individual who is enrolled in the plan. In such case, the manifestation of a disease or disorder in one individual cannot also be used as genetic information about other group members and to further increase the premium for the employer.".

(b) LIMITATIONS ON GENETIC TESTING; PROHIBITION ON COLLECTION OF GENETIC INFORMATION; APPLICATION TO ALL PLANS.—Section 9802 of such Code is amended by redesignating subsection (c) as subsection (f) and by inserting after subsection (b) the following new subsections:

"(c) GENETIC TESTING.—

"(1) LIMITATION ON REQUESTING OR REQUIRING GENETIC TESTING.—A group health plan may not request or require an individual or a family member of such individual to undergo a genetic test.

"(2) RULE OF CONSTRUCTION.—Paragraph (1) shall not be construed to limit the authority of a health care professional who is providing health care services to an individual to request that such individual undergo a genetic test.

"(3) RULE OF CONSTRUCTION REGARDING PAYMENT.—

"(A) IN GENERAL.—Nothing in paragraph (1) shall be construed to preclude a group health plan from obtaining and using the results of a genetic test in making a determination regarding payment (as such term is defined for the purposes of applying the regulations promulgated by the Secretary of Health and Human Services under part C of title XI of the Social Security Act and section 264 of the Health Insurance Portability and Accountability Act of 1996, as may be revised from time to time) consistent with subsection (a).

"(B) LIMITATION.—For purposes of subparagraph (A), a group health plan may request only the minimum amount of information necessary to accomplish the intended purpose.

"(4) RESEARCH EXCEPTION.—Notwithstanding paragraph (1), a group health plan may request, but not require, that a participant or beneficiary undergo a genetic test if each of the following conditions is met:

"(A) The request is made pursuant to research that complies with part 46 of title 45, Code of Federal Regulations, or equivalent Federal regulations, and any applicable State or local law or regulations for the protection of human subjects in research.

"(B) The plan clearly indicates to each participant or beneficiary, or in the case of a minor child, to the legal guardian of such beneficiary, to whom the request is made that—

"(i) compliance with the request is voluntary; and

"(ii) non-compliance will have no effect on enrollment status or premium or contribution amounts.

"(C) No genetic information collected or acquired under this paragraph shall be used for underwriting purposes.

"(D) The plan notifies the Secretary in writing that the plan is conducting activities pursuant to the exception provided for under this paragraph, including a description of the activities conducted.

"(E) The plan complies with such other conditions as the Secretary may by regulation require for activities conducted under this paragraph.

"(d) PROHIBITION ON COLLECTION OF GENETIC INFORMATION.—

"(1) IN GENERAL.—A group health plan shall not request, require, or purchase genetic information for underwriting purposes (as defined in section 9832).

"(2) PROHIBITION ON COLLECTION OF GENETIC INFORMATION PRIOR TO ENROLLMENT.—A group health plan shall not request, require, or purchase genetic information with respect to any individual prior to such individual's enrollment under the plan or in connection with such enrollment.

"(3) INCIDENTAL COLLECTION.—If a group health plan obtains genetic information incidental to the requesting, requiring, or purchasing of other information concerning any individual, such request, requirement, or purchase shall not be considered a violation of paragraph (2) if such request, requirement, or purchase is not in violation of paragraph (1).

"(e) APPLICATION TO ALL PLANS.—The provisions of subsections (a)(1)(F), (b)(3), (c), and (d) and subsection (b)(1) and section 9801 with respect to genetic information, shall apply to group health plans without regard to section 9831(a)(2).".

(c) APPLICATION TO GENETIC INFORMATION OF A FETUS OR EMBRYO.—Such section is further amended by adding at the end the following:

"(f) GENETIC INFORMATION OF A FETUS OR EMBRYO.—Any reference in this chapter to genetic information concerning an individual or family member of an individual shall—

"(1) with respect to such an individual or family member of an individual who is a pregnant woman, include genetic

information of any fetus carried by such pregnant woman; and

"(2) with respect to an individual or family member utilizing an assisted reproductive technology, include genetic information of any embryo legally held by the individual or family member.".

(d) DEFINITIONS.—Subsection (d) of section 9832 of such Code is amended by adding at the end the following:

"(6) FAMILY MEMBER.—The term 'family member' means, with respect to any individual—

"(A) a dependent (as such term is used for purposes of section 9801(f)(2)) of such individual, and

"(B) any other individual who is a first-degree, second-degree, third-degree, or fourth-degree relative of such individual or of an individual described in subparagraph (A).

"(7) GENETIC INFORMATION.—

"(A) IN GENERAL.—The term 'genetic information' means, with respect to any individual, information about—

"(i) such individual's genetic tests,

"(ii) the genetic tests of family members of such individual, and

"(iii) the manifestation of a disease or disorder in family members of such individual.

"(B) INCLUSION OF GENETIC SERVICES AND PARTICIPATION IN GENETIC RESEARCH.—Such term includes, with respect to any individual, any request for, or receipt of, genetic services, or participation in clinical research which includes genetic services, by such individual or any family member of such individual.

"(C) EXCLUSIONS.—The term 'genetic information' shall not include information about the sex or age of any individual.

"(8) GENETIC TEST.—

"(A) IN GENERAL.—The term 'genetic test' means an analysis of human DNA, RNA, chromosomes, proteins, or metabolites, that detects genotypes, mutations, or chromosomal changes.

"(B) EXCEPTIONS.—The term 'genetic test' does not mean—

"(i) an analysis of proteins or metabolites that does not detect genotypes, mutations, or chromosomal changes, or

"(ii) an analysis of proteins or metabolites that is directly related to a manifested disease, disorder, or pathological condition that could reasonably be detected by a health care professional with appropriate training and expertise in the field of medicine involved.

"(9) GENETIC SERVICES.—The term 'genetic services' means—

"(A) a genetic test;

"(B) genetic counseling (including obtaining, interpreting, or assessing genetic information); or

"(C) genetic education.

"(10) UNDERWRITING PURPOSES.—The term 'underwriting purposes' means, with respect to any group health plan, or health insurance coverage offered in connection with a group health plan—

"(A) rules for, or determination of, eligibility (including enrollment and continued eligibility) for benefits under the plan or coverage;

"(B) the computation of premium or contribution amounts under the plan or coverage;

"(C) the application of any pre-existing condition exclusion under the plan or coverage; and

"(D) other activities related to the creation, renewal, or replacement of a contract of health insurance or health benefits.".

(e) ENFORCEMENT.—

(1) IN GENERAL.—Subchapter C of chapter 100 of the Internal Revenue Code of 1986 (relating to general provisions) is amended by adding at the end the following new section:

"SEC. 9834. ENFORCEMENT.

"For the imposition of tax on any failure of a group health plan to meet the requirements of this chapter, see section 4980D.".

(2) CONFORMING AMENDMENT.—The table of sections for subchapter C of chapter 100 of such Code is amended by adding at the end the following new item:

"Sec. 9834. Enforcement.".

(f) REGULATIONS AND EFFECTIVE DATE.—

(1) REGULATIONS.—The Secretary of the Treasury shall issue final regulations or other guidance not later than 12 months after the date of the enactment of this Act to carry out the amendments made by this section.

(2) EFFECTIVE DATE.—The amendments made by this section shall apply with respect to group health plans for plan years beginning after the date that is 1 year after the date of the enactment of this Act.

SEC. 104. AMENDMENTS TO TITLE XVIII OF THE SOCIAL SECURITY ACT RELATING TO MEDIGAP.

(a) NONDISCRIMINATION.—Section 1882(s)(2) of the Social Security Act (42 U.S.C. 1395ss(s)(2)) is amended by adding at the end the following:

"(E) An issuer of a medicare supplemental policy shall not deny or condition the issuance or effectiveness of the policy (including the imposition of any exclusion of benefits under the policy based on a pre-existing condition) and shall not discriminate in the pricing of the policy (including the adjustment of premium rates) of an individual on the basis of the genetic information with respect to such individual.

"(F) RULE OF CONSTRUCTION.—Nothing in subparagraph (E) or in subparagraphs (A) or (B) of subsection (x)(2) shall be construed to limit the ability of an issuer of a medicare supplemental policy from, to the extent otherwise permitted under this title—

"(i) denying or conditioning the issuance or effectiveness of the policy or increasing the premium for an employer based on the manifestation of a disease or disorder of an individual who is covered under the policy; or

"(ii) increasing the premium for any policy issued to an individual based on the manifestation of a disease

or disorder of an individual who is covered under the policy (in such case, the manifestation of a disease or disorder in one individual cannot also be used as genetic information about other group members and to further increase the premium for the employer).".

(b) LIMITATIONS ON GENETIC TESTING AND GENETIC INFORMATION.—

(1) IN GENERAL.—Section 1882 of the Social Security Act (42 U.S.C. 1395ss) is amended by adding at the end the following:

"(x) LIMITATIONS ON GENETIC TESTING AND INFORMATION.—

"(1) GENETIC TESTING.—

"(A) LIMITATION ON REQUESTING OR REQUIRING GENETIC TESTING.—An issuer of a medicare supplemental policy shall not request or require an individual or a family member of such individual to undergo a genetic test.

"(B) RULE OF CONSTRUCTION.—Subparagraph (A) shall not be construed to limit the authority of a health care professional who is providing health care services to an individual to request that such individual undergo a genetic test.

"(C) RULE OF CONSTRUCTION REGARDING PAYMENT.—

"(i) IN GENERAL.—Nothing in subparagraph (A) shall be construed to preclude an issuer of a medicare supplemental policy from obtaining and using the results of a genetic test in making a determination regarding payment (as such term is defined for the purposes of applying the regulations promulgated by the Secretary under part C of title XI and section 264 of the Health Insurance Portability and Accountability Act of 1996, as may be revised from time to time) consistent with subsection (s)(2)(E).

"(ii) LIMITATION.—For purposes of clause (i), an issuer of a medicare supplemental policy may request only the minimum amount of information necessary to accomplish the intended purpose.

"(D) RESEARCH EXCEPTION.—Notwithstanding subparagraph (A), an issuer of a medicare supplemental policy may request, but not require, that an individual or a family member of such individual undergo a genetic test if each of the following conditions is met:

"(i) The request is made pursuant to research that complies with part 46 of title 45, Code of Federal Regulations, or equivalent Federal regulations, and any applicable State or local law or regulations for the protection of human subjects in research.

"(ii) The issuer clearly indicates to each individual, or in the case of a minor child, to the legal guardian of such child, to whom the request is made that—

"(I) compliance with the request is voluntary; and

"(II) non-compliance will have no effect on enrollment status or premium or contribution amounts.

"(iii) No genetic information collected or acquired under this subparagraph shall be used for underwriting, determination of eligibility to enroll or maintain enrollment status, premium rating, or the creation, renewal, or replacement of a plan, contract, or coverage for health insurance or health benefits.

"(iv) The issuer notifies the Secretary in writing that the issuer is conducting activities pursuant to the exception provided for under this subparagraph, including a description of the activities conducted.

"(v) The issuer complies with such other conditions as the Secretary may by regulation require for activities conducted under this subparagraph.

"(2) PROHIBITION ON COLLECTION OF GENETIC INFORMATION.—

"(A) IN GENERAL.—An issuer of a medicare supplemental policy shall not request, require, or purchase genetic information for underwriting purposes (as defined in paragraph (3)).

"(B) PROHIBITION ON COLLECTION OF GENETIC INFORMATION PRIOR TO ENROLLMENT.—An issuer of a medicare supplemental policy shall not request, require, or purchase genetic information with respect to any individual prior to such individual's enrollment under the policy in connection with such enrollment.

"(C) INCIDENTAL COLLECTION.—If an issuer of a medicare supplemental policy obtains genetic information incidental to the requesting, requiring, or purchasing of other information concerning any individual, such request, requirement, or purchase shall not be considered a violation of subparagraph (B) if such request, requirement, or purchase is not in violation of subparagraph (A).

"(3) DEFINITIONS.—In this subsection:

"(A) FAMILY MEMBER.—The term 'family member' means with respect to an individual, any other individual who is a first-degree, second-degree, third-degree, or fourth-degree relative of such individual.

"(B) GENETIC INFORMATION.—

"(i) IN GENERAL.—The term 'genetic information' means, with respect to any individual, information about—

"(I) such individual's genetic tests,

"(II) the genetic tests of family members of such individual, and

"(III) subject to clause (iv), the manifestation of a disease or disorder in family members of such individual.

"(ii) INCLUSION OF GENETIC SERVICES AND PARTICIPATION IN GENETIC RESEARCH.—Such term includes, with respect to any individual, any request for, or receipt of, genetic services, or participation in clinical research which includes genetic services, by such individual or any family member of such individual.

"(iii) EXCLUSIONS.—The term 'genetic information' shall not include information about the sex or age of any individual.

"(C) GENETIC TEST.—

"(i) IN GENERAL.—The term 'genetic test' means an analysis of human DNA, RNA, chromosomes, proteins, or metabolites, that detects genotypes, mutations, or chromosomal changes.

"(ii) EXCEPTIONS.—The term 'genetic test' does not mean—

"(I) an analysis of proteins or metabolites that does not detect genotypes, mutations, or chromosomal changes; or

"(II) an analysis of proteins or metabolites that is directly related to a manifested disease, disorder, or pathological condition that could reasonably be detected by a health care professional with appropriate training and expertise in the field of medicine involved.

"(D) GENETIC SERVICES.—The term 'genetic services' means—

"(i) a genetic test;

"(ii) genetic counseling (including obtaining, interpreting, or assessing genetic information); or

"(iii) genetic education.

"(E) UNDERWRITING PURPOSES.—The term 'underwriting purposes' means, with respect to a medicare supplemental policy—

"(i) rules for, or determination of, eligibility (including enrollment and continued eligibility) for benefits under the policy;

"(ii) the computation of premium or contribution amounts under the policy;

"(iii) the application of any pre-existing condition exclusion under the policy; and

"(iv) other activities related to the creation, renewal, or replacement of a contract of health insurance or health benefits.

"(F) ISSUER OF A MEDICARE SUPPLEMENTAL POLICY.—The term 'issuer of a medicare supplemental policy' includes a third-party administrator or other person acting for or on behalf of such issuer.".

(2) APPLICATION TO GENETIC INFORMATION OF A FETUS OR EMBRYO.—Section 1882(x) of such Act, as added by paragraph (1), is further amended by adding at the end the following:

"(4) GENETIC INFORMATION OF A FETUS OR EMBRYO.—Any reference in this section to genetic information concerning an individual or family member of an individual shall—

"(A) with respect to such an individual or family member of an individual who is a pregnant woman, include genetic information of any fetus carried by such pregnant woman; and

"(B) with respect to an individual or family member utilizing an assisted reproductive technology, include genetic information of any embryo legally held by the individual or family member.".

(3) CONFORMING AMENDMENT.—Section 1882(o) of the Social Security Act (42 U.S.C. 1395ss(o)) is amended by adding at the end the following:

"(4) The issuer of the medicare supplemental policy complies with subsection (s)(2)(E) and subsection (x).".

(c) EFFECTIVE DATE.—The amendments made by this section shall apply with respect to an issuer of a medicare supplemental policy for policy years beginning on or after the date that is 1 year after the date of enactment of this Act.

(d) TRANSITION PROVISIONS.—

(1) IN GENERAL.—If the Secretary of Health and Human Services identifies a State as requiring a change to its statutes or regulations to conform its regulatory program to the changes made by this section, the State regulatory program shall not be considered to be out of compliance with the requirements of section 1882 of the Social Security Act due solely to failure to make such change until the date specified in paragraph (4).

(2) NAIC STANDARDS.—If, not later than October 31, 2008, the National Association of Insurance Commissioners (in this subsection referred to as the "NAIC") modifies its NAIC Model Regulation relating to section 1882 of the Social Security Act (referred to in such section as the 1991 NAIC Model Regulation, as subsequently modified) to conform to the amendments made by this section, such revised regulation incorporating the modifications shall be considered to be the applicable NAIC model regulation (including the revised NAIC model regulation and the 1991 NAIC Model Regulation) for the purposes of such section.

(3) SECRETARY STANDARDS.—If the NAIC does not make the modifications described in paragraph (2) within the period specified in such paragraph, the Secretary of Health and Human Services shall, not later than July 1, 2009, make the modifications described in such paragraph and such revised regulation incorporating the modifications shall be considered to be the appropriate regulation for the purposes of such section.

(4) DATE SPECIFIED.—

(A) IN GENERAL.—Subject to subparagraph (B), the date specified in this paragraph for a State is the earlier of—

(i) the date the State changes its statutes or regulations to conform its regulatory program to the changes made by this section, or

(ii) July 1, 2009.

(B) ADDITIONAL LEGISLATIVE ACTION REQUIRED.—In the case of a State which the Secretary identifies as—

(i) requiring State legislation (other than legislation appropriating funds) to conform its regulatory program to the changes made in this section, but

(ii) having a legislature which is not scheduled to meet in 2009 in a legislative session in which such legislation may be considered, the date specified in this paragraph is the first day of the first calendar quarter beginning after the close of the first legislative session of the State legislature that begins on or after July 1, 2009. For purposes of the previous sentence, in the case of a State that has a 2-year legislative session, each year of such session shall be deemed to be a separate regular session of the State legislature.

SEC. 105. PRIVACY AND CONFIDENTIALITY.

(a) IN GENERAL.—Part C of title XI of the Social Security Act is amended by adding at the end the following new section:

"APPLICATION OF HIPAA REGULATIONS TO GENETIC INFORMATION

"SEC. 1180. (a) IN GENERAL.—The Secretary shall revise the HIPAA privacy regulation (as defined in subsection (b)) so it is consistent with the following:

"(1) Genetic information shall be treated as health information described in section 1171(4)(B).

"(2) The use or disclosure by a covered entity that is a group health plan, health insurance issuer that issues health insurance coverage, or issuer of a medicare supplemental policy of protected health information that is genetic information about an individual for underwriting purposes under the group health plan, health insurance coverage, or medicare supplemental policy shall not be a permitted use or disclosure.

"(b) DEFINITIONS.—For purposes of this section:

"(1) GENETIC INFORMATION; GENETIC TEST; FAMILY MEMBER.—The terms 'genetic information', 'genetic test', and 'family member' have the meanings given such terms in section 2791 of the Public Health Service Act (42 U.S.C. 300gg–91), as amended by the Genetic Information Nondiscrimination Act of 2007.

"(2) GROUP HEALTH PLAN; HEALTH INSURANCE COVERAGE; MEDICARE SUPPLEMENTAL POLICY.—The terms 'group health plan' and 'health insurance coverage' have the meanings given such terms under section 2791 of the Public Health Service Act (42 U.S.C. 300gg–91), and the term 'medicare supplemental policy' has the meaning given such term in section 1882(g).

"(3) HIPAA PRIVACY REGULATION.—The term 'HIPAA privacy regulation' means the regulations promulgated by the Secretary under this part and section 264 of the Health Insurance Portability and Accountability Act of 1996 (42 U.S.C. 1320d–2 note).

"(4) UNDERWRITING PURPOSES.—The term 'underwriting purposes' means, with respect to a group health plan, health insurance coverage, or a medicare supplemental policy—

"(A) rules for, or determination of, eligibility (including enrollment and continued eligibility) for, or determination of, benefits under the plan, coverage, or policy;

"(B) the computation of premium or contribution amounts under the plan, coverage, or policy;

"(C) the application of any pre-existing condition exclusion under the plan, coverage, or policy; and

"(D) other activities related to the creation, renewal, or replacement of a contract of health insurance or health benefits.

"(c) PROCEDURE.—The revisions under subsection (a) shall be made by notice in the Federal Register published not later than 60 days after the date of the enactment of this section and shall be effective upon publication, without opportunity for any prior public comment, but may be revised, consistent with this section, after opportunity for public comment.

"(d) ENFORCEMENT.—In addition to any other sanctions or remedies that may be available under law, a covered entity that is a group health plan, health insurance issuer, or issuer of a medicare supplemental policy and that violates the HIPAA privacy regulation (as revised under subsection (a) or otherwise) with respect to the use or disclosure of genetic information shall be subject to the

penalties described in sections 1176 and 1177 in the same manner and to the same extent that such penalties apply to violations of this part.".

(b) REGULATIONS; EFFECTIVE DATE.—

(1) REGULATIONS.—Not later than 12 months after the date of the enactment of this Act, the Secretary of Health and Human Services shall issue final regulations to carry out the revision required by section 1180(a) of the Social Security Act, as added by subsection (a). The Secretary has the sole authority to promulgate such regulations, but shall promulgate such regulations in consultation with the Secretaries of Labor and the Treasury.

(2) EFFECTIVE DATE.—The amendment made by subsection (a) shall take effect on the date that is 1 year after the date of the enactment of this Act.

SEC. 106. ASSURING COORDINATION.

Except as provided in section 105(b)(1), the Secretary of Health and Human Services, the Secretary of Labor, and the Secretary of the Treasury shall ensure, through the execution of an interagency memorandum of understanding among such Secretaries, that—

(1) regulations, rulings, and interpretations issued by such Secretaries relating to the same matter over which two or more such Secretaries have responsibility under this title (and the amendments made by this title) are administered so as to have the same effect at all times; and

(2) coordination of policies relating to enforcing the same requirements through such Secretaries in order to have a coordinated enforcement strategy that avoids duplication of enforcement efforts and assigns priorities in enforcement.

TITLE II—PROHIBITING EMPLOYMENT DISCRIMINATION ON THE BASIS OF GENETIC INFORMATION

SEC. 201. DEFINITIONS.

In this title:

(1) COMMISSION.—The term "Commission" means the Equal Employment Opportunity Commission as created by section 705 of the Civil Rights Act of 1964 (42 U.S.C. 2000e–4).

(2) EMPLOYEE; EMPLOYER; EMPLOYMENT AGENCY; LABOR ORGANIZATION; MEMBER.—

(A) IN GENERAL.—The term "employee" means—

(i) an employee (including an applicant), as defined in section 701(f) of the Civil Rights Act of 1964 (42 U.S.C. 2000e(f));

(ii) a State employee (including an applicant) described in section 304(a) of the Government Employee Rights Act of 1991 (42 U.S.C. 2000e–16c(a));

(iii) a covered employee (including an applicant), as defined in section 101 of the Congressional Accountability Act of 1995 (2 U.S.C. 1301);

(iv) a covered employee (including an applicant), as defined in section 411(c) of title 3, United States Code; or

(v) an employee or applicant to which section 717(a) of the Civil Rights Act of 1964 (42 U.S.C. 2000e–16(a)) applies.

(B) EMPLOYER.—The term "employer" means—

(i) an employer (as defined in section 701(b) of the Civil Rights Act of 1964 (42 U.S.C. 2000e(b)));

(ii) an entity employing a State employee described in section 304(a) of the Government Employee Rights Act of 1991;

(iii) an employing office, as defined in section 101 of the Congressional Accountability Act of 1995;

(iv) an employing office, as defined in section 411(c) of title 3, United States Code; or

(v) an entity to which section 717(a) of the Civil Rights Act of 1964 applies.

(C) EMPLOYMENT AGENCY; LABOR ORGANIZATION.—The terms "employment agency" and "labor organization" have the meanings given the terms in section 701 of the Civil Rights Act of 1964 (42 U.S.C. 2000e).

(D) MEMBER.—The term "member", with respect to a labor organization, includes an applicant for membership in a labor organization.

(3) FAMILY MEMBER.—The term "family member" means, with respect to an individual—

(A) a dependent (as such term is used for purposes of section 701(f)(2) of the Employee Retirement Income Security Act of 1974) of such individual, and

(B) any other individual who is a first-degree, second-degree, third-degree, or fourth-degree relative of such individual or of an individual described in subparagraph (A).

(4) GENETIC INFORMATION.—

(A) IN GENERAL.—The term "genetic information" means, with respect to any individual, information about—

(i) such individual's genetic tests,

(ii) the genetic tests of family members of such individual, and

(iii) the manifestation of a disease or disorder in family members of such individual.

(B) INCLUSION OF GENETIC SERVICES AND PARTICIPATION IN GENETIC RESEARCH.—Such term includes, with respect to any individual, any request for, or receipt of, genetic services, or participation in clinical research which includes genetic services, by such individual or any family member of such individual.

(C) EXCLUSIONS.—The term "genetic information" shall not include information about the sex or age of any individual.

(5) GENETIC MONITORING.—The term "genetic monitoring" means the periodic examination of employees to evaluate acquired modifications to their genetic material, such as chromosomal damage or evidence of increased occurrence of mutations, that may have developed in the course of employment due to exposure to toxic substances in the workplace,

in order to identify, evaluate, and respond to the effects of or control adverse environmental exposures in the workplace.

(6) GENETIC SERVICES.—The term "genetic services" means—

(A) a genetic test;

(B) genetic counseling (including obtaining, interpreting, or assessing genetic information); or

(C) genetic education.

(7) GENETIC TEST.—

(A) IN GENERAL.—The term "genetic test" means an analysis of human DNA, RNA, chromosomes, proteins, or metabolites, that detects genotypes, mutations, or chromosomal changes.

(B) EXCEPTIONS.—The term "genetic test" does not mean an analysis of proteins or metabolites that does not detect genotypes, mutations, or chromosomal changes.

SEC. 202. EMPLOYER PRACTICES.

(a) DISCRIMINATION BASED ON GENETIC INFORMATION.—It shall be an unlawful employment practice for an employer—

(1) to fail or refuse to hire, or to discharge, any employee, or otherwise to discriminate against any employee with respect to the compensation, terms, conditions, or privileges of employment of the employee, because of genetic information with respect to the employee; or

(2) to limit, segregate, or classify the employees of the employer in any way that would deprive or tend to deprive any employee of employment opportunities or otherwise adversely affect the status of the employee as an employee, because of genetic information with respect to the employee.

(b) ACQUISITION OF GENETIC INFORMATION.—It shall be an unlawful employment practice for an employer to request, require, or purchase genetic information with respect to an employee or a family member of the employee except—

(1) where an employer inadvertently requests or requires family medical history of the employee or family member of the employee;

(2) where—

(A) health or genetic services are offered by the employer, including such services offered as part of a wellness program;

(B) the employee provides prior, knowing, voluntary, and written authorization;

(C) only the employee (or family member if the family member is receiving genetic services) and the licensed health care professional or board certified genetic counselor involved in providing such services receive individually identifiable information concerning the results of such services; and

(D) any individually identifiable genetic information provided under subparagraph (C) in connection with the services provided under subparagraph (A) is only available for purposes of such services and shall not be disclosed to the employer except in aggregate terms that do not disclose the identity of specific employees;

(3) where an employer requests or requires family medical history from the employee to comply with the certification

provisions of section 103 of the Family and Medical Leave Act of 1993 (29 U.S.C. 2613) or such requirements under State family and medical leave laws;

(4) where an employer purchases documents that are commercially and publicly available (including newspapers, magazines, periodicals, and books, but not including medical databases or court records) that include family medical history;

(5) where the information involved is to be used for genetic monitoring of the biological effects of toxic substances in the workplace, but only if—

(A) the employer provides written notice of the genetic monitoring to the employee;

(B)(i) the employee provides prior, knowing, voluntary, and written authorization; or

(ii) the genetic monitoring is required by Federal or State law;

(C) the employee is informed of individual monitoring results;

(D) the monitoring is in compliance with—

(i) any Federal genetic monitoring regulations, including any such regulations that may be promulgated by the Secretary of Labor pursuant to the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.), the Federal Mine Safety and Health Act of 1977 (30 U.S.C. 801 et seq.), or the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.); or

(ii) State genetic monitoring regulations, in the case of a State that is implementing genetic monitoring regulations under the authority of the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.); and

(E) the employer, excluding any licensed health care professional or board certified genetic counselor that is involved in the genetic monitoring program, receives the results of the monitoring only in aggregate terms that do not disclose the identity of specific employees; or

(6) where the employer conducts DNA analysis for law enforcement purposes as a forensic laboratory or for purposes of human remains identification, and requests or requires genetic information of such employer's employees, but only to the extent that such genetic information is used for analysis of DNA identification markers for quality control to detect sample contamination.

(c) PRESERVATION OF PROTECTIONS.—In the case of information to which any of paragraphs (1) through (6) of subsection (b) applies, such information may not be used in violation of paragraph (1) or (2) of subsection (a) or treated or disclosed in a manner that violates section 206.

SEC. 203. EMPLOYMENT AGENCY PRACTICES.

(a) DISCRIMINATION BASED ON GENETIC INFORMATION.—It shall be an unlawful employment practice for an employment agency—

(1) to fail or refuse to refer for employment, or otherwise to discriminate against, any individual because of genetic information with respect to the individual;

(2) to limit, segregate, or classify individuals or fail or refuse to refer for employment any individual in any way

that would deprive or tend to deprive any individual of employment opportunities, or otherwise adversely affect the status of the individual as an employee, because of genetic information with respect to the individual; or

(3) to cause or attempt to cause an employer to discriminate against an individual in violation of this title.

(b) ACQUISITION OF GENETIC INFORMATION.—It shall be an unlawful employment practice for an employment agency to request, require, or purchase genetic information with respect to an individual or a family member of the individual except—

(1) where an employment agency inadvertently requests or requires family medical history of the individual or family member of the individual;

(2) where—

(A) health or genetic services are offered by the employment agency, including such services offered as part of a wellness program;

(B) the individual provides prior, knowing, voluntary, and written authorization;

(C) only the individual (or family member if the family member is receiving genetic services) and the licensed health care professional or board certified genetic counselor involved in providing such services receive individually identifiable information concerning the results of such services; and

(D) any individually identifiable genetic information provided under subparagraph (C) in connection with the services provided under subparagraph (A) is only available for purposes of such services and shall not be disclosed to the employment agency except in aggregate terms that do not disclose the identity of specific individuals;

(3) where an employment agency requests or requires family medical history from the individual to comply with the certification provisions of section 103 of the Family and Medical Leave Act of 1993 (29 U.S.C. 2613) or such requirements under State family and medical leave laws;

(4) where an employment agency purchases documents that are commercially and publicly available (including newspapers, magazines, periodicals, and books, but not including medical databases or court records) that include family medical history; or

(5) where the information involved is to be used for genetic monitoring of the biological effects of toxic substances in the workplace, but only if—

(A) the employment agency provides written notice of the genetic monitoring to the individual;

(B)(i) the individual provides prior, knowing, voluntary, and written authorization; or

(ii) the genetic monitoring is required by Federal or State law;

(C) the individual is informed of individual monitoring results;

(D) the monitoring is in compliance with—

(i) any Federal genetic monitoring regulations, including any such regulations that may be promulgated by the Secretary of Labor pursuant to the Occupational Safety and Health Act of 1970 (29 U.S.C.

651 et seq.), the Federal Mine Safety and Health Act of 1977 (30 U.S.C. 801 et seq.), or the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.); or

(ii) State genetic monitoring regulations, in the case of a State that is implementing genetic monitoring regulations under the authority of the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.); and

(E) the employment agency, excluding any licensed health care professional or board certified genetic counselor that is involved in the genetic monitoring program, receives the results of the monitoring only in aggregate terms that do not disclose the identity of specific individuals.

(c) PRESERVATION OF PROTECTIONS.—In the case of information to which any of paragraphs (1) through (5) of subsection (b) applies, such information may not be used in violation of paragraph (1), (2), or (3) of subsection (a) or treated or disclosed in a manner that violates section 206.

SEC. 204. LABOR ORGANIZATION PRACTICES.

(a) DISCRIMINATION BASED ON GENETIC INFORMATION.—It shall be an unlawful employment practice for a labor organization—

(1) to exclude or to expel from the membership of the organization, or otherwise to discriminate against, any member because of genetic information with respect to the member;

(2) to limit, segregate, or classify the members of the organization, or fail or refuse to refer for employment any member, in any way that would deprive or tend to deprive any member of employment opportunities, or otherwise adversely affect the status of the member as an employee, because of genetic information with respect to the member; or

(3) to cause or attempt to cause an employer to discriminate against a member in violation of this title.

(b) ACQUISITION OF GENETIC INFORMATION.—It shall be an unlawful employment practice for a labor organization to request, require, or purchase genetic information with respect to a member or a family member of the member except—

(1) where a labor organization inadvertently requests or requires family medical history of the member or family member of the member;

(2) where—

(A) health or genetic services are offered by the labor organization, including such services offered as part of a wellness program;

(B) the member provides prior, knowing, voluntary, and written authorization;

(C) only the member (or family member if the family member is receiving genetic services) and the licensed health care professional or board certified genetic counselor involved in providing such services receive individually identifiable information concerning the results of such services; and

(D) any individually identifiable genetic information provided under subparagraph (C) in connection with the services provided under subparagraph (A) is only available for purposes of such services and shall not be disclosed

to the labor organization except in aggregate terms that do not disclose the identity of specific members;

(3) where a labor organization requests or requires family medical history from the members to comply with the certification provisions of section 103 of the Family and Medical Leave Act of 1993 (29 U.S.C. 2613) or such requirements under State family and medical leave laws;

(4) where a labor organization purchases documents that are commercially and publicly available (including newspapers, magazines, periodicals, and books, but not including medical databases or court records) that include family medical history; or

(5) where the information involved is to be used for genetic monitoring of the biological effects of toxic substances in the workplace, but only if—

(A) the labor organization provides written notice of the genetic monitoring to the member;

(B)(i) the member provides prior, knowing, voluntary, and written authorization; or

(ii) the genetic monitoring is required by Federal or State law;

(C) the member is informed of individual monitoring results;

(D) the monitoring is in compliance with—

(i) any Federal genetic monitoring regulations, including any such regulations that may be promulgated by the Secretary of Labor pursuant to the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.), the Federal Mine Safety and Health Act of 1977 (30 U.S.C. 801 et seq.), or the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.); or

(ii) State genetic monitoring regulations, in the case of a State that is implementing genetic monitoring regulations under the authority of the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.); and

(E) the labor organization, excluding any licensed health care professional or board certified genetic counselor that is involved in the genetic monitoring program, receives the results of the monitoring only in aggregate terms that do not disclose the identity of specific members.

(c) PRESERVATION OF PROTECTIONS.—In the case of information to which any of paragraphs (1) through (5) of subsection (b) applies, such information may not be used in violation of paragraph (1), (2), or (3) of subsection (a) or treated or disclosed in a manner that violates section 206.

SEC. 205. TRAINING PROGRAMS.

(a) DISCRIMINATION BASED ON GENETIC INFORMATION.—It shall be an unlawful employment practice for any employer, labor organization, or joint labor-management committee controlling apprenticeship or other training or retraining, including on-the-job training programs—

(1) to discriminate against any individual because of genetic information with respect to the individual in admission to, or employment in, any program established to provide apprenticeship or other training or retraining;

(2) to limit, segregate, or classify the applicants for or participants in such apprenticeship or other training or retraining, or fail or refuse to refer for employment any individual, in any way that would deprive or tend to deprive any individual of employment opportunities, or otherwise adversely affect the status of the individual as an employee, because of genetic information with respect to the individual; or

(3) to cause or attempt to cause an employer to discriminate against an applicant for or a participant in such apprenticeship or other training or retraining in violation of this title.

(b) ACQUISITION OF GENETIC INFORMATION.—It shall be an unlawful employment practice for an employer, labor organization, or joint labor-management committee described in subsection (a) to request, require, or purchase genetic information with respect to an individual or a family member of the individual except—

(1) where the employer, labor organization, or joint labor-management committee inadvertently requests or requires family medical history of the individual or family member of the individual;

(2) where—

(A) health or genetic services are offered by the employer, labor organization, or joint labor-management committee, including such services offered as part of a wellness program;

(B) the individual provides prior, knowing, voluntary, and written authorization;

(C) only the individual (or family member if the family member is receiving genetic services) and the licensed health care professional or board certified genetic counselor involved in providing such services receive individually identifiable information concerning the results of such services; and

(D) any individually identifiable genetic information provided under subparagraph (C) in connection with the services provided under subparagraph (A) is only available for purposes of such services and shall not be disclosed to the employer, labor organization, or joint labor-management committee except in aggregate terms that do not disclose the identity of specific individuals;

(3) where the employer, labor organization, or joint labor-management committee requests or requires family medical history from the individual to comply with the certification provisions of section 103 of the Family and Medical Leave Act of 1993 (29 U.S.C. 2613) or such requirements under State family and medical leave laws;

(4) where the employer, labor organization, or joint labor-management committee purchases documents that are commercially and publicly available (including newspapers, magazines, periodicals, and books, but not including medical databases or court records) that include family medical history;

(5) where the information involved is to be used for genetic monitoring of the biological effects of toxic substances in the workplace, but only if—

(A) the employer, labor organization, or joint labor-management committee provides written notice of the genetic monitoring to the individual;

(B)(i) the individual provides prior, knowing, voluntary, and written authorization; or

(ii) the genetic monitoring is required by Federal or State law;

(C) the individual is informed of individual monitoring results;

(D) the monitoring is in compliance with—

(i) any Federal genetic monitoring regulations, including any such regulations that may be promulgated by the Secretary of Labor pursuant to the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.), the Federal Mine Safety and Health Act of 1977 (30 U.S.C. 801 et seq.), or the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.); or

(ii) State genetic monitoring regulations, in the case of a State that is implementing genetic monitoring regulations under the authority of the Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.); and

(E) the employer, labor organization, or joint labor-management committee, excluding any licensed health care professional or board certified genetic counselor that is involved in the genetic monitoring program, receives the results of the monitoring only in aggregate terms that do not disclose the identity of specific individuals; or

(6) where the employer conducts DNA analysis for law enforcement purposes as a forensic laboratory or for purposes of human remains identification, and requests or requires genetic information of such employer's apprentices or trainees, but only to the extent that such genetic information is used for analysis of DNA identification markers for quality control to detect sample contamination.

(c) PRESERVATION OF PROTECTIONS.—In the case of information to which any of paragraphs (1) through (6) of subsection (b) applies, such information may not be used in violation of paragraph (1), (2), or (3) of subsection (a) or treated or disclosed in a manner that violates section 206.

SEC. 206. CONFIDENTIALITY OF GENETIC INFORMATION.

(a) TREATMENT OF INFORMATION AS PART OF CONFIDENTIAL MEDICAL RECORD.—If an employer, employment agency, labor organization, or joint labor-management committee possesses genetic information about an employee or member, such information shall be maintained on separate forms and in separate medical files and be treated as a confidential medical record of the employee or member. An employer, employment agency, labor organization, or joint labor-management committee shall be considered to be in compliance with the maintenance of information requirements of this subsection with respect to genetic information subject to this subsection that is maintained with and treated as a confidential medical record under section 102(d)(3)(B) of the Americans With Disabilities Act (42 U.S.C. 12112(d)(3)(B)).

(b) LIMITATION ON DISCLOSURE.—An employer, employment agency, labor organization, or joint labor-management committee shall not disclose genetic information concerning an employee or member except—

(1) to the employee or member of a labor organization (or family member if the family member is receiving the genetic services) at the written request of the employee or member of such organization;

(2) to an occupational or other health researcher if the research is conducted in compliance with the regulations and protections provided for under part 46 of title 45, Code of Federal Regulations;

(3) in response to an order of a court, except that—

(A) the employer, employment agency, labor organization, or joint labor-management committee may disclose only the genetic information expressly authorized by such order; and

(B) if the court order was secured without the knowledge of the employee or member to whom the information refers, the employer, employment agency, labor organization, or joint labor-management committee shall inform the employee or member of the court order and any genetic information that was disclosed pursuant to such order;

(4) to government officials who are investigating compliance with this title if the information is relevant to the investigation;

(5) to the extent that such disclosure is made in connection with the employee's compliance with the certification provisions of section 103 of the Family and Medical Leave Act of 1993 (29 U.S.C. 2613) or such requirements under State family and medical leave laws; or

(6) to a Federal, State, or local public health agency only with regard to information that is described in section 201(4)(A)(iii) and that concerns a contagious disease that presents an imminent hazard of death or life-threatening illness, and that the employee whose family member or family members is or are the subject of a disclosure under this paragraph is notified of such disclosure.

(c) RELATIONSHIP TO HIPAA REGULATIONS.—With respect to the regulations promulgated by the Secretary of Health and Human Services under part C of title XI of the Social Security Act (42 U.S.C. 1320d et seq.) and section 264 of the Health Insurance Portability and Accountability Act of 1996 (42 U.S.C. 1320d–2 note), this title does not prohibit a covered entity under such regulations from any use or disclosure of health information that is authorized for the covered entity under such regulations. The previous sentence does not affect the authority of such Secretary to modify such regulations.

SEC. 207. REMEDIES AND ENFORCEMENT.

(a) EMPLOYEES COVERED BY TITLE VII OF THE CIVIL RIGHTS ACT OF 1964.—

(1) IN GENERAL.—The powers, procedures, and remedies provided in sections 705, 706, 707, 709, 710, and 711 of the Civil Rights Act of 1964 (42 U.S.C. 2000e–4 et seq.) to the Commission, the Attorney General, or any person, alleging a violation of title VII of that Act (42 U.S.C. 2000e et seq.) shall be the powers, procedures, and remedies this title provides to the Commission, the Attorney General, or any person, respectively, alleging an unlawful employment practice in violation of this title against an employee described in section 201(2)(A)(i), except as provided in paragraphs (2) and (3).

(2) COSTS AND FEES.—The powers, remedies, and procedures provided in subsections (b) and (c) of section 722 of the Revised Statutes of the United States (42 U.S.C. 1988), shall be powers, remedies, and procedures this title provides to the Commission, the Attorney General, or any person, alleging such a practice.

(3) DAMAGES.—The powers, remedies, and procedures provided in section 1977A of the Revised Statutes of the United States (42 U.S.C. 1981a), including the limitations contained in subsection (b)(3) of such section 1977A, shall be powers, remedies, and procedures this title provides to the Commission, the Attorney General, or any person, alleging such a practice (not an employment practice specifically excluded from coverage under section 1977A(a)(1) of the Revised Statutes of the United States).

(b) EMPLOYEES COVERED BY GOVERNMENT EMPLOYEE RIGHTS ACT OF 1991.—

(1) IN GENERAL.—The powers, remedies, and procedures provided in sections 302 and 304 of the Government Employee Rights Act of 1991 (42 U.S.C. 2000e–16b, 2000e–16c) to the Commission, or any person, alleging a violation of section 302(a)(1) of that Act (42 U.S.C. 2000e–16b(a)(1)) shall be the powers, remedies, and procedures this title provides to the Commission, or any person, respectively, alleging an unlawful employment practice in violation of this title against an employee described in section 201(2)(A)(ii), except as provided in paragraphs (2) and (3).

(2) COSTS AND FEES.—The powers, remedies, and procedures provided in subsections (b) and (c) of section 722 of the Revised Statutes of the United States (42 U.S.C. 1988), shall be powers, remedies, and procedures this title provides to the Commission, or any person, alleging such a practice.

(3) DAMAGES.—The powers, remedies, and procedures provided in section 1977A of the Revised Statutes of the United States (42 U.S.C. 1981a), including the limitations contained in subsection (b)(3) of such section 1977A, shall be powers, remedies, and procedures this title provides to the Commission, or any person, alleging such a practice (not an employment practice specifically excluded from coverage under section 1977A(a)(1) of the Revised Statutes of the United States).

(c) EMPLOYEES COVERED BY CONGRESSIONAL ACCOUNTABILITY ACT OF 1995.—

(1) IN GENERAL.—The powers, remedies, and procedures provided in the Congressional Accountability Act of 1995 (2 U.S.C. 1301 et seq.) to the Board (as defined in section 101 of that Act (2 U.S.C. 1301)), or any person, alleging a violation of section 201(a)(1) of that Act (42 U.S.C. 1311(a)(1)) shall be the powers, remedies, and procedures this title provides to that Board, or any person, alleging an unlawful employment practice in violation of this title against an employee described in section 201(2)(A)(iii), except as provided in paragraphs (2) and (3).

(2) COSTS AND FEES.—The powers, remedies, and procedures provided in subsections (b) and (c) of section 722 of the Revised Statutes of the United States (42 U.S.C. 1988), shall be powers, remedies, and procedures this title provides to that Board, or any person, alleging such a practice.

(3) DAMAGES.—The powers, remedies, and procedures provided in section 1977A of the Revised Statutes of the United States (42 U.S.C. 1981a), including the limitations contained in subsection (b)(3) of such section 1977A, shall be powers, remedies, and procedures this title provides to that Board, or any person, alleging such a practice (not an employment practice specifically excluded from coverage under section 1977A(a)(1) of the Revised Statutes of the United States).

(4) OTHER APPLICABLE PROVISIONS.—With respect to a claim alleging a practice described in paragraph (1), title III of the Congressional Accountability Act of 1995 (2 U.S.C. 1381 et seq.) shall apply in the same manner as such title applies with respect to a claim alleging a violation of section 201(a)(1) of such Act (2 U.S.C. 1311(a)(1)).

(d) EMPLOYEES COVERED BY CHAPTER 5 OF TITLE 3, UNITED STATES CODE.—

(1) IN GENERAL.—The powers, remedies, and procedures provided in chapter 5 of title 3, United States Code, to the President, the Commission, the Merit Systems Protection Board, or any person, alleging a violation of section 411(a)(1) of that title, shall be the powers, remedies, and procedures this title provides to the President, the Commission, such Board, or any person, respectively, alleging an unlawful employment practice in violation of this title against an employee described in section 201(2)(A)(iv), except as provided in paragraphs (2) and (3).

(2) COSTS AND FEES.—The powers, remedies, and procedures provided in subsections (b) and (c) of section 722 of the Revised Statutes of the United States (42 U.S.C. 1988), shall be powers, remedies, and procedures this title provides to the President, the Commission, such Board, or any person, alleging such a practice.

(3) DAMAGES.—The powers, remedies, and procedures provided in section 1977A of the Revised Statutes of the United States (42 U.S.C. 1981a), including the limitations contained in subsection (b)(3) of such section 1977A, shall be powers, remedies, and procedures this title provides to the President, the Commission, such Board, or any person, alleging such a practice (not an employment practice specifically excluded from coverage under section 1977A(a)(1) of the Revised Statutes of the United States).

(e) EMPLOYEES COVERED BY SECTION 717 OF THE CIVIL RIGHTS ACT OF 1964.—

(1) IN GENERAL.—The powers, remedies, and procedures provided in section 717 of the Civil Rights Act of 1964 (42 U.S.C. 2000e–16) to the Commission, the Attorney General, the Librarian of Congress, or any person, alleging a violation of that section shall be the powers, remedies, and procedures this title provides to the Commission, the Attorney General, the Librarian of Congress, or any person, respectively, alleging an unlawful employment practice in violation of this title against an employee or applicant described in section 201(2)(A)(v), except as provided in paragraphs (2) and (3).

(2) COSTS AND FEES.—The powers, remedies, and procedures provided in subsections (b) and (c) of section 722 of the Revised Statutes of the United States (42 U.S.C. 1988), shall be powers, remedies, and procedures this title provides

to the Commission, the Attorney General, the Librarian of Congress, or any person, alleging such a practice.

(3) DAMAGES.—The powers, remedies, and procedures provided in section 1977A of the Revised Statutes of the United States (42 U.S.C. 1981a), including the limitations contained in subsection (b)(3) of such section 1977A, shall be powers, remedies, and procedures this title provides to the Commission, the Attorney General, the Librarian of Congress, or any person, alleging such a practice (not an employment practice specifically excluded from coverage under section 1977A(a)(1) of the Revised Statutes of the United States).

(f) PROHIBITION AGAINST RETALIATION.—No person shall discriminate against any individual because such individual has opposed any act or practice made unlawful by this title or because such individual made a charge, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under this title. The remedies and procedures otherwise provided for under this section shall be available to aggrieved individuals with respect to violations of this subsection.

(g) DEFINITION.—In this section, the term "Commission" means the Equal Employment Opportunity Commission.

SEC. 208. DISPARATE IMPACT.

(a) GENERAL RULE.—Notwithstanding any other provision of this Act, "disparate impact", as that term is used in section 703(k) of the Civil Rights Act of 1964 (42 U.S.C. 2000e–2(k)), on the basis of genetic information does not establish a cause of action under this Act.

(b) COMMISSION.—On the date that is 6 years after the date of enactment of this Act, there shall be established a commission, to be known as the Genetic Nondiscrimination Study Commission (referred to in this section as the "Commission") to review the developing science of genetics and to make recommendations to Congress regarding whether to provide a disparate impact cause of action under this Act.

(c) MEMBERSHIP.—

(1) IN GENERAL.—The Commission shall be composed of 8 members, of which—

(A) 1 member shall be appointed by the Majority Leader of the Senate;

(B) 1 member shall be appointed by the Minority Leader of the Senate;

(C) 1 member shall be appointed by the Chairman of the Committee on Health, Education, Labor, and Pensions of the Senate;

(D) 1 member shall be appointed by the ranking minority member of the Committee on Health, Education, Labor, and Pensions of the Senate;

(E) 1 member shall be appointed by the Speaker of the House of Representatives;

(F) 1 member shall be appointed by the Minority Leader of the House of Representatives;

(G) 1 member shall be appointed by the Chairman of the Committee on Education and Labor of the House of Representatives; and

(H) 1 member shall be appointed by the ranking minority member of the Committee on Education and Labor of the House of Representatives.

(2) COMPENSATION AND EXPENSES.—The members of the Commission shall not receive compensation for the performance of services for the Commission, but shall be allowed travel expenses, including per diem in lieu of subsistence, at rates authorized for employees of agencies under subchapter I of chapter 57 of title 5, United States Code, while away from their homes or regular places of business in the performance of services for the Commission.

(d) ADMINISTRATIVE PROVISIONS.—

(1) LOCATION.—The Commission shall be located in a facility maintained by the Equal Employment Opportunity Commission.

(2) DETAIL OF GOVERNMENT EMPLOYEES.—Any Federal Government employee may be detailed to the Commission without reimbursement, and such detail shall be without interruption or loss of civil service status or privilege.

(3) INFORMATION FROM FEDERAL AGENCIES.—The Commission may secure directly from any Federal department or agency such information as the Commission considers necessary to carry out the provisions of this section. Upon request of the Commission, the head of such department or agency shall furnish such information to the Commission.

(4) HEARINGS.—The Commission may hold such hearings, sit and act at such times and places, take such testimony, and receive such evidence as the Commission considers advisable to carry out the objectives of this section, except that, to the extent possible, the Commission shall use existing data and research.

(5) POSTAL SERVICES.—The Commission may use the United States mails in the same manner and under the same conditions as other departments and agencies of the Federal Government.

(e) REPORT.—Not later than 1 year after all of the members are appointed to the Commission under subsection (c)(1), the Commission shall submit to Congress a report that summarizes the findings of the Commission and makes such recommendations for legislation as are consistent with this Act.

(f) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Equal Employment Opportunity Commission such sums as may be necessary to carry out this section.

SEC. 209. CONSTRUCTION.

(a) IN GENERAL.—Nothing in this title shall be construed to—

(1) limit the rights or protections of an individual under any other Federal or State statute that provides equal or greater protection to an individual than the rights or protections provided for under this title, including the protections of an individual under the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) (including coverage afforded to individuals under section 102 of such Act (42 U.S.C. 12112)), or under the Rehabilitation Act of 1973 (29 U.S.C. 701 et seq.);

(2)(A) limit the rights or protections of an individual to bring an action under this title against an employer, employment agency, labor organization, or joint labor-management committee for a violation of this title; or

(B) provide for enforcement of, or penalties for violation of, any requirement or prohibition applicable to any employer, employment agency, labor organization, or joint labor-management committee subject to enforcement for a violation under—

(i) the amendments made by title I of this Act;

(ii)(I) subsection (a) of section 701 of the Employee Retirement Income Security Act of 1974 as such section applies with respect to genetic information pursuant to subsection (b)(1)(B) of such section;

(II) section 702(a)(1)(F) of such Act; or

(III) section 702(b)(1) of such Act as such section applies with respect to genetic information as a health status-related factor;

(iii)(I) subsection (a) of section 2701 of the Public Health Service Act as such section applies with respect to genetic information pursuant to subsection (b)(1)(B) of such section;

(II) section 2702(a)(1)(F) of such Act; or

(III) section 2702(b)(1) of such Act as such section applies with respect to genetic information as a health status-related factor; or

(iv)(I) subsection (a) of section 9801 of the Internal Revenue Code of 1986 as such section applies with respect to genetic information pursuant to subsection (b)(1)(B) of such section;

(II) section 9802(a)(1)(F) of such Act; or

(III) section 9802(b)(1) of such Act as such section applies with respect to genetic information as a health status-related factor;

(3) apply to the Armed Forces Repository of Specimen Samples for the Identification of Remains;

(4) limit or expand the protections, rights, or obligations of employees or employers under applicable workers' compensation laws;

(5) limit the authority of a Federal department or agency to conduct or sponsor occupational or other health research that is conducted in compliance with the regulations contained in part 46 of title 45, Code of Federal Regulations (or any corresponding or similar regulation or rule);

(6) limit the statutory or regulatory authority of the Occupational Safety and Health Administration or the Mine Safety and Health Administration to promulgate or enforce workplace safety and health laws and regulations; or

(7) require any specific benefit for an employee or member or a family member of an employee or member under any group health plan or health insurance issuer offering group health insurance coverage in connection with a group health plan.

(b) GENETIC INFORMATION OF A FETUS OR EMBRYO.—Any reference in this title to genetic information concerning an individual or family member of an individual shall—

(1) with respect to such an individual or family member of an individual who is a pregnant woman, include genetic information of any fetus carried by such pregnant woman; and

(2) with respect to an individual or family member utilizing an assisted reproductive technology, include genetic information of any embryo legally held by the individual or family member.

(c) RELATION TO AUTHORITIES UNDER TITLE I.—With respect to a group health plan, or a health insurance issuer offering group health insurance coverage in connection with a group health plan, this title does not prohibit any activity of such plan or issuer that is authorized for the plan or issuer under any provision of law referred to in clauses (i) through (iv) of subsection (a)(2)(B).

SEC. 210. MEDICAL INFORMATION THAT IS NOT GENETIC INFORMATION.

An employer, employment agency, labor organization, or joint labor-management committee shall not be considered to be in violation of this title based on the use, acquisition, or disclosure of medical information that is not genetic information about a manifested disease, disorder, or pathological condition of an employee or member, including a manifested disease, disorder, or pathological condition that has or may have a genetic basis.

SEC. 211. REGULATIONS.

Not later than 1 year after the date of enactment of this title, the Commission shall issue final regulations to carry out this title.

SEC. 212. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated such sums as may be necessary to carry out this title (except for section 208).

SEC. 213. EFFECTIVE DATE.

This title takes effect on the date that is 18 months after the date of enactment of this Act.

TITLE III—MISCELLANEOUS PROVISIONS

SEC. 301. SEVERABILITY.

If any provision of this Act, an amendment made by this Act, or the application of such provision or amendment to any person or circumstance is held to be unconstitutional, the remainder of this Act, the amendments made by this Act, and the application of such provisions to any person or circumstance shall not be affected thereby.

SEC. 302. CHILD LABOR PROTECTIONS.

(a) IN GENERAL.—Section 16(e) of the Fair Labor Standards Act of 1938 (29 U.S.C. 216(e)) is amended to read as follows:

"(e)(1)(A) Any person who violates the provisions of sections 12 or 13(c), relating to child labor, or any regulation issued pursuant to such sections, shall be subject to a civil penalty not to exceed—

"(i) $11,000 for each employee who was the subject of such a violation; or

"(ii) $50,000 with regard to each such violation that causes the death or serious injury of any employee under the age of 18 years, which penalty may be doubled where the violation is a repeated or willful violation.

"(B) For purposes of subparagraph (A), the term 'serious injury' means—

"(i) permanent loss or substantial impairment of one of the senses (sight, hearing, taste, smell, tactile sensation);

"(ii) permanent loss or substantial impairment of the function of a bodily member, organ, or mental faculty, including the loss of all or part of an arm, leg, foot, hand or other body part; or

"(iii) permanent paralysis or substantial impairment that causes loss of movement or mobility of an arm, leg, foot, hand or other body part.

"(2) Any person who repeatedly or willfully violates section 6 or 7, relating to wages, shall be subject to a civil penalty not to exceed $1,100 for each such violation.

"(3) In determining the amount of any penalty under this subsection, the appropriateness of such penalty to the size of the business of the person charged and the gravity of the violation shall be considered. The amount of any penalty under this subsection, when finally determined, may be—

"(A) deducted from any sums owing by the United States to the person charged;

"(B) recovered in a civil action brought by the Secretary in any court of competent jurisdiction, in which litigation the Secretary shall be represented by the Solicitor of Labor; or

"(C) ordered by the court, in an action brought for a violation of section 15(a)(4) or a repeated or willful violation of section 15(a)(2), to be paid to the Secretary.

"(4) Any administrative determination by the Secretary of the amount of any penalty under this subsection shall be final, unless within 15 days after receipt of notice thereof by certified mail the person charged with the violation takes exception to the determination that the violations for which the penalty is imposed occurred, in which event final determination of the penalty shall be made in an administrative proceeding after opportunity for hearing in accordance with section 554 of title 5, United States Code, and regulations to be promulgated by the Secretary.

"(5) Except for civil penalties collected for violations of section 12, sums collected as penalties pursuant to this section shall be applied toward reimbursement of the costs of determining the violations and assessing and collecting such penalties, in accordance with the provision of section 2 of the Act entitled 'An Act to authorize the Department of Labor to make special statistical studies upon payment of the cost thereof and for other purposes' (29 U.S.C. 9a). Civil penalties collected for violations of section 12 shall be deposited in the general fund of the Treasury.".

(b) EFFECTIVE DATE.—The amendments made by this section shall take effect on the date of the enactment of this Act.

Speaker of the House of Representatives.

Vice President of the United States and
President of the Senate.

The MAOA Gene Predicts Credit Card Debt *

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Abstract

Economists have long realized the importance of credit markets and borrowing behavior for household finance and economics more generally. More recently, twin studies have shown that genetic variation plays a significant role in financial decision making. However, these studies have not identified which genes might be involved. Here we present the first evidence of a specific gene that may influence borrowing behavior. Using data from Add Health, we show that individuals with a polymorphism of the MAOA gene that has lower transcriptional efficiency are significantly more likely to report having credit card debt. Having one or both MAOA alleles of the low efficiency type raises the average likelihood of having credit card debt by 14%. These results suggest that behavioral models benefit from integrating genetic variation and that economists should consider the welfare consequences of possible discrimination by lenders on the basis of genotype.

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1 Introduction

The practical and theoretical importance of credit card debt cannot be overstated. Some 180 million Americans currently have a credit card (Lusardi and Tufano 2009) and approximately half regularly carry unpaid credit card debt (Sprenger and Stavins 2008). The ubiquity of credit card debt has sparked renewed interest in the study of household finance and high-cost borrowers in particular (Campbell 2006, Agarwal, Driscol, Gabaix and Laibson 2008, Tufano, Maynard and De Neve 2008, Lusardi and Tufano 2009, Zinman 2009). The variables used to explain variation in credit card usage typically include age, gender, ethnicity, income levels, employment, and financial literacy.

Because credit card debt is generally viewed as a form of present-biased decision making it has also received the attention of those economists studying intertemporal choices and discounting (Agarwal, Skiba and Tobacman 2009, Laibson, Repetto and Tobacman forthcoming). They find that present-biased preferences correlate with credit card borrowing (Meier and Sprenger 2010). A number of such studies also find that individual variation in the propensity to make impulsive, present-biased decisions is associated with specific cognitive functions. For example, individual differences in valuing immediate and delayed monetary rewards can be traced to separate neural systems (McClure, Laibson, Loewenstein and Cohen 2004) and processes in the anterior prefrontal cortex, a region in the brain shown to support the integration of diverse information (Shamosh, DeYoung, Green, Reis, Johnson, Conway, Engle, Braver and Gray 2008).

While it is possible that differences in brain activity result from development or environmental factors, there is a growing body of evidence that suggests some of these differences are influenced by genes. Recent studies using twin design research techniques have been able to gauge the explanatory power of both genes and environment, and they suggest that genetic variation plays an important role in a number of behaviors including invest-

ment decisions (Cesarini, Johannesson, Lichtenstein, Sandewall and Wallace forthcoming), other-regarding preferences and risk-taking (Cesarini, Dawes, Johannesson, Lichtenstein and Wallace 2009), the tendency to cooperate (Cesarini, Dawes, Fowler, Johannesson, Lichtenstein and Wallace 2008), political behavior (Alford, Funk and Hibbing 2005, Hatemi, Medland, Morley, Heath and Martin 2007, Fowler, Baker and Dawes 2008), leadership (De Neve, Mikhaylov, Dawes, Fowler and Christakis n.d.), and happiness levels (Weiss, Bates and Luciano 2008, De Neve, Fowler, Frey and Christakis 2010).

Although twin studies are an important first step in establishing the role of genes for a particular behavior, they do not identify the specific genes involved. The increasing availability of DNA analyses now allows us to test hypotheses about targeted genes and their effects. For example, social scientists have recently shown that specific gene variants are associated with dictator game giving (Knafo, Israel, Darvasi, Bachner-Melman, Uzefovsky, Cohen, Feldman, Lerer, Laiba, Raz and et al 2008), financial risk-taking in men (Dreber, Apicella, Eisenberg, Garcia, Zamore, Lum and Campbell 2009, Kuhnen and Chiao 2009), punishment behavior in public goods games (McDermott, Tingley, Cowden, Frazetto and Johnson 2009), and political behavior and attitudes (Fowler and Dawes 2008, Dawes and Fowler 2009, Settle, Dawes, Christakis and Fowler forthcoming).

For borrowing behavior, the natural place to start the search for such genes is among those that have already been shown to account for variation in related behaviors. Among these, MAOA is a prime candidate. The MAOA gene encodes monoamine oxidase A, an enzyme that degrades neurotransmitters such as serotonin, dopamine, and epinephrine (adrenaline) in parts of the brain that regulate impulsiveness and cognitive ability (Hariri, Drabant, Munoz, Kolachana, Mattay, Egan and Weinberger 2005, Meyer-Lindenberg, Buckholtz, Kolachana, Hariri, Pezawas, Blasi, Wabnitz, Honea, Verchinski, Callicott, Egan, Mattay and Weinberger 2006, Eisenberger, Way, Taylor, Welch and Lieberman 2007). MAOA has been studied for more than twenty years and much is known about the way different versions of this gene regulate transcription, metabolism, and signal transfers between neurons, all of

which have behavioral effects (Craig 2007). In particular, the less transcriptionally efficient alleles of this gene have been associated with a variety of impulsive and addictive behaviors, as well as a lack of conscientiousness (Walderhaug, Lunde, Nordvik, Landro, Refsum and Magnusson 2002, Saito, Lachman, Diaz, Hallikaien, Kauhanen and et al 2002, Contini, Marques, Garcia, Hutz and Bau 2006, Passamonti, Fera, Magariello, Cerasa, Gioia, Muglia, Nicoletti, Gallo, Provinciali and Quattrone 2006, Rosenberg, Templeton, Feigin, Lancet, Beckmann, Selig, Hamer and Skorecki 2006, Guo, Ou, Roettger and Shih 2008, McDermott et al. 2009). As a result, economists have specifically identified MAOA as a candidate gene for further study (Benjamin, Chabris, Glaeser, Gudnason, Harris, Laibson, Launer and Purcell 2007).

Because credit card debt is a relatively expensive form of debt, our prior intuition is that, all other things being equal, it would be used more by those individuals seeking immediate gratification, displaying less consideration of future consequences, and reduced information processing. Hence, we hypothesize that people with less transcriptionally efficient alleles of the MAOA gene are more likely to accrue credit card debt. Although recent studies have already shown that a large fraction of the variation in economic behavior can be attributed to genetic factors, to date no specific genes have been identified in this process.

It is crucial to point out at the outset that the goal of this article is to show association rather than causality. Using data from the National Longitudinal Study of Adolescent Health (Add Health), we conduct gene association tests on the relationship between MAOA and credit card debt. The results indicate that the MAOA gene is significantly associated with the reporting of credit card debt. To our knowledge, this is the first article to show a specific gene variant is associated with real world borrowing behavior.

2 Some Basic Genetics Concepts

Human DNA is composed of an estimated 21,000 genes that form the blueprint for molecules that regulate the development and function of the human body. Genes are distinct regions

of human DNA that are placed in the 23 pairs of chains, or chromosomes, that make up all human DNA. Almost all human cells contain the same inherited DNA chains that develop from the moment of conception.

Individuals inherit one half of their DNA from each parent, with one copy of each gene coming from the mother and one copy from the father. Some genes come in different versions, known as "alleles"—for example, sickle cell disease results from a particular allele coding for abnormal rather than normal hemoglobin. Each parent has two separate copies of an allele at each "locus", or location, on the chromosome, but each sperm or egg cell contains only one of these alleles. Thus a child has a 50% chance of receiving a particular allele from a particular parent. For example, suppose that at a given locus there are two possible alleles, A and B. If both parents are "heterozygous" at that locus, meaning they each have an A and a B allele (AB or BA—order is irrelevant), then a given offspring has a 25% chance of being "homozygous" for A (AA), a 25% chance of being homozygous for B (BB) and a 50% chance of being heterozygous (AB or BA). If an individual is heterozygous at a locus, a "dominant" allele may impose itself on the "recessive" allele and the expression of the latter allele will not be observed.

Genes transcribe proteins that begin a cascade of interactions that regulate bodily structure and function. Many of the observable traits and behaviors of interest, referred to as "phenotypes", are far downstream from the original "genotypes" present in the DNA. While in some cases one allele can single-handedly lead to a disease (such as Sickle Cell Anemia, Huntingtons disease, and cystic fibrosis), the vast majority of phenotypes are "polygenic", meaning they are influenced by multiple genes (Mackay 2001, Plomin, DeFries, McClearn and McGuffin 2008), and are shaped by a multitude of environmental forces. As a result, association models between genotypes and phenotypes are an important first step, but they are not the end of the story. It is also important to investigate the extent to which genetic associations are moderated by environmental factors and other genes.

3 The MAOA Gene

In order to study the genetic component of a behavioral outcome, scientists start with "candidate" genes that are known to influence related behaviors or processes in the body. For economic behavior, this means focusing on genes that affect brain development, neurotransmitter synthesis and reception, hormone regulation, and transcriptional factors (Damberg, Garpenstrand, Hallman and Oreland 2001, Benjamin et al. 2007).

To study whether genes affect credit card borrowing behavior we chose a candidate gene that has already received much attention for its association with behavioral traits. The MAOA gene is responsible for transcribing an enzyme called monoamine oxidase A that is critical to the metabolism of serotonin and other neurological processes in the brain. In particular, the body's homeostatic response to excess serotonin is to reabsorb it into the emitting or pre-synaptic neuron. Once the reuptake of serotonin is complete, MAOA degrades the serotonin so that its components can be reabsorbed in the cell.

Animal studies indicate that the serotonin system has an important effect on social behavior. Rhesus macaque monkeys with impaired serotonin metabolisms are impulsive in response to social stressors (Kraemer, Ebert, Schmidt and McKinney 1989) and studies of rodents show that acute emotional stress affects the way MAOA breaks down serotonin in several areas of the brain (Popova, Voitenko and Maslova 1989, Virkkunen, Goldman, Nielsen and Linnoila 1995). In mice, knock-out studies that eliminate the MAOA gene in subjects cause enzymatic activity to come to a complete halt (Cases, Seif, Grimsby, Gaspar and Chen 1995). MAOA has also been shown to alter the structure of the brain in mice (Cases, Vitalis, Seif, De Maeyer, Sotelo and Gaspar 1996). There is strong evidence that the serotonin system affects complex social traits in humans (Balciuniene and Jazin 2001). For example, the serotonin function has been associated with aspects of impulsivity, such as reward sensitivity and inhibitory cognitive control (Walderhaug et al. 2002, Cools, Blackwell, Clark, Menzies, Cox and Robbins 2005), and is also related to prefrontal cortex activity (Rubia, Lee, Cleare, Tunstall, Fu, Brammer and McGuire 2005).

The MAOA gene has a variable-number tandem repeat (VNTR) polymorphism[1] in its promoter region[2] that is responsible for variation in transcriptional efficiency. The VNTR on the MAOA gene consists of repeat variations that result in either a 291, 321, 336, 351, or 381 base-pair fragment size. The 291 and 321 base-pair alleles have lower transcriptional efficiency than the 336, 351, and 381 base-pair alleles (Denney, Sharma, Dave and Waguespack 1994, Sabol, Hu and Hamer 1998). Following the literature, we group the 291 and 321 base-pair alleles to form a "low" transcription group and the 336, 351, and 381 base-pair alleles to form a "high" transcription group (Caspi, McClay, Moffitt, Mill, Martin, Craig, Taylor and Poulton 2002, Haberstick, Lessem, Hopfer, Smolen, Ehringer, Timberlake and Hewitt 2005, Frazzetto, Di Lorenzo, Carola, Proietti, Sokolowska, Siracusano, Gross and Troisi 2007, Fowler and Dawes 2008, McDermott et al. 2009). This functional polymorphism of the MAOA gene produces the same protein but the short allele is associated with less basal activity than the high allele. Consequently, the short variant produces significantly less MAOA mRNA[3] and protein (Sabol et al. 1998, Denney et al. 1994, Denney, Koch and Craig 1999). These less transcriptionally efficient alleles of MAOA have been linked to impulsive and addictive behavior, as well as attention deficit disorder, all of which appear to be mediated by certain parts of the brain (Lawson, Turic, Langley, Pay, Govan and et al. 2003, Domsche, Sheehan, Lowe, Kirley, Mullins and et al 2005, Contini et al. 2006). For example, the development of the amygdala and orbitofrontal cortex has been linked to a small genetic locus which contains the gene for MAOA (Good, Lawrence and Thomas 2003).

The MAOA gene is located on the X variant of chromosome 23. As such, the distribution of alleles is gender specific—unlike genes located on the other chromosomes. Males will have only one MAOA allele (their other chromosome is a Y variant), whereas females will have two MAOA alleles. As a result, males will necessarily be homozygous for either the

[1] A VNTR polymorphism is a repeated segment of DNA that varies among individuals in a population.

[2] A promoter region is the regulatory region of DNA that tells transcription enzymes where to begin. These promoter regions typically lie upstream from the genes they control.

[3] Messenger ribonucleic acid (mRNA) is a type of RNA that carries information from DNA to ribosomes. In turn, these ribosomes "read" messenger RNAs and translate their information into proteins.

high or low MAOA polymorphism. On the other hand, females can be heterozygous and have both a high and a low allele. The enzymatic activity of the number of alleles is not additive, hence the heterozygous females cannot be characterized with certainty (Caspi et al. 2002). We therefore follow the recent literature by grouping heterozygous females with the low transcription group (Fan, Fossella, Sommer, Wu and Posner 2003, Frazzetto et al. 2007, Fowler and Dawes 2008).

Not all studies show a direct relationship between genetic variation and behavior. Instead, developmental or concurrent environments may moderate an association between genes and observed social behavior. A gene-environment interaction has been identified in many cases for impulsive and violent behavior (Caspi et al. 2002, Foley, Eaves, Wormley, Silberg, Maes and et al. 2004, Haberstick et al. 2005, Kim-Cohen, Caspi, Taylor, Williams, Newcombe and et al 2006), the most famous of which is the Caspi *et al.* (2002) paper. This work shows that exposure to stressors like child abuse at early developmental stages may interact with the low MAOA polymorphism resulting in antisocial behavior later in life. In these studies the gene itself was not associated with the behavior once the interaction with environment was included in the association test. Here we show evidence for a *direct* association between the MAOA genotype and the reporting of credit card debt. However, future studies may show that this direct association is also moderated by environmental factors (for example, variation in local credit markets).

4 The Add Health Data

This research is based on genetic and survey data collected as part of The National Longitudinal Study of Adolescent Health. Add Health is a study that explores the causes of health-related behavior of adolescents in grades 7 through 12 and their outcomes in adulthood. It has been employed widely across disciplines and recently it has produced important contributions in economics (Echenique, Fryer and Kaufman 2006, Echenique and Fryer 2007, Alcott, Karlan, Mobius, Rosenblat and Szeidl 2007, Norton and Han 2009). The first wave of the

Add Health study (1994-1995) selected 80 high schools from a sampling frame of 26,666. The schools were selected based on their size, school type, census region, level of urbanization, and percent of the population that was white. Participating high schools were asked to identify junior high or middle schools that served as feeder schools to their school. This resulted in the participation of 145 middle, junior high, and high schools. From those schools, 90,118 students completed a 45-minute questionnaire and each school was asked to complete at least one School Administrator questionnaire. This process generated descriptive information about each student, the educational setting, and the environment of the school. From these respondents, a core random sample of 12,105 adolescents in grades 7-12 were drawn plus several over-samples, totaling more than 27,000 adolescents. These students and their parents were administered in-home surveys in the first wave. Wave II (1996) was comprised of another set of in-home interviews of more than 15,000 students from the Wave I sample and a follow-up telephone survey of the school administrators. Wave III (2001-2002) consisted of an in-home interview, six years later, of 15,170 Wave I participants. The result of this sampling design is that Add Health is a nationally representative study. Women make up 49% of the study's participants, Hispanics 12.2%, Blacks 16.0%, Asians 3.3%, and Native Americans 2.2%. Participants in Add Health also represent all regions of the country: the Northeast makes up 17% of the sample, the South 27%, the Midwest 19%, and the West 17%.

Allelic information for a number of genetic markers were collected for 2,574 individuals as part of Wave III. These particular genes were chosen because they are known to affect brain development, neurotransmitter synthesis and reception, and hormone regulation. Details of the DNA collection and genotyping process are available at the Add Health website (Add Health Biomarker Team 2007). Allelic information includes markers that identify alleles of the MAOA polymorphism. The conventional grouping of these alleles (described above) results in a MAOA "low" group that represents 52% of our sample and the "high" group representing 48%. A detailed breakdown is provided in the Appendix.

In Wave III, subjects were asked "Do you have any credit card debt?" About 41% answered in the affirmative. While this question gives us a valuable opportunity to explore the genetic antecedents of credit card usage, we want to make clear two limitations of the data. First, it would be preferable to have verifiable information about the actual amount of credit card debt. Second, it would also be preferable to have information about the credit card use of older adults. The Add Health sample is restricted to individuals who are 18-26 years old during Wave III, so it is possible that our results apply only to financial decision-making by young adults and not to people in different age categories.

Table 1 presents the variable means for the whole sample and by the transcriptional efficiency grouping of the MAOA genotype. For the binary variables (credit card debt, gender, race dummies, and college) these means also represent column frequencies. The p-value is obtained from the Pearson chi-square test. For continuous variables (age and income) the p-value is the significance value of the F-test on a linear regression between these variables and the MAOA genotype.

5 Genetic Association

Genetic association studies test whether an allele or genotype occurs more frequently within a group exhibiting a particular trait than those without the trait. However, a significant association can mean one of three things: (1) The genotype itself influences credit card use; (2) the genotype is in "linkage disequilibrium" with a genotype at another locus that influences credit card use; or (3) the observed association is a false positive signal due to "population stratification".[4]

Population stratification occurs because groups may have different allele frequencies due to their genetic ancestry. Financial decision-making in these groups may be the product of

[4]Given our data, we cannot differentiate between 1 and 2. In order to do so we would need additional genetic information about loci in close proximity to the locus of interest. Thus, a significant association means that either a particular genotype, or one likely near it on the same gene, significantly influences subjective well-being.

Table 1: Descriptive statistics (N = 2,574)

		MAOA		
	Mean	High	Low	P-value
Credit Card Debt *(yes)*	0.41	0.38	0.44	0.001
Race				
White	0.57	0.66	0.50	0.000
Black	0.17	0.11	0.21	0.000
Hispanic	0.15	0.14	0.16	0.155
Asian	0.07	0.04	0.09	0.000
Gender *(male)*	0.48	0.58	0.38	0.000
Age	21.9	21.8	22.0	0.246
Income	12,912	13,651	12,264	0.361
College *(yes)*	0.55	0.55	0.55	0.738

Note: Table 1 presents the variable means for the whole sample and by the transcriptional efficiency grouping of the MAOA genotype. For the binary variables (credit card debt, gender, race dummies, and college) these means also represent column frequencies. The p-value is obtained from the Pearson chi-square test. For continuous variables (age and income) the p-value is the significance value of the F-test on a linear regression between these variables and the MAOA genotype.

their environments, alleles other than the one of interest, or some unobserved reason. For example, two groups may not have mixed in the past for cultural reasons. Through the process of local adaptation or genetic drift these groups may develop different frequencies of a particular genotype. At the same time, the two groups may also develop divergent behaviors that are not influenced by the genotype but completely by the environment in which they live. Once these two groups mix in a larger population, simply comparing the frequency of the genotype to the observed behavior would lead to a spurious association.

There are two main research designs employed in association studies, case-control designs and family-based designs. Case-control designs compare the frequency of genotypes among subjects that exhibit a trait of interest to subjects who do not. As a result, case-control designs are vulnerable to population stratification if either group is especially prone to selection effects. A typical way to deal with this problem is to include controls for the race or ethnic-

ity of the subject or to limit the analysis to a specific racial or ethnic group. Family-based designs handle the problem of population stratification by using family members, such as parents or siblings, as controls. Tests using family data compare whether offspring exhibiting the trait receive a risk allele from their parents more often than would be expected by chance. The family-based design is very powerful in minimizing type I error (false positive) but suffers from much lower power in detecting a true association and is thus prone to type II error (false negative). Xu and Shete (2006) show, based on extensive simulation work, that a case-control association study using a mixed-effects logistic regression outperforms family-based designs in detecting an association while at the same time effectively limiting type I error.

To test for genetic association we employ a mixed-effects logistic regression model (Guo and Zhao 2000, Xu and Shete 2006):

$$P[Y_{ij} = 1|Z_{kij}, U_j] = logit\left(\beta_0 + \beta_G G_{ij} + \beta_k Z_{kij} + U_j\right)$$

where i and j index subject and family respectively. For the MAOA gene, $G = 1$ if the subject's genotype is L/L, L/H or H/L, and $G = 0$ if the subject's genotype is H/H (where H represents having a copy of a 336, 351, or 381 base-pair "high" allele, and L represents having a copy of a 291 or 321 base-pair "low" allele). Z is a matrix of variables to control for underlying population structure of the Add Health sample as well as potentially mediating factors such as age, gender, income, parental income and education that may influence financial decision-making. Finally, the variable U is a family random effect that controls for potential genetic and environmental correlation among family members. The coefficient β_G tests the association between the MAOA genotype and the tendency to report credit card debt. The coefficients are reported as odds ratios, so the null hypothesis is that $\beta_G = 1$ (that is, having a low efficiency allele of the MAOA gene does not increase the odds of reporting credit card debt).

To control for the effects of the underlying population structure, we include indicator

variables for whether a subject self-reported as Black, Hispanic, or Asian (base category is White). Following the policy of the United States Census, Add Health allows respondents to mark more than one race. Since this complicates the ability to control for stratification, we exclude these individuals ($N = 117$), but supplementary analysis including them yields substantively identical results.

6 Results

Table 2 shows the results of several specifications of the models to test the hypothesis that the MAOA low efficiency genotype is associated with reporting credit card debt. Each of these specifications includes variables for age, gender, and race to control for population stratification. *Model 1* shows that the low allele of MAOA is significantly associated with increased credit card debt ($p = 0.014$). This model suggests that the odds of a person reporting credit card debt are increased by a factor 1.24 when moving from the high efficiency ($G = 0$) to the low efficiency ($G = 1$) genotype of the MAOA gene.

It is possible that other socio-economic factors *mediate* the relationship between the gene we have identified and credit card usage. For example, we might expect genes to contribute to variation in socio-economic factors such as income (Bowles and Gintis 2002), which in turn would impact financial decision-making. Also, several twin studies have suggested that variation in cognitive ability can be attributed to genetic factors (McGue and Bouchard 1998). If so, then variation in the ability to process financial information may also be linked to genes. Variation in educational attainment is also a factor that has been found to be heritable (Baker, Treloar, Reynolds, Heath and Martin 1996, Heath, Berg, Eaves, Solaas, Corey, Sundet, Magnus and Nance 1985) and is frequently shown to influence household finance. In order to test whether these variables are potentially mediators, we add them to *Model 2* (income, parental income, and education). If these variables were acting as mediators, then including them would eliminate the association between MAOA and debt, but the association remains significant. We also regress each of these variables separately

on MAOA low along with race, age, and gender controls in the appendix. Since MAOA low is not significantly associated with any of these variables, we can further rule them out as mediators.

Following Xu and Shete (2006), as a robustness test for population stratification, we also include *Model 3* that is an association model for those subjects that uniquely identified themselves as being white. The significant coefficient on MAOA and its p-value ($p = 0.021$) suggest that population stratification between self-reported racial categories is not driving the association between MAOA and credit card debt.

Table 2: Models of Association Between MAOA and Credit Card Debt

	Model 1			*Model 2*			*Model 3*		
	OR	*SE*	P-value	OR	*SE*	P-value	OR	*SE*	P-value
MAOA Low	**1.24**	**0.11**	**0.014**	**1.30**	**0.14**	**0.019**	**1.37**	**0.19**	**0.021**
Black	0.86	0.11	0.256	0.94	0.16	0.717			
Hispanic	0.90	0.34	0.774	0.61	0.32	0.354			
Asian	0.96	0.18	0.838	0.95	0.26	0.860			
Age	1.25	0.03	0.000	1.22	0.04	0.000	1.28	0.06	0.000
Male	0.77	0.07	0.004	0.76	0.08	0.014	0.84	0.12	0.213
Income				1.00	0.00	0.131	1.00	0.00	0.171
Parental income				1.02	0.08	0.837	0.93	0.10	0.502
College				1.69	0.20	0.000	1.47	0.23	0.012
Intercept	0.01	0.58	0.000	0.01	0.67	0.000	0.00	0.87	0.000
N	2528			2067			1187		
$PseudoR2$	0.030			0.044			0.042		

Note: Variable definitions are in the appendix. All results are expressed in odds ratios (OR). Standard errors (SE) and P-values are also presented.

In Figure 1 we summarize our results for MAOA by simulating the marginal effect from the coefficient covariance matrix of *Model 1.* Holding all other variables constant at their mean and varying the MAOA genotype of all subjects from high to low would increase the reporting of credit card debt in this population from 38.2% (95%CI: 35.2%—41.1%) to 43.5% (95%CI: 40.5%—46.5%). This implies that the marginal effect of having one or both MAOA

alleles of the low efficiency type raises the average likelihood of having credit card debt by about 14%.

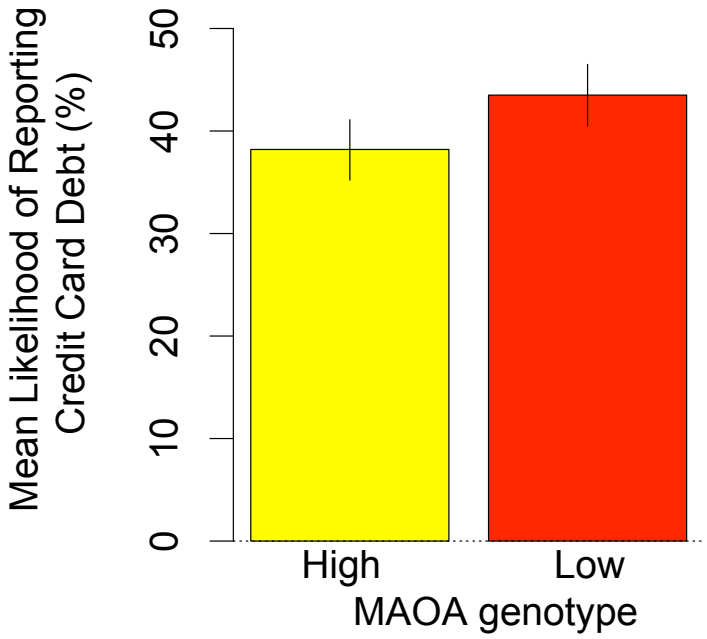

Figure 1: Varying the MAOA genotype of all subjects from high to low would increase the reporting of credit card debt in this population from 38.2% (95%CI: 35.2%—41.1%) to 43.5% (95%CI: 40.5%—46.5%). This implies that the marginal effect of having one or both MAOA alleles of the low efficiency type raises the average likelihood of having credit card debt by about 14%. Simulation results based on *Model 1* parameters are presented along with 95% confidence intervals. All other variables are held at their mean.

7 Conclusion

Prior research has linked the low efficiency alleles of the MAOA gene to impulsivity and reduced conscientiousness via its impact on the serotonin metabolism and other neurological processes. As such, we hypothesized that its carriers would be more susceptible to high-cost borrowing, as exemplified by credit card debt, and this intuition is verified in the data. To our knowledge, this is the first specific genotype to be associated with real world economic

behavior.

If genetic variation influences credit card borrowing behavior, then there are likely to be important theoretical and welfare implications. The theoretical contribution of the MAOA finding lies in providing new explanatory power for understanding intertemporal choice. In the discounting literature, credit card debt is a favorite indicator as it presents a real-world measure of individuals' time preferences (Tobacman 2009, Laibson et al. forthcoming). For example, Meier and Sprenger (2010) present the results of a large field study that shows that present-biased time preferences correlate with credit card borrowing and earlier theoretical work in behavioral economics argued that greater present bias would predict levels of credit card borrowing as impatience leads to having higher discount rates for delayed rewards (Laibson 1997, Fehr 2002, Heidhues and Koszegi forthcoming). In particular, this MAOA finding may build on work by McClure et al. (2004) that identified neural systems involved in valuing immediate and delayed monetary rewards. Our results suggest that some of the variation in these systems may result from differences in MAOA genotype, since genes are upstream from the neurological processes that McClure et al. (2004) identified.

Economists should especially consider the welfare consequences of allowing credit companies to discriminate on the basis of a person's genotype, and more broadly, the welfare consequences of any kind of genetic discrimination. On 21 May 2008 the Genetic Information Nondiscrimination Act became a federal law in the United States, but it only protects people from discrimination by health insurers and employers. The results here suggest that these protections should be extended to prevent discrimination by lenders as well. As the cost of genotyping plummets, millions of individuals will soon have their genomes sequenced, so we hope our results will stimulate interest in developing an appropriate policy framework to prevent *any* kind of genetic discrimination.

Finally, we offer a word of caution. While the MAOA gene may show significant association with credit card debt, it is important to emphasize that there is no single "debt gene." Instead, there is likely to be a set of genes whose expression, in combination with

environmental factors, influences financial decision-making. Association studies like ours require replication before their findings can be truly considered anything more than suggestive, therefore more work needs to be done in order to verify and better understand the specific association we have identified.

Appendix

Variable Definitions

MAOA Low is an indicator variable for whether the subject's genotype is L/L, L/H or H/L (where L represents having a copy of a 291 or 321 base-pair "low" allele and H represents having a copy of a 336, 351, or 381 base-pair "high" allele). The *race/ethnicity* indicator variables are based on the questions "Are you of Hispanic or Latino origin?" and "What is your race? [white/black or African American/American Indian or Native American/Asian or Pacific Islander]". *Age* is self-reported age and *Male* is an indicator taking the value of 1 if the respondent is a male and 0 for a female. *Income* is the response to the question "Including all the income sources you reported above, what was your total personal income before taxes in [2000/2001]?" *College* is an indicator variable taking the value 1 if the respondent completed at least one year of college and 0 for no college. It is based on the question "What is the highest grade or year of regular school you completed?" *Parental income* is asked of the parents in Wave I. It is the numeric answer to the question "About how much total income, before taxes did your family receive in 1994? Include your own income, the income of everyone else in your household, and income from welfare benefits, dividends, and all other sources." For information regarding the other Add Health genes used in this Appendix please refer to the cited Add Health document (Add Health Biomarker Team 2007).

MAOA Genotype (VNTR)	Allele Distribution	Frequency (%)
291bp (low)	59	1.1
321bp (low)	2,016	39.7
336bp (high)	45	0.9
351bp (high)	2,897	57.1
381bp (high)	61	1.2
Total	5,078	100

Table 3: Distribution and frequency of MAOA variable-number tandem repeat (VNTR) alleles across sample population (each individual has two alleles).

	Model 1		*Model 2*		*Model 3*		*Model 4*		*Model 5*	
	OR	P-value	OR	P-value	OR	P-value	OR	P-value	OR	P-value
MAOA 291bp	0.94	0.784								
MAOA 321bp			**1.14**	**0.014**						
MAOA 336bp					1.43	0.186				
MAOA 351bp							**0.87**	**0.007**		
MAOA 381bp									1.04	0.849
Male	0.74	0.001	0.74	0.014	0.74	0.001	0.83	0.14	0.74	0.001
Age	1.25	0.000	1.25	0.000	1.25	0.000	1.25	0.000	1.25	0.000
Black	0.91	0.462	0.87	0.289	0.90	0.433	0.86	0.248	0.90	0.426
Hispanic	0.89	0.762	0.90	0.789	0.88	0.730	0.90	0.788	0.89	0.765
Asian	1.01	0.944	0.96	0.819	1.02	0.915	0.96	0.831	1.01	0.938
N	2528		2528		2528		2528		2528	
$PseudoR2$	0.028		0.030		0.029		0.031		0.028	

Table 4: Association models between MAOA genotype (VNTR) variations and credit card debt. All results are expressed in odds ratios (OR) and P-values are presented.

	OR	P-value
MAOA: low	1.25	0.021
DRD4: r4	0.97	0.674
DRD2: a1	0.87	0.063
DAT1: r10	1.08	0.295
CHRNA6: rs892413	1.11	0.265
CHRNB3: rs13280604	0.92	0.362
CYP2A6B: inactive	0.75	0.200
5-HTTLPR: short	1.05	0.436
Male	0.78	0.010
Age	1.23	0.002
Black	0.89	0.533
Hispanic	1.16	0.743
Asian	0.89	0.658
Intercept	0.01	0.000
N	2132	
$PseudoR2$	0.030	

Table 5: Association model between available Add Health genotypes and credit card debt. All results are expressed in odds ratios (OR) and P-values are presented.

DV	$MAOA\ Low$ $p-value$
Income	0.44
College	0.59
Married	0.17
Divorced	0.20
Religious	0.27
Educational Debt	0.49
Parental Income	0.36

Table 6: Tests for potential mediator variables. Table presents p values for MAOA low in models with income, college attendance, job, married, divorced, religious, educational debt, and parents' income as dependent variables. Regressions also include race, age, and gender controls.

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