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Genetic Testing in the Workplace

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GENETIC TESTING IN THE WORKPLACE

INTRODUCTION

Occupational disease is a pervasive problem in our society. It is estimated that 390,000 workers contract disabling illnesses each year, and approximately 100,000 die from these occupational diseases.\(^1\) Statistics demonstrate that exposure to chemicals used or produced in the workplace is the predominant cause of occupational health problems, primarily because of the number of workers involved.\(^2\) As these and other alarming facts concerning occupational health have been made available, investigations and debates have arisen concerning how such diseases can be minimized. One of the most controversial methods is the use of genetic testing in the workplace.

Genetic tests can identify so called "hypersusceptible" workers; persons who either inherited or, through chemical exposure, acquired "defective" genes creating a vulnerability to certain occupational illnesses.\(^3\) While genetic testing may provide health benefits to many employees, its use as a

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2. Office of Technology Assessment, *ROLE OF GENETIC TESTING IN THE PREVENTION OF OCCUPATIONAL DISEASE* 24 (1983) [hereinafter OTA Report]. It is estimated that 8.5 million workers per year are exposed to chemical hazards in the manufacturing industry. Furthermore, particular jobs expose workers to numerous chemicals. For example, the OTA Report states that rubber workers are exposed to approximately 3,000 chemicals. *Id.*
3. The medical definition of a hypersusceptible individual is: a condition of inordinate or abnormally increased susceptibility to chemicals, infective agents, or other agents which in the normal individual are entirely innocuous . . . workers who react to certain substances at low levels, below the threshold concentration associated with injury or definite discomfort. (citations omitted). Reinhardt, *Chemical Hypersusceptibility* 20 J. OCCUPATIONAL MED. 319 (May 1978). *See also* Samuels, *Medical Surveillance: Biological, Social and Ethical Parameters*, 28 J. OCCUPATIONAL MED. 572, 574 (1986) (emphasizing that the different reactions of workers is due to a combination of what they inherit and the environment to which they are exposed.)

Of the more than 55,000 different chemicals available for use in the workplace, there are no estimates indicating what percentage of these are hazardous to employee health. OTA Report, *supra* note 2, at 24. However, numerous substances are believed to have a correlation to occupational diseases. Below are some examples of genetic traits and the resulting illnesses for susceptible workers who have been exposed to certain chemical agents. Most of these characteristics have been the focus of genetic screening in the past.

1. Glucose-6-phosphate dehydrogenase (G-6-PD) Deficiency
   G-6-PD deficiency has been a common subject of genetic screening. In fact, it was the second most frequently tested trait of the 366 companies responding to the OTA survey. OTA Report, *supra* note 2, at 34. It is a sex-linked condition affecting males. When exposed to certain oxidizing chemicals a worker with the deficiency suffers a hemolytic crisis, or a deterioration of the red blood cells resulting in anemia. *Hear*
screening device can also create serious consequences. The potential for dis-

ings, infra note 23, at 159. Other substances which could trigger hemolytic effects are copper, TNT, and ozone. OTA Report, supra note 2, at 90-91.

While the sex of a worker is an important criteria in testing for this type of deficiency, ethnic background is also relevant. There are variants of the G-6-PD deficiency found in black and Mediterranean populations resulting in some of the most serious hemolytic effects. Although the variants found in these populations are the most severe, several other variants of the G-6-PD trait exist, depending upon geographical location. Furthermore, the frequency of this trait is highest in American blacks at approximately 13-16%; in Filipinos at 12-13%; in Mediterranean Jews at 11%; in Greeks at 2% to 32%; in Scandinavians at 1% to 8; in Chinese at 2 to 5%; in European Jews at 1%; in East Indians at 0.3%; and in the American and British Caucasians at 0.1%. Id. at 90.

The evidence accumulated in past studies reflects a strong correlation between the G-6-PD deficiency and occupational exposure as the cause of illness. Nevertheless, many of these observations have been made in vitro, thus requiring further research under actual exposure situations. Id. at 90-91.

2. Sickle-cell Trait
The trait found in black populations that can eventually lead to the disease sickle-cell anemia has been the most debated of the genetic susceptibilities. There are four ob-

stensible reasons for the controversies. First, because it predominantly affects blacks (the trait can also exist in some Mediterranean populations), there exists a heightened concern for racial discrimination. Second, despite the lack of evidence proving that sickle-cell anemia is triggered by chemical exposures, Omenn, Predictive Identification of Hypersusceptible Individuals, 24 J. OCCUPATIONAL MED. 369, 372 (1982), a survey of major industries revealed that the majority of occupational genetic screening has been for the sickle-cell trait. OTA Report, supra note 2, at 91. Third, many confuse the trait with the disease, even though persons possessing the sickle-cell trait may never experience the effects of sickle-cell anemia. Id. Finally, if an individual were to possess the genetic condition, it would become active during one's childhood and, at that time, may be made known to the carrier. This eliminates the need for it to be detected through preemployment screening tests. Id.

Consequently, the use of employment tests for determining the existence of the sickle-cell trait should be conducted for genetic counseling purposes only, i.e., a person known to be carrying the trait should be provided guidance in decisions concerning reproduction. Omenn, supra, at 372. There also have been suggestions that employers should simply cease sickle-cell trait testing, making it the responsibility of the community and the individual. See, Hearings, infra note 23, at 160 (statement of Gilbert S. Omenn, M.D., Ph.D.).

3. Thalassemic Trait
Thalassemic is an erythroblastic anemia - a deficiency in the production of red blood cells. An individual may possess the trait in either a heterozygous of homozy-

gous form, thus suffering from the disease in a mild to fatal degree, respectively. However, the heterozygous form has a higher frequency and is more difficult to de-
tect. Additionally, even in its mild state, the disease can be exacerbated under in-
creased exposure to occupational chemicals. Research is being carried out to evaluate these effects from benzene and lead exposures. Variants of the thalassemia heterozygous trait occur in American blacks at 2-7%; in Greek-Americans and Italian-Americans at 4-5%; and in others of Greek ancestry at 2%. OTA Report, supra note 2, at 90-92.

4. NADH Dehydrogenase Deficiency
In order for oxygen to be transported to the body tissues, it must bind itself to red
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criminatory testing, or discriminatory use of the results, is at the forefront of the debate because genetic traits are often directly related to a person's racial or ethnic background. Thus, there are fears that the technology could be used to exclude from the workplace persons of particular racial or ethnic groups due to an assumption that they possess genetic vulnerability.

The exclusion of genetically vulnerable employees can also have deleterious effects on their less susceptible co-workers. Hypersusceptible workers actually play an important role in warning employers that a serious health hazard exists. If susceptible workers are removed, occupational dangers to other workers could go unnoticed or concealed. As a result, employees who did not demonstrate having the genetic variation may contract the same illness years later. This is not to suggest that hypersusceptible employees should be placed at risk for the sake of protecting less susceptible employees. Rather, if the tests are used, they should operate to protect both categories of workers by informing susceptible workers that they may be at a greater risk of contracting an occupational disease, and by providing notice that a potential risk to other employees may exist.

The benefits from this rapidly developing technology are accompanied by a penumbra of legal, ethical and social implications. Although the tests are still in relatively early stages of development, they have already been used in the workplace. Therefore, there is an urgency to address the legal and ethical ramifications of this use of genetic testing so that guidelines and regula-

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blood cells. This involves the oxidation of the iron atom in the red blood cells. Normally, once the oxygen is released, the hemoglobin returns to its unoxidized state. However, when this does not occur, often due to a NADH dehydrogenase deficiency, methemoglobinemia results. The exact effects of this disease vary with its severity, but it can include bluish skin, headaches, shortness of breath, lethargy and even death. Methemoglobinemia can be acquired from chemical exposure to aromatic nitro and amino compounds. Populations demonstrating a greater susceptibility to the NADH dehydrogenase deficiency include Alaskan Eskimos and Indians, Navajo Indians and Puerto Ricans. Id. at 92.

Although screening for this trait in an occupational setting has not been conducted, studies indicating the connection between industrial chemical exposures and methemoglobinemia suggest that a number of employees could be at serious risk. Id. at 93. Thus, it is reasonable for the NADH dehydrogenase deficiency to be a suitable target for genetic testing in the workplace.

5. Skin Hypersensitivities

Seventy percent of all occupational disease claims paid by insurance companies are for industrial dermatitis. Hearings, infra note 23, at 161 (statement of Gilbert S. Omenn, A.D., Ph.D.). There is a wide range of skin reactions to various chemicals. Many suggest that the differences experienced to dermatologic irritants could be genetically linked. Id. However, studies have not yet identified a specific causative trait. OTA Report, supra note 2, at 98. Because dermatitis is so prevalent under varying occupational conditions, further research into its genetic causes is warranted. 4. See infra note 12.
tions may be developed to balance the competing interests of both the employer and the employee.

This Comment reviews the existing methods of genetic testing of workers and the purposes for which they are used. Genetic screening, rather than genetic monitoring, shall be the main focus of this Comment because the past and potential future use of genetic screening exceeds that of genetic monitoring. The legal, social and ethical dilemmas relevant to this emerging controversial technology will be explored.\(^5\) In particular, this Comment examines the employer's duties to provide a safe working environment, the employee's rights implicated by genetic testing, and the statutory sources that are available to regulate this potentially invasive and explosive area of genetics. Finally, this Comment looks at the future of genetic testing and the proposals being made as to how it should be managed in order to protect the competing interests involved.

### OVERVIEW OF GENETIC TESTING

*Development of a New Technology*

It has been over twenty years since the notion of identifying workers' genetic susceptibilities to industrial chemicals was first suggested.\(^6\) The idea represented a response to correlations observed between the science of genetics and occupational health. Researchers had learned that the susceptibilities to chemical exposures varied significantly between individual workers.\(^7\) They also discovered that even where exposure levels at a particular workplace were well below the required standards, hypersusceptible workers experienced adverse reactions.\(^8\) Finally, developments made in human genetics led to the theory that such susceptibilities were linked to an individual's genetic makeup.\(^9\)

With the identification of a new "susceptible working class" and the ad-

\(^5\) Because this Comment addresses genetic testing in private companies with only brief mention of testing conducted by the Government, the possible constitutional issues will not be discussed.


\(^7\) Stokinger & Scheel, supra note 6, at 564.

\(^8\) Id.

\(^9\) Id.
vent of genetic tests, prerequisites for occupational hypersusceptibility tests were eventually devised. These guidelines include: 1) the detection of a specific genetic anomaly, 2) a high prevalence of the anomaly in the worker population, 3) the substances affecting the genetic traits should be common to the industry, 4) the trait must be otherwise compatible with one's normal lifestyle until industrial exposure occurs, and 5) the test must be relatively inexpensive and simple, thus available for large scale use.¹⁰

Since that time, tests have been improved¹¹ and relied upon by various manufacturing companies and utilities for both medical practice and research purposes.¹² In more recent years, however, companies once enthusiastic about using genetic tests have "gone underground" and are less willing to publicly announce such practices. This is largely attributable to congressional hearings held in the early 1980's which exposed some of the uncertainties of the scientific validity and legal and social applicability of genetic testing in the workplace.¹³

*Methods of Genetic Testing*

Genetic variability is only one factor contributing to the response an individual may have to his environment - his workplace. Other factors, such as a person's diet or smoking habits, play a role as well.¹⁴ Thus, genetic testing is viewed as a possible means for evaluating at least one of the causes of occupational illness.¹⁵ Scientists have devised two different methods to

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¹⁰. *Id.* at 564-65.

¹¹. See OTA Report, *supra* note 2, at 26 (genetic testing has potential for use in medical surveillance because many traits may be identified by easy and inexpensive tests). See also *Genetic Screening of Workers: Hearing Before the Subcomm. on Investigations and Oversight of the House Comm. on Science and Technology, 97th Cong., 2d Sess. 44* (1982) (statement of Gretchen Kolsrud, Ph.D., Manager of Biological Applicaitons Progam, Office of Technology Assessment) (observing that progress in the field of genetics is extraordinary) [hereinafter *Hearings*]. See also Otten, *Genetic Examination of Workers is an Issue of Growing Urgency*, Wall Street J., Feb 24, 1986, at 1, col. 1 (quoting Marc Lappe, Professor of Health Policy, University of-California, that "these tests have tremendous predictive power, and that can only increase.").

¹². The OTA Report which summarized the findings of its 1982 survey discovered that, of the responding 366 organizations, six (1.6%) were currently testing, seventeen (4.6%) used genetic testing during the previous twelve years, four (1.1%) anticipated using the tests in the following five years, and 55 (15%) would possibly use the tests in the following five years. OTA Report, *supra* note 2, at 34. Furthermore, genetic testing in the workplace has been implemented in several European countries and no longer is restricted for use in academic research. See Otten, *supra* note 11, at 8, col. 4.


¹⁵. It should not be assumed that genetic testing could be an exclusive remedy to occupational disease. Indeed, many workers not possessing a genetic deficiency may contract the same illness at a later date, or they may be prone to certain diseases for different reasons.
pinpoint illness causing traits: genetic monitoring and genetic screening. Both the mechanics and the purposes of each method differs. To note, screening methods have already been utilized by private industries and by the military.  

**Genetic Monitoring**

Genetic monitoring assesses whether an individual has experienced genetic damage as a result of previous exposure to hazardous chemicals or ionizing radiation. Workers subjected to this type of testing undergo periodic examinations using blood or other body fluids to determine whether any genetic damage has occurred. Monitoring can be done in two ways: cytogenetic techniques or noncytogenetic techniques. The former involve the detection of major structural damage in chromosomes. The latter look for damage to the molecular structure of the deoxyribonucleic acid (“DNA”) contained within chromosomes. Cytogenetic techniques remain largely in the developmental stages.

Once perfected, genetic monitoring could be used to determine whether a carcinogen is present in the workplace and whether exposure levels to a carcinogen present a risk to employee health. Such tests can only be performed on groups of workers, not on individuals. Therefore, the tests could determine if a population of workers is at an increased health risk and whether the exposure level should be decreased for that group. Interestingly, because no single employee’s hypersusceptibility can be identified by

Nonetheless, genetic testing can help to focus on what is believed to be a significant factor of many occupational diseases.

16. The U.S. Air Force previously had a policy of disqualifying candidates who possessed merely the trait for sickle-cell anemia, a condition primarily affecting blacks. The reason behind the policy was that such persons would suffer a “sickle cell crisis” at high altitudes causing dizziness and fainting. This policy was followed despite statistics indicating that only 7.4% of those in the Air Force participate in flight duties. See generally Severo, *Air Force Rejects Cadets with Sickle Trait*, N.Y. Times, Feb. 4, 1980, at 13, col. 1. The Air Force has subsequently discontinued the policy. However, the U.S. Coast guard has begun a genetic monitoring program. See infra text at note 37.


20. Id.

21. Id.

22. Id.

these methods, there is less potential for discriminatory employment effects in comparison to genetic screening methods.\textsuperscript{24}

\textit{Genetic Screening}

Genetic screening methods are used on an individual, rather than group, basis. Therefore, genetic screening tests can be administered to individual applicants or employees.\textsuperscript{25} By studying a person’s body fluids, usually blood, the test can identify the presence of a specific genetic trait. The trait may indicate a vulnerability to an occupational illness should the person be exposed to a particular chemical.\textsuperscript{26} Unlike genetic monitoring, genetic screening methods are primarily concerned with the actual possession of the trait. Therefore, genetic screening ignores whether a person has inherited this trait or has acquired it through previous exposure.\textsuperscript{27} Additionally, the purpose of screening is to prevent hypersusceptible workers from entering certain jobs in the first place, as opposed to monitoring which indicates excessive exposure levels.

Genetic screening can be used as an effective exclusionary tool. The hypersusceptible applicant may not be hired on the basis of the test results, while a current employee possessing a genetic vulnerability may be prohibited from obtaining a transfer or promotion.\textsuperscript{28} However, the fact that an occupational disease in these individuals may be prevented lends support to the argument that the benefits outweigh the costs of not entering a potentially hazardous area of work. This will be discussed below at greater length. It is important for now, however, to be aware that these issues are central to the debate over the use of genetic screening.

\textit{Validity of Genetic Tests}

Although genetic tests have already been used to identify both individuals and groups with particular genetic traits, there still exists a great deal of discrepancy over their validity and reliability. The validity of a test is de-
fined as the degree to which a test measures what it is intended to measure. The predictive value of a test depends upon three factors: 1) the test's sensitivity (a measure of the test's accuracy in correctly identifying persons with the condition), 2) the test's specificity (a measure of the test's accuracy in correctly identifying persons free of the condition), and 3) the actual frequency of the condition in the population being screened. The reliability of a test refers to the degree to which the test consistently reaches the same result in any given circumstance. These definitions are important to genetic testing because they establish that a test's objective is to find the line of demarcation between those testing positive and those testing negative. This is otherwise known as the "cutoff point." Methods have been devised for choosing a cutoff point which will enable testers to more accurately identify workers who possess the genetic trait. However, the sensitivity and specificity are inversely related. Therefore, a test with the ability to achieve high sensitivity will have low specificity, and one having high specificity will have low sensitivity. It is essential that a proper balance between these two measurements be established in selecting a cutoff point in order to ensure the validity of a test. Still, although cutoff points could help obtain accurate test results, the validity and reliability of genetic testing remains unconfirmed. One commentator explained that the "scientific legitimacy of genetic analysis is perverted by the rising tendency to isolate and favor it as a sole explanation of disease..." A more prevalent view is that, although the tests have not sufficiently met scientific criteria for use in an occupational setting, the significant advances which have been made merit further investigation.

Nonetheless, as arguments over validity and reliability continue, new programs using genetic tests are being implemented. For example, the United

32. For example, if the test is established to identify all workers with a genetic defect, it is likely that these so called "true positives" will be detected. However, it may be overly-inclusive, or non-specific, and therefore result in many "false positives". The effect would be to label non-susceptible workers as genetically susceptible. Therefore, followup tests must be conducted to determine which workers actually possess the genetic trait. On the other hand, where only a certain number of workers are to be identified, some may go undetected, indicating an under-inclusive test. See OTA Report, supra note 2, at 58.
33. Id.
34. Id.
35. Samuels, supra note 3, at 575.
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States Coast Guard has recently established a genetic monitoring program in order to analyze exposure data and identify hazardous chemicals. In addition, a 1982 survey of Fortune 500 manufacturing utilities and companies indicated that several employers were currently using some form of genetic testing. Others had used them in the past, while a number of other companies were considering using the tests in the near future. Even though the tests' validity and reliability is currently being questioned, many employers believe that "some validity" is sufficient to warrant the biological screening of workers, as evidenced by the fact that some companies have already used genetic tests in the workplace.

Purposes

Generally, there are four common purposes of genetic testing: diagnosis, research, information and exclusion. Each raises its own legal and ethical considerations. It is the fourth purpose, however, that constitutes the most controversial due to its potential for discriminatory and coercive effects. Yet, the possible benefits from all of these purposes can lend legitimacy to arguments in favor of genetic testing, provided that they are accompanied by proper guidelines and safeguards. With proper guidelines and safeguards, genetic employment examinations would be more acceptable legally, ethically and societally.

Diagnosis

In uncovering the causes of an occupational illness, a physician is confronted with an array of possible factors, genetic variances being only one. It is more beneficial to take an eclectic approach in identifying the etiology of an illness, rather than attempting to focus on only one or two factors. Thus, genetic tests are considered important diagnostic aids for many medical inquiries. Studies show that both the organism itself and the surrounding environment will influence the impact of a disease. The more difficult task, however, is to determine the extent to which each plays a role. As genetic tests are made available for diagnostic purposes, the degree to which genes

38. See supra note 12. It has been suggested that genetic screening is the method more commonly relied upon by those companies which use genetic testing. See Hearings, supra note 11, at 103 (statement of Mark A. Rothstein, West Virginia University School of Law). One explanation is that such techniques have a greater predictive value than monitoring techniques. Id. at 102.
40. Id. at 82 (statement of Thomas H. Murray, Ph.D., Hastings Center).
41. Id. at 84.
are causative factors of disease will become more clear. This will add credibility and lessen apprehension to the use of genetic testing.

Specific dilemmas can arise subsequent to the diagnosis that an employee is genetically predisposed to illness. The employee could be labeled "constitutionally weak" to perform a job, and therefore find difficulty in obtaining employment. Likewise, past experience warns that the lack of adequate genetic counseling has led to many patients misunderstanding their conditions. Consequently, a high degree of care should be observed by physicians when explaining to patients the existence of a genetic anomaly and its consequences, i.e., what occupations the patient should not enter, family planning, and what short and long-term effects exist.

Research

Due to current conflicts over the validity of genetic testing, research is probably the most appropriate use of this infant technology. Unfortunately, research is not a common purpose among those companies that have conducted the tests. There are two specific areas in which research is genuinely needed. First, further epidemiological studies must be conducted to confirm the connection between populations of workers, workplace exposure and resulting illnesses. Second, greater inquiry must be made into the efficacy of genetic tests to actually minimize occupational disease. An increase in research of these areas could have a significant impact on the degree to which genetic tests are considered reliable, valid and necessary.

Research purposes pose important ethical concerns. The most frequently debated are the issues of confidentiality and informed consent. How and when they arise often depends upon the relationships existing between the parties involved. For example, researchers conducting the tests are often the employer's agents, while the subjects are its employees. Thus, researchers have a duty to reveal test results to their employers, while owing no duty of confidentiality to the employees tested. In addition, the benefits from research may not be directed toward the subjects themselves but, rather, to-

42. Id.
43. Id.
44. Id. at 86.
45. The OTA Report cited research as the least frequent use by organizations which responded to the 1982 survey. OTA Report, supra note 2, at 39. But see APPLICATIONS OF BIOTECHNOLOGY TO TESTS FOR HUMAN GENETIC DISORDERS, OFFICE OF TECHNOLOGY ASSESSMENT 28 (July 1986) (unpublished report) (survey of 47 companies developing DNA probes: 83% stated the probes were for research purposes, while 66% were developing them for diagnostic purposes) [hereinafter Applications of Biotechnology].
46. Hearings, supra note 23, at 85. (statement of Thomas H. Murray, Ph.D., Hastings Center).
ward employees working under similar conditions at a future date. Consequently, the importance of an employee's right to confidentiality and informed consent is lessened by his status as a "non-interested" subject in the study.\textsuperscript{47} Finally, because the tests are being used for research and not exclusionary purposes, and therefore not intended to affect employment, informed consent may not be considered necessary for employee participation.\textsuperscript{48}

Traditionally, decisions as to whether informed consent or confidentiality are required have been the responsibility of the researchers.\textsuperscript{49} If such practices continue, it will be necessary to provide researchers with clear guidelines addressing the possible legal and ethical effects of their decisions. For instance, where confidentiality is not maintained, researchers should be made aware of exactly who will be permitted access to the information and how this will affect the subject's future employment. Researchers should also be able to identify under what circumstances and for what purposes informed consent is desired.

\textit{Information}

Using genetic test results to provide occupational health information can be of considerable value to both employees and employers. Employees would be advised of potential health risks before coming into contact, or having further contact, with deleterious substances. Employers could not only be made aware that individual employees or worker populations may be at risk, but also that certain exposure levels are too high. Furthermore, the use of genetic test results to improve occupational health is generally disfavored because current test validity is poor.\textsuperscript{50} The benefit to employers, however, fuels arguments opposing genetic testing. Its critics assert that the tests will lead to employment discrimination against a particular racial or ethnic group that has become associated with a genetic trait.

Once reliability in genetic testing is achieved, the information produced by the tests could be used to help employees select places of employment. Two caveats, however, deserve mentioning. First, the consequences and choices related to genetic susceptibility should be thoroughly explained to an employee in order to aid future employment decisions. Second, whether a screening program will be socially desirable depends on the conscionability of these available choices.\textsuperscript{51} For example, if one of the choices is to find

\textsuperscript{47} Id.
\textsuperscript{48} Id. at 86.
\textsuperscript{49} Id.
\textsuperscript{50} Id. at 87.
\textsuperscript{51} Id. at 88.
alternative employment, a reasonable number of job opportunities must be available in order to consider the option conscionable.

**Exclusion**

Employers have already begun to rely on screening tests in preemployment situations. Due to a lack of guidelines in administering their exclusionary policies, abuses have resulted. Because of the inherently controversial nature of genetic screening, the exclusionary practices made possible through the use of the technology are justifiably confronted with heightened legal and ethical scrutiny. In fact, a thorough ethical analysis has been proposed listing several prerequisites that, if satisfied, would promote a more “morally defensible” exclusionary policy. First, there must be scientific evidence linking a specific illness to a genetic variation. Second, there are several conditional requirements: 1) the relative and absolute risks for workers with the genetic anomaly should be large; 2) the incidents of mislabeling individuals should be few and reversible; 3) the number of those actually excluded should be very small; 4) there should be relatively few jobs involved so as to avoid severe limitations on workers’ employment choices; 5) the illness itself should be severe and irreversible; and 6) the tests should not be disproportionately administered to groups which have traditionally

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52. See supra note 12.
53. As previously mentioned, blacks have already been screened out of flying positions in the Air Force. See supra note 16.

Women have also been subjected to exclusion. While not directly related to the methods of genetic testing discussed in this Comment, some argue that because no tests are needed to identify the trait of one’s gender, exclusion on the basis of one’s sex has been a relatively easy and widespread practice. Some companies have excluded women because of suggestions that their reproductive systems or the fetuses they could be carrying may be injured by certain exposures, such as exposure to lead. As a result, many women have been excluded or removed from jobs because of their childbearing capacity, regardless of their intentions not to have children. Some women have gone as far as to submit to sterilization operations in order to stay employed and support their families.

Such exclusionary policies ignore some very important facts. First, most female workers are not pregnant at a given time. Only 8.8% of the female labor force is pregnant each year. Second, male workers’ reproductive systems are similarly affected by substances, and therefore have the potential to cause fetal damage. Finally, protective equipment and safe exposure levels should be provided for both sexes if the true concern is for fetal protection and not simply to screen women out of traditionally male dominated jobs. Another option would be to exclude workers of both sexes who are planning to have children. For a general discussion, see Hearings, supra note 30, at 173-219 (statements of Joan E. Bertin, American Civil Liberties Union, Velma Hunt, Pennsylvania State University, and Jeane Stellman, Columbia University).

54. See Hearings, supra note 23, at 92 (statement by Thomas H. Murray, Ph.D., Hastings Center).
experienced discrimination.  
These standards are not designed to constrain exclusionary policies relying on genetic tests. On the contrary, they are a means by which employee health protection can be promoted while, at the same time, discriminatory exclusion can be prevented. However, those proposing these guidelines have offered no explanation as to how they can be satisfied or how adherence can be policed. Before an exclusionary policy could be "morally defensible", these issues must be addressed.

**Underlying Purposes**

Diagnosis, research, information and exclusion constitute the more overt purposes of genetic testing. However, there are also several underlying motives. First, employers may have a sincere concern for the health of their employees, believing that protection through exclusion is the most effective paternalistic policy available. Second, with increasing insurance costs, employers have a strong economic incentive to minimize their liabilities created by occupational health hazards, and to avoid lawsuits arising from resulting injuries. Third, genetic predictions could increase productivity by decreasing absenteeism due to illness. Finally, many employers contend that it is not economically feasible to maintain a workplace safe for all employees, as required under the Occupational Safety and Health Act. Genetic tests could make this a more realistic objective, however, by screening out those employees with the lowest tolerance levels, and thereby minimizing the need for expensive safety equipment and procedures.

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55. *Id.* Murray concludes that along with economic cost-effectiveness factors, moral and political costs are very influential to evaluating exclusionary policies. Therefore, he suggests that such programs be the "least restrictive alternatives" to other available means of improving occupational health. *Id.*

56. *See Hearings, supra* note 30, at 151 (statement by Gilbert S. Omenn, M.D., Ph.D.); *Field, supra* note 37, at 125; *Otten supra* note 11, at 1, col. 1. Another paternalistic purpose was expressed by DuPont. Its medical director explained that screening blacks for sickle-cell trait was purely for the "education and edification of the individuals involved." Severs, *Screening of Blacks by DuPont Sharpens Debate on Gene Tests*, N.Y. Times, Feb. 4, 1980, at 13, col. 1.


59. *Id.* See *Otten, supra* note 11, at 1, col. 1.


LEGAL IMPLICATIONS OF GENETIC SCREENING

While the technology of genetic screening presents a new method of promoting occupational health, it implicates the rights and duties embodied in the employer-employee relationship. However, the lack of legal precedent in this area forces commentators to draw analogies and speculate as to how emerging legal problems should be resolved. As the science continues to gain momentum, examination of the legal and ethical issues should not be permitted to lag behind the technological advances. While Congress has already taken an initial step through a series of hearings in the early 1980's, further evaluation and discussion is necessary before genetic testing becomes an acceptable employment practice.

Recovery for Genetic Occupational Illness Under State Workers' Compensation Laws

Workers' compensation laws were originally designed to provide a remedy for occupational injuries. A distinction was made between occupational injuries and occupational diseases. However, with the increase of occupational disease in many industries came the abandonment of this dichotomy. As a result, general compensation coverage for occupational diseases is provided by every state. Nonetheless, certain statutory requirements must be met before a disease is considered work-related, and therefore compensable. Some of these requirements can bar many workers' compensation claims for occupational diseases, including genetic occupational diseases.

Generally, in order for an illness to be covered by workers' compensation laws, an employee must prove that the disease suffered is truly occupational in nature. The disease cannot be one that would have developed regardless of any industrial exposure.

If a disease is not a customary or natural result of the profession or industry, per se, but is the consequence of some extrinsic condition or independent agency, the disease cannot be imputed to the occupation or industry, and is in no accurate sense an occupation or industry disease.

This requisite causal relationship between employment and illness is included in most state definitions of occupational disease.

62. See supra notes 11, 23 and 30.
64. Id.
67. Larson, supra note 63, at 233-34.
While each state provides general compensation coverage for occupational disease, the question of exactly how extensive this coverage is remains open. The answer is unclear due to an underlying fear amongst some states to allow overly broad coverage for occupational illness. Consequently, these states have adopted restrictive statutory definitions of "occupational illness." Therefore, whether an employee's disease falls within the purview of a state's workers' compensation coverage clearly depends on satisfying its definition for occupational illness. This is accomplished by establishing the necessary causal connection between the disease and the employee's occupation. However, this threshold requirement can be difficult to satisfy, particularly in the context of genetic occupational disease.

One obstacle to proving the causal link arises where the employee's disability is caused by an "ordinary disease of life", rather than a disease specifically related to the employee's job. In such a case, the workers' compensation claim would be denied. For example, a state statute could make compensable a disability caused by the genetic occupational disease thalassemic anemia. Thus, in a restrictive jurisdiction, anemia would constitute an "ordinary disease of life" while thalassemic anemia would constitute an occupational disease. Consequently, if an employee possessing the thalassemic trait brought a claim for anemia caused by past lead exposure, rather than specifically stating that the claim was for thalassemic anemia, he would be denied recovery. This would be the result despite the fact that the exposure was necessary to "activate" the trait giving rise to the anemia. The distinction is one of semantics and is based on a restrictive interpretation of the statute. Such an approach has a fatal effect on the outcome of a workers' compensation claim.

A more formidable obstacle to establishing the causal relationship between disease and employment is the requirement that the disease be caused solely by a chemical exposure without contribution from ANY other factor. If the illness is attributable to any non-occupational cause, even if it is in addition to an occupational cause, it may, in some jurisdictions, constitute

68. Id. at 233.
69. BARTH, supra note 66, at 93.
70. Id.
71. Id. at 95-96.
72. For a general discussion of this and other genetic and occupational diseases, see supra note 3.
73. For a general discussion, see BARTH, supra note 66, at 96 (citing Asten Hill Mfg. Co. v. Bambrick, 291 A.2d 354 (Pa. 1972) where the court denied a claim of disability due to lung cancer that was caused by asbestos exposure; the claim, in order to be successful under the workers' compensation statute, should have been brought for asbestosis).
an "ordinary disease of life". This poses a significant problem to employees whose claims are based on genetic occupational illnesses. The possession of a genetic vulnerability to illness could be regarded as a factor completely independent from the employee's occupation, even though the occupational exposure is a necessary element to the illness becoming evident in the first place. Thus, the employee's genetic makeup may, as an independent causative factor of the disease, bar compensation.

There exists a general rule "that the employer takes the worker as he finds him." However, many states do not strictly adhere to this rule. Thus, some courts have denied workers' compensation claims for disease where the employee had a "preexisting condition" unrelated to the workplace. A disease arising from such a condition is not deemed, in some states, causally related to employment. This approach creates a serious impediment to claims brought by genetically susceptible employees because, clearly, genetic conditions exist prior and unrelated to employment. Consequently, although the occupational exposure must occur to trigger the onset of the disease, the employee's genetic predisposition may bar recovery.

The long latency periods of many genetic occupational diseases also frustrates an employee's ability to satisfy the causal relationship requirement. First, a long latency period can affect an employee's ability to remember whether he ever was exposed during his employment to a particular substance that would have triggered the genetic occupational illness. If an employee cannot remember whether the exposure ever occurred at the workplace, the causal link cannot be established.

Second, with the passage of time resulting from a long latency period comes an increased burden of collecting the evidence necessary to demonstrate the causal connection between occupation and disease. Records and documents containing information of the occupational exposure are likely to be unavailable after a long period of time has passed since that exposure first

74. Id.
75. For a general discussion of cases involving a determination of whether other causes contributed to the illness, see id. at 96-98.
76. Id. at 115.
77. Id.
78. For a general discussion, see id. at 115-17.
79. A Survey of State Administrative Practices revealed that, of the states responding to the survey, Missouri, Ohio and West Virginia would not compensate for preexisting conditions unrelated to employment; Oklahoma and Tennessee were undecided on this issue; and Alabama, Arkansas, Georgia, Louisiana, Maine, Maryland, Montana, Pennsylvania, South Dakota and Wyoming did not respond. Id. at 116.
80. Id. at 62-63. See OTA Report, supra note 2, at 113.
81. See BARTH, supra note 66, at 63.
occurred. Finally, the difficulties caused by long latency periods to proving workers' compensation claims may actually be exacerbated by the eventual use of genetic testing. If genetic becomes a highly predictive means of determining the causes of some occupational illnesses, non-hypersusceptible claimants will need to prove that, despite the absence of a genetic vulnerability, the occupational exposure caused the illness. The relatively little understanding of the etiology of occupational diseases makes this task burdensome. Thus, a non-hypersusceptible claimant will have the impediments of the long latency period of his illness compounded by the unavailability of a specific test to prove that the cause of his condition was occupational. On the other hand, the genetically susceptible claimant can rely on the genetic test results to help establish that but for the occupational exposure, his genetic illness would never have been triggered. Assuming he is not in a jurisdiction which denies claims for preexisting conditions of multi-factor causes, he is likely to recover workers' compensation.

Even if a claimant seeking workers' compensation for a genetic occupational disease can overcome these obstacles, the existence of a long latency period and a restrictive statute of limitations can hamper his ability to bring the suit in the first place. Most states include a statute of limitations in their workers' compensation laws. There are three common types of statute of limitations: 1) minimum exposure rule, 2) recent exposure rule, and 3) exposure in the state rule. A brief examination of each rule reveals that they can operate as significant bars to a worker's compensation claim for disease.

The minimum exposure rule requires an employee to prove that the hazardous exposure occurred within a specific minimum period of time in order for a claim to be brought. For example, in the context of a claim for a genetic

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82. See id. Generally, there are six factors pertinent to establishing the causal connection. While these criteria have been relied upon in the context of disease resulting from radiation exposure, they can also be applied to other types of exposure. They include:

1) The extent of the exposure and its relationship to the development of the disease;
2) Whether the disease is known to be related to the particular exposure;
3) The employee's predisposition or hypersensitivity to the effects of the exposure;
4) The effects of other agents to which the employee was exposed, either on or off the job;
5) The existence of other sources of the particular exposure outside of the employee's workplace, and
6) Exposure to the particular substance at a previous or subsequent job.

Id. at 65.

83. OTA Report, supra note 2 at 113.
84. BARTH, supra note 66, at 120.
85. Id. at 120-23.
86. Id. at 121.
occupational illness, an employee would need to show that the exposure to lead occurred within the specified time period prior to the contracting of thalassemic anemia. If the disease arose before the beginning of this time period, the employee's workers' compensation claim would be barred.\textsuperscript{87}

The minimum exposure rule may not as act as an obstacle to those employees whose claims involve diseases with long latency periods. In such cases, the employees would be exposed to the hazardous substance within the required minimum time period before actually contracting the disease. However, some diseases may develop shortly after the occupational exposure has occurred. Consequently, an employee may be barred from any recovery simply because his particular disease had a relatively short latency period and was quick to reveal itself.

The recent exposure rule also imposes difficulties for many workers' claims. This rule bars claims for occupational diseases arising later than a specified number of years from the time of exposure.\textsuperscript{88} For example, a state law could require continuous occupational exposure to occur three years prior to the onset of the disease in order for the recent exposure rule to be satisfied. Therefore, if an employee develops a genetic occupational disease after being exposed for only two years and eleven months, his workers' compensation claim will be barred. This is also the result where the employee has been exposed to a substance during the twenty years preceding the onset of his occupational illness but such exposure was not continuous.\textsuperscript{89}

Finally, the exposure in the state rule establishes a minimum time requirement in which the injurious exposure must occur in the particular state.\textsuperscript{90} This rule is designed to prevent employer liability for employees previously exposed in other states.\textsuperscript{91} Consequently, an employee working for the same employer for many years, but in plants located in different states, would be prevented from bringing a workers' compensation claim.\textsuperscript{92} Furthermore, an employee failing to satisfy the minimum time requirement, that is, by showing that he was exposed to the hazardous substance within the specified time period, shall also be unable to file his claim.

Despite these and other obstacles confronting employees bringing workers' compensation claims for diseases, some claimants are nonetheless suc-

\textsuperscript{87} The minimum exposure periods vary between states. For example, Louisiana prohibits claims for diseases contracted during the first year of employment. Other states, such as Georgia, Iowa, Kansas and Utah, have a five year minimum exposure level. BARTH, supra note 66, at 121.

\textsuperscript{88} Id.

\textsuperscript{89} For other examples of the recent exposure rule, see id. at 121-23.

\textsuperscript{90} Id. at 123.

\textsuperscript{91} Id.

\textsuperscript{92} Id.
cessful. However, workers’ compensation laws were not initially promulgated with the intent to extend coverage to occupational diseases. In addition, some states have had difficulty adopting laws to extend such coverage. As a result, there are many impediments inherent to some state workers’ compensation laws which create insurmountable burdens to claims for illnesses. These hinderances combined with the lack of understanding surrounding the etiology of genetic occupational diseases render workers’ compensation laws of little value to hypersusceptible employees. Thus, other statutory frameworks must be explored in order to determine what may be a source of protection and recovery for the genetically susceptible worker.

*Employer Duties and Liabilities Under the Occupational Safety and Health Act*

The sole federal statute pertaining to an employer’s duty to protect its employees from occupational illness is the 1970 Occupational Safety and Health Act (“OSH Act”). It imposes a general duty on employers to maintain a workplace free from “recognized” health hazards. This responsibility belongs only to the employer, and cannot be delegated to or assumed by the employee. Many critics fear that genetic screening will delegate this responsibility to the employee. By excluding the more vulnerable employees, employers would be relieved of their obligation to maintain and improve environmental conditions in the workplace. This is often referred to as “blaming the victim”.

Victim-blaming, however, ignores the possibility that workers not labeled susceptible may subsequently contract the illness. By removing only biologically predisposed individuals, an employer would be making the false assumption that others are not at risk. Therefore, the sanctioning of high exposure levels to less susceptible workers merely defers a substantial amount of occupational illness and cost to a later date. As an alternative, an employer may decide to use an overly inclusive genetic screening test in order to avoid such consequences. This will help insulate the employer from liability for occupational disease. However, it will also lead to the unjustified

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94. 29 U.S.C. § 654(a). A “recognized” hazard is one which either the employer or the particular industry regards as dangerous and there is a manner in which they are handled to prevent the onset of disease. OTA Report, supra note 2, at 119.
95. OTA Report, supra note 2, at 119.
96. See Hearings supra note 11, at 51 (statement of Dr. Kennith B. Miller, Medical Director, worker's Institute for Safety and Health); Diamond, supra note 29, at 244; Murray, supra note 38, at 6; Samuels, supra note 3, at 574.
97. See Samuels, supra note 18, at 5; Severo, supra note 60, at 36, col. 2.
98. Employers have been criticized for using other types of screening devices based on
exclusion of some less susceptible employees. Nonetheless, this approach will be attractive to many employers because it may actually prove less expensive to use an over-inclusive test than to more precisely determine each individual worker's susceptibilities.\textsuperscript{99}

Of course, the threshold question is whether the Occupational Health and Safety Administration ("OSHA") possesses the authority to regulate genetic testing in the workplace. Although there have been conflicting opinions, it is generally agreed that OSHA has such jurisdiction provided the applied regulations relate to promoting workplace health and safety.\textsuperscript{100} This does not mean, however, that the OSH Act is designed to protect workers' individual rights. Its purpose is to protect their occupational health.\textsuperscript{101} Nor should the conference of regulatory jurisdiction be confused with the notion that the OSH Act requires an employer to conduct genetic testing. On the contrary, it simply imposes a general duty to protect workers' health and safety, but it does not specify the means by which that duty is to be carried out.\textsuperscript{102} Therefore, it must be determined whether providing a safe workplace for even the most susceptible employees is compatible with an employer's general duty to protect workers' health and safety under the OSH Act.

The Secretary of Labor has promulgated strict limitations on the allowable exposure levels of various toxic substances.\textsuperscript{103} OSHA has the authority to establish exposure levels so that "no employee will suffer material impairment of health or functional capacity, even if exposed for his or her entire working life."\textsuperscript{104} Yet, there is no mention as to whether such standards include consideration of hypersusceptible workers. It does, however, use the invalid assumptions, and therefore resulting in overinclusive screening. See Comment, Occupationally Induced Cancer Susceptibility: Regulating the Risk, 96 Harv. L. Rev. 697, 703.

\textsuperscript{99} Id. at 703-04.

\textsuperscript{100} OTA Report, supra note 2, at 122. But see Hearings, supra note 11, at 127-28 (statement of Mark A. Rothstein, West Virginia University School of Law) (suggesting that the OSH Act would need to be amended because it deals with workplace conditions, not employee rights).

\textsuperscript{101} See Whirlpool Corp. v. Marshall, 445 U.S. 1, 11-12 (1980).

\textsuperscript{102} OSHA confirmed that its standards do not mandate genetic testing of employees. It stated that its regulations require only that a worker's general health status be identified and that OSHA does not advocate exclusionary policies. It also acknowledged that genetic tests could shift the responsibility of toxic control to employees. See United States Department of Labor, OSHA Clarifies Reference to "Genetic Factors" in Medical Surveillance Requirements, News, Feb. 20, 1980, at 1-2. The clarification came in response to questions over an OSHA regulation stating that the required employee medical histories shall include "family and occupational background, including genetic and environmental factors." See generally Severo, Federal Mandate for Gene Tests Disturbs U.S. Job Safety Official, N.Y. Times, Feb. 6, 1980, at 1, 36.


term "no" employee, which could be interpreted as providing for the protection of all employees. Nonetheless, a more thorough examination of the statute reveals that it was not intended to provide for absolutely risk-free workplaces.

While the language delegating authority to set safety standards appears broad, the Secretary can impose standards only "to the extent feasible." The judicial interpretation of this language actually restricts what could otherwise be the Secretary's broad discretion in setting exposure levels. The Supreme Court, in American Textile Manufacturers Institute v. Donovan ("the Cotton Dust case"), held that "to the extent feasible" requires that a safety standard be technologically and economically feasible. In other words, that it be capable of being met and feasible for the industry as a whole, rather than for only an individual employer. The Court recognized that the feasibility requirements were intended to relieve employers of the duty to achieve "absolute safety" in the workplace. Consequently, when confronted with protecting the health of genetically susceptible workers, the members of an industry could argue that the proposed standard is beyond the point of technological or economic feasibility, and therefore unenforceable.

According to Section 3(8), the Secretary's standards must be "reasonably necessary and appropriate to provide safe or healthful employment and places of employment." The Supreme Court has held that to satisfy this requirement, the Secretary must determine that a workplace environment poses a "significant risk" to employees, and that the risk could be eliminated, or lessened, by altering employment practices. The Court confirmed that the congressional intent underlying the OSH Act was to eliminate significant risks to employees, not to achieve absolute safety.

Under this decision, the Secretary could only promulgate a standard designed to protect hypersusceptible employees where he has demonstrated that the industry's current exposure levels present a significant risk to the

107. Id. at 508-09.
108. Id. at 514, 521 n.38.
109. Id. at 514.
113. Id. at 646.
health of those employees. A "significant" risk may be shown in terms of the odds in which an employee may become affected by an exposure level. For example, if the odds are one in a billion that an individual will be affected, the risk may not be considered significant. On the other hand, if the odds are one in a thousand, the risk may warrant a change in the current exposure level. Thus, in order to guarantee safe exposure levels to genetically susceptible workers, the odds must reflect that a relatively significant number of workers are at risk.

The Secretary is given the authority to prescribe medical examination procedures used in determining the effects of exposure levels. However, as mentioned earlier, this does not necessarily include requiring genetic testing. Thus, because it does not mandate such tests, and because it provides for neither employee rights, nor an absolute risk-free workplace, the OSH Act may prove to be of little help in protecting the health of genetically susceptible employees.

Nonetheless, there are two possible protections that deserve mentioning. First, the OSH Act provides for medical removal protection ("MRP"). Currently, the OSHA standard for lead exposures requires that workers at an increased risk to be removed to comparable jobs. A similar medical removal provision could be included in any standards governing genetically susceptible workers where it is not otherwise technologically or economically feasible to lower exposure levels.

The second possible protection is Section 11(c), which prohibits discrimi-
nation against an employee who exercises any right afforded by the OSH Act. In Whirlpool Corp. v. Marshall, the Supreme Court applied this protection to the right of an employee to refuse to perform a task because of a reasonable apprehension that the working conditions present an imminent threat of death or serious bodily injury, coupled with a reasonable belief that there is neither the time nor opportunity to seek redress through established procedures.

Therefore, a hypersusceptible employee may have the right to refuse to work without fear of being unjustly discharged, where the work environment poses an imminent risk to the employee due to his genetic condition, provided that no less drastic alternative is available. Proving such a threat is, however, more difficult in these situations because of current disputes over the validity of genetic testing. Moreover, because occupational illnesses often entail extended latency periods, the hypersusceptible worker may not meet the imminence requirement.

Similar to the common law, an employer’s willful violation of his required duties under the OSH Act can lead to civil and/or criminal penalties, depending on the resulting injury to employees. One of these duties is to provide a true and accurate representation of any report or record. Accordingly, false statements concerning an employee’s medical record justify imposition of a penalty, and an employer who knowingly misrepresents an employee’s genetic test results is subject to penalties under the OSH Act. Unlike common law, however, the Act prohibits an employer from relying on whether an employee has consented to work under hazardous conditions. Hence, it is more difficult to shift the blame to the employee under the OSH Act.

124. Id. at 10-11.
125. OTA Report, supra note 2, at 119.
126. Id.
127. See generally 29 U.S.C. § 666 (1986). One limitation on employee rights under the Act is that no private right of action exists. Rather, a petition must be filed with the Secretary of Labor in order to have the regulation enforced. OTA Report, supra note 2, at 119.
128. An employer who falsely misrepresents any application, record, report, plan or other document is subject to a fine of not more than $10,000 or imprisonment of not more than six months, or both. 29 U.S.C. § 666(g) (1982).
129. OTA Report, supra note 2, at 119.
Employee Rights

Discrimination

Title VII of the 1964 Civil Rights Act

There is a significant concern that biological screening has the potential to be used as a discriminatory device because genetic traits are often associated with a person's racial or ethnic background. An employer generally has the right to hire anyone it so chooses, and can establish the employment criteria and conduct the testing necessary to determine which applicants satisfy its standards. Because employees must accept employers' policies, Title VII provides that employees have the right to be free from employment discrimination based on race, color, religion, sex or national origin. Discrimination generally takes two forms: (1) disparate treatment, which involves a hiring policy that overtly discriminates against a protected group of workers, and (2) disparate impact, which involves a hiring policy that may be facially neutral, has a discriminatory effect.

In alleging disparate treatment, a plaintiff must show proof of the employer's discriminatory motive. A prima facie case of discrimination involves demonstrating that the plaintiff belongs to a group protected under Title VII and has been denied employment despite his qualifications that were the equivalent of those that the employer sought in its applicants. Once a prima facie case has been established, the employer may assert a "legitimate, nondiscriminatory reason for the employee's rejection." It is at this point that the plaintiff may argue that the employer's facially neutral

130. See Hearings, supra note 11, at 103 (statement of Mark A. Rothstein, West Virginia School of Law) (genetic screening often has a disparate impact along racial lines while cytogenetic methods do not). For example, population frequencies for the G-6-PD deficiency occur in American Caucasians at .1%; American black males at 16%; British at .1%; Chinese at 2-5%; European Jews at 1%; Filipinos at 12-13%; Mediterranean Jews at 11% and Scandinavians at 1-8%. OTA Report, supra note 2, at 124.
131. Hearings, supra note 11, at 103 (statement of Mark A. Rothstein, West Virginia University School of Law).
134. OTA Report, supra note 2, at 123.
135. Id.
136. The four components of the prima facie case of racial discrimination include: 1) that the individual belongs to a racial minority; 2) that he applied and was qualified for a job for which the employer was seeking applicants; 3) that, despite his qualifications, he was rejected; and 4) that, after his rejection, the position remained open and the employer continued to seek applicants from persons of complainant's qualifications. McDonnell Douglas Corp. v. Green, 411 U.S. 792, 802 (1973).
137. Id.
hiring policy serves merely as a "pretext" for discriminatory actions.\(^{138}\)

In the context of genetic screening, disparate treatment could occur here only those workers of a particular racial or ethnic background associated with a genetic trait are subjected to the tests, or excluded altogether.\(^{139}\) Furthermore, it could occur even where all applicants are subjected to the genetic tests, but an applicant belonging to a protected group tests positive for the genetic trait and is refused employment, regardless of his qualifications. While the employer can defend its decision on the basis of the test results, the applicant can assert a pretext argument if he can show that the employer hired another applicant who tested positive but was not of the same racial or ethnic background, or sex.\(^{140}\)

An employer can defend charges of discriminatory treatment by demonstrating a "bona fide occupational qualification" ("BFOQ").\(^{141}\) The BFOQ requires that employment criteria based on religion, sex or national origin be "reasonably necessary to the normal operation of [the] particular business or enterprise."\(^{142}\) However, no BFOQ can be based on an employee's race. Some commentators have criticized the provision for permitting employment practices designed to minimize costs, even if they create a discriminatory result.\(^{143}\) Therefore, employers using genetic screening methods would merely need to show that, despite a discriminatory effect, the tests are necessary to minimize insurance and other costs related to occupational illness from chemical exposures.

Disparate impact involves employment practices implemented without any discriminatory intent, but having an adverse effect on a group protected under Title VII that cannot be justified by business exigencies or by job requirements.\(^{144}\) Unlike disparate treatment, proof of discriminatory intent is not required.\(^{145}\)

The leading Supreme Court case which confronted the issue of disparate

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138. Id. at 804.
For example, DuPont previously tested only its black employees for sickle cell anemia. See Severo, *Screening of Blacks by DuPont Sharpens Debate on Gene Tests*, N.Y. Times, at 1, 13 (Feb. 4, 1980). Similarly, the previous policy of the United States Air Force whereby it rejected only black candidates is an example of such discrimination. See supra note 16.
140. See *Employment Discrimination*, supra note 139, at 330.
142. Id.
143. See, e.g., Rothschild and Werden, supra note 132, at 265.
144. OTA Report, supra note 2, at 123.
145. Id.
impact is *Griggs v. Duke Power Co.*,146 in which the Court recognized that the purpose of Title VII was not only to proscribe overt discriminatory employment practices, but also those that are "fair in form, but discriminatory in operation."147 Thus, an employer's good intentions or absence of discriminatory intent becomes irrelevant where its employment practices discriminate. However, if an employer can prove that the job criteria has a "manifest relationship to the employment in question,"148 i.e., is necessary and relates to job performance, its use will not be prohibited.149

The disparate impact analysis was refined into a three-step approach in *Albermarle Paper Co. v. Moody.*150 First, a plaintiff must establish a prima facie case of discrimination.151 Second, once such discrimination is shown, the burden shifts to the employer to prove that the tests are related to job performance. Finally, if the employer meets this burden, the plaintiff may offer evidence that there are alternative tests or practices that could minimize the disparate impact while serving the employer's business interests.152

Genetic screening practices have the potential to create a disparate impact due to the tendency of genetic traits to vary along racial or ethnic lines. Thus, an applicant could establish a prima facie case of discrimination by showing that the tests screen from jobs the workers of a particular racial or ethnic group frequently possessing a genetic trait disproportionately. The employer's "business necessity - job related" defense in this context would entail proof that: (1) there is a valid reason for excluding workers who are presently capable of performing the required work but who may become physically unable to do so in the future, i.e., for productivity reasons or to decrease disability insurance costs, (2) it is important to the business that employees not be suffering from an occupational illness, (3) the specific screening procedure used is accurate and reliable in identifying the presence of the genetic trait, (4) there is a high correlation between the trait and the individual's susceptibility to disease at the legal exposure levels, (5) the company cannot feasibly decrease exposure through engineering controls, protective devices, or job placement, and (6) the company cannot insure itself at a reasonable cost against potential tort liability.153

146. 401 U.S. 424 (1971).
147. *Id.* at 431.
148. *Id.* at 432.
149. *Id.* at 431.
150. 422 U.S. 405 (1975).
151. *See supra* note 136.
152. *Albermarle Paper Co.*, 422 U.S. at 425.
153. OTA Report, *supra* note 2, at 125. Once the employer has proposed its defense, the court must determine whether the need for the practice sufficiently outweighs the disparate impact. *Id.*
Validation of a genetic test is an essential element to this defense. An employer using tests which it asserts are related to job performance, must show that the tests have undergone professional validation studies pursuant to the Uniform Guidelines on Employee Selection Procedures ("UGESP") issued by the Equal Employment Opportunity Commission ("EEOC"). Under the UGESP, an employer must demonstrate, through available data, that the test is "predictive of or significantly correlated with important elements of work behavior that comprise or are relevant to the job or jobs for which candidates are being evaluated."\[155\]

Currently, genetic screening methods are incapable of satisfying these standards due to uncertainty about its predictive value.\[156\] Thus, use of such tests would be violative of Title VII. In cases in which similar concerns arose, courts generally ordered the employer to develop new testing procedures that would be acceptable under the UGESP.\[157\] If the predictions that genetic screening will become a more accurate technology prove true\[158\], however, the tests may eventually meet the UGESP requirements and be considered appropriate for use despite any disparate impact on groups of employees.

Although it is unsettled as to whether Title VII will provide the necessary protection for victims of genetic discrimination, it has been regarded as likely means of redress.\[159\] A bill has been introduced in Congress to amend Title VII to specifically cover discrimination on the basis of an employee's genetic characteristics.\[160\]

The Rehabilitation Act

The 1973 Rehabilitation Act ("the Act")\[161\] has also been suggested as a means to prevent employment discrimination against genetically susceptible

154. 29 C.F.R. § 1607 (1986).
155. Id. at § 1607.4(c).
156. See supra note 32-38, and accompanying text.
158. See infra note 234.
159. See Hearings, supra note 11, at 117 (statement of James English, Esq. United Steelworkers of America), See id. at 127 (statement of Mark A. Rothstein, West Virginia University School of Law) (suggesting that Title VII would be the "best place to start with respect to employment discrimination").
160. The bill exempts from the definition of "genetic characteristics" genetically linked conditions creating undue hardship on an employer's business. Thus, an employer could still discriminate on the basis of a genetic trait where the costs of protecting a susceptible employee would be prohibitively expensive. See OTA Workshop, supra note 45, at 40.
workers, particularly through Sections 503 and 504. Section 503 provides that any federal contract in excess of $2,500 must include a provision requiring the employer "to take affirmative action to employ and advance...qualified handicapped individuals." Section 504 prohibits a federally funded program from discriminating against a handicapped person solely on the basis of his handicap.

The Act refers to discrimination based on an individual’s handicap. Therefore, in order for the Act to protect persons with genetic susceptibilities, such persons must satisfy the Act’s definition of “handicapped.” According to the Act, a handicapped person is one who: (1) has a physical or mental impairment that substantially limits one or more of the person’s major life activities, (2) has a record of such impairment, or (3) is regarded as having such an impairment. Furthermore, a person must be “otherwise qualified” for employment in order to fall within the Act’s coverage.

The definition’s first requirement is that a genetic trait constitute an impairment and constitute a substantial limitation of a person’s major life activities. Genetic testing, however, generally identifies persons who have the potential of acquiring a physical impairment due to chemical exposures. Regulations of the Department of Health and Human Services (“HHS”) governing Section 504, defines a physical impairment, by reference to a person’s current condition. Unless the potential condition is considered an impairment under this definition, or unless the regulations are amended to include such conditions, a genetically susceptible individual appears to be unprotected under Section 504.

There is no definition of impairment with the Office of Federal Contract Compliance Program (“OFCCP”) regulations governing Section 503. However, the federal district court for the District of Hawaii in E.E. Black, Ltd.

162. Id. at § 793.
163. Id. at § 793(a).
164. Id. at § 794.
165. There are, however, limitations inherent to the available protection under Sections 503 and 504. For instance, employers covered by the Act include either government contractors or federal funds recipients. Although this covers approximately 3 million firms, or about one-half of American businesses, OTA Report, supra note 2, at 126, the Act will not address the actions of employers not within its scope. Thus, many handicapped persons remain unprotected.
166. 41 C.F.R. § 60-741.2 (1986).
168. See OTA Report, supra note 2, at 127.
169. A physical impairment is defined as “any physical disorder or condition, cosmetic configuration, or anatomical loss affecting one or more of the following body systems: neurological; musculoskeletal; special sense organs; cardiovascular; reproductive; digestive; genito-urinary; hemic and lymphatic; skin; and endocrine.” 45 C.F.R. § 84.3(j)(2)(i)(A) (1986).
v. Marshall, interpreted impairment as "any condition which weakens, diminishes, restricts or otherwise damages an individual's health or physical or mental activity." Under this broad definition, a hypersusceptible worker could be protected by Section 503. Notwithstanding the court's interpretation of Section 503, a uniform definition of impairment that would afford hypersusceptible workers protection under both Sections 503 and 504 is needed.

The next question is whether a person's job constitutes the type of activity which the Act intended to address. Recently, the Supreme Court declared that "working" is a major life activity within the meaning of the Act. Similarly, the OFCCP regulations regard employment and vocational training as activities which can be limited by impairments. Thus, under both Sections 503 and 504, if a person's ability to work is limited by a genetic susceptibility, it is the type of activity which the Act addresses.

The presence of an impairment will not, however, automatically afford an individual the Act's protection. Rather, the focus "must be on the individual job seeker, and not solely on the impairment or the perceived impairment." Therefore, a case-by-case determination is made of whether a person's handicap substantially limits his employability. The "substantially limits" language refers to the degree to which an impairment affects employability. The OFCCP regulations state that a "handicapped individual who is likely to experience difficulty in securing, retaining or advancing in employment would be substantially limited."

In E.E. Black, the district court established a set of factors for determining what constitutes a substantial limitation including: (1) the number and type of jobs from which the impaired individual is disqualified, (2) the relevant geographical area, and available employment in areas to which the applicant has reasonable access, and (3) the applicant's own expectations and

171. Id. at 1098.
172. The court recognized that Congress intended the Act "to have broad coverage and effect." Id. at 1097-98.
173. The effects of some genetic susceptibilities can lead to anemia, headaches, shortness of breath and lethargy. See generally supra note 3. Clearly, such conditions would tend to weaken, diminish, restrict or otherwise damage a person's physical activity.
177. Id.
179. Id.
training. Under these standards, a genetically susceptible worker could be deemed substantially limited from employment if his impairment, or perceived impairment, precludes him from jobs that are the "same or similar" to those offered by employers in the area to which the employee has reasonable access.

Yet another obstacle confronting hypersusceptible workers in securing the Act's coverage is their inability to show a record of impairment under part two of the definition. To have a record of impairment an individual must have a history of, or have been misclassified as having, an impairment. Because genetic conditions often involve extended latency periods, it would be difficult to establish a record demonstrating its history and effects. However, the "having a record" requirement could be satisfied if the genetic test results were considered sufficient to establish a record of the employee's potential impairment. Alternatively, a hypersusceptible employee could be misclassified as having an impairment that substantially limits his ability to work, when his condition has not caused such an effect. Such would be the case where the mere possession of a genetic vulnerability by an employee has led to his being considered to have an impairment despite the lack of any resulting limitation on his ability to work. Thus, this misclassification would satisfy the definition of having a record of impairment thereby bringing the employee within the purview of the Act.

The third part of the definition of handicapped persons does not require that an individual have an actual impairment to be protected by the Rehabilitation Act. Rather, he need only be perceived as having an impairment that substantially limits his ability to work due to the negative reaction of others. This part of the definition could actually provide to be the most persuasive support for the extension of the Act's coverage to genetically susceptible individuals.

Because a genetic condition is not a visible physical condition and is discoverable only through genetic testing, employment disqualification could result from an employer's perception that the vulnerability will impair the employee's ability to work. Furthermore, discrimination based on an employee's belonging to a particular racial or ethnic group known by the employer to have a high frequency of genetic vulnerability, despite that

181. See id. at 1101.
182. 45 C.F.R. § 84.3(j)(2)(iii) (1986).
183. In Arline, the record was established by the hospitalization of the employee due to her impairment. 107 S.Ct. at 1128.
individual employee's genetic makeup, could also occur. Discrimination on the basis of such perceptions, regardless of whether the impairment actually exists, is prohibited by the Act. Therefore, an individual, currently healthy, who tests positive for a genetic susceptibility, such a person who is simply a member of a racial or ethnic group, could not be excluded from a job on the basis of the employer's perception that he could eventually develop an occupational disease.

This has three important effects. First, it insures that susceptible employees who possess a genetic trait, but never contract the occupational disease associated with that trait, are not unjustly excluded from a job. Second, it protects non-susceptible employees who test positive due to over-inclusive tests from being unjustifiably disqualified from employment. Third, it helps to minimize exclusion based on a person's racial or ethnic background.

Finally, there is the question of the effect of the Act's "otherwise qualified" requirement. An otherwise qualified person is one who is able to meet all of the program's requirements despite his handicap: That is, one who can perform "the essential functions of the job" with reasonable accommodation. Therefore, reducing exposure levels or providing safety equipment could constitute a reasonable accommodation to otherwise qualified hypersusceptible workers, provided these steps do not create an undue financial or administrative burden on the employer.

Once a handicapped person covered by the Act has been disqualified from employment, the employer may be required to justify this decision. An employer covered by Section 503 must show that the job criteria he used for screening purposes is consistent with business necessity and the safe performance of the job. Therefore, to defend genetic screening under Section 503, employers need to prove that a job involves exposure to a substance likely to cause illness in individuals possessing a certain genetic trait. Fur-

186. See 41 C.F.R. § 60-741.30, App. A, (1986); 45 C.F.R. § 84.3(j)(ii) (1986) (both defining the term "regarded as having an impairment").
187. "[O]nly those persons who are both handicapped and otherwise qualified are eligible for relief." Arline, 107 S.Ct. at 1129-30.
188. Davis, 442 U.S. at 406.
189. 41 C.F.R. § 60-741.2 (1986); 45 C.F.R. § 84.3(k) (1986). An employer may make a reasonable accommodation by 1) making facilities used by employees readily feasible to and usable by handicapped persons, and 2) job restructuring, part-time or modified work schedules, acquisition or modification of equipment or devices, the provision of readers or interpreters, and other similar actions. 45 C.F.R. § 84.12(b) (1986).
190. However, the OTA Report states that it is unlikely that an employer would be required to lower exposure levels below current OSHA standards in order to accomodate hyper-susceptible employees. OTA Report, supra note 2, at 130.
191. Davis, 442 U.S. at 412.
192. 41 C.F.R. § 60-741.6(c) (1986).
thermore, they must be able to support the predictive value of the screening techniques.\textsuperscript{193}

A comparable defense exists under Section 504, however, Section 504 only requires that the employment criteria be "job-related."\textsuperscript{194} Furthermore, there cannot be available alternative job-related tests that do not screen out as many handicapped persons as does the employer's test.\textsuperscript{195} Therefore, under Section 504 employers using genetic screening tests must demonstrate that these tests are related to the job in question\textsuperscript{196} and that they do not screen out genetically susceptible employees more frequently than other available tests. The first prong of this defense could be satisfied where the test relates to a job involving a chemical known to trigger an exposed employee's susceptibility. The second prong places the burden on the Director of the Office of Civil Rights of the HHS to examine what alternative tests and criteria are available.\textsuperscript{197}

The Act imposes an affirmative duty on employers to make a reasonable accommodation for otherwise qualified handicapped employees.\textsuperscript{198} However, if the accommodation creates undue financial and administrative burdens, the employer's failure to promote the handicapped person is not considered discrimination within the meaning of Section 504.\textsuperscript{199} The defense of undue hardship is available under both Sections 503 and 504.\textsuperscript{200} Additionally, discrimination will not be found where the reasonable accommodations do not overcome the effects of a person's handicap.\textsuperscript{201} What is required to remedy discrimination is simply that the reasonable accommodations be made, not that they be successful.

Under Section 503, factors influencing the undue hardship defense are the business necessity of an employer's employment policies and the financial

\textsuperscript{193} The regulations promulgated under Section 503 provide two standards which must be met in defending one's employment selection methods. The methods must 1) relate to the job(s) for which a handicapped individual is applying; and 2) be consistent with business necessity and job safety. 41 C.F.R. § 60-741.5(c)(2) (1986).
\textsuperscript{194} 45 C.F.R. § 84.13(a) (1986).
\textsuperscript{195} Id.
\textsuperscript{196} As previously noted, Title VII requires that the criteria "manifest a relationship to the job and job performance." See supra notes 133-134 and accompanying text. However, the courts may not necessarily follow the same standard in Rehabilitation Act cases. Thus, the outcome of a Section 504 case depends on how the job-related requirement is defined. See OTA Report, supra note 2, at 129.
\textsuperscript{197} 45 C.F.R. § 84.13(a) (1987).
\textsuperscript{198} See Arline, 107 S.Ct. at 1131 n.19. This obligation is not limited to modifying current working conditions. Employers can accommodate handicapped employees by transferring them to alternative job positions. Id.
\textsuperscript{199} Id.
\textsuperscript{200} See 41 C.F.R. § 60-741.6(d) (1986); 45 C.F.R. § 84.12(a) (1986).
\textsuperscript{201} See Arline, 107 S.Ct. at 1128 n.7.
burden created by the suggested accommodation.\textsuperscript{202} Similarly, under Section 504, no accommodation need be made if the employer demonstrates that the federal program's size, budget, structure of the workforce, or the nature and cost of the accommodation would create an undue hardship.\textsuperscript{203} Consequently, because of the expenses often associated with providing safer workplace, it is likely that the "undue hardship" defense will be readily available to many employers. Nonetheless, there are less costly alternatives available that could help protect susceptible employees. For example, an employer could implement shift rotations, divide maximum exposure time, increase monitoring and medical surveillance, and provide personal protection equipment.\textsuperscript{204}

\textit{State Law}

Lack of assurance and agreement concerning the federal statutory protection against genetic employment discrimination has prompted some states to enact their own legislation. For example, New Jersey specifically prohibits discrimination on the basis of an individual's atypical cellular or blood trait.\textsuperscript{205} Both Florida\textsuperscript{206} and North Carolina\textsuperscript{207} have eliminated the sickle-cell trait as an employment criteria. Some anticipate that state laws, rather than federal legislation, will play a major role in regulating the use of genetic screening methods in the workplace.\textsuperscript{208}

\textit{Privacy Rights and Confidentiality}

Because of the intrusive nature of genetic tests, privacy rights are in danger of infringement.\textsuperscript{209} The tests have the potential not only to disclose a person's genetic makeup, but also his medical history, drug use, diet, the presence of sexually transmitted diseases, and a predisposition to illnesses other than those related to his occupation (\textit{i.e.} schizophrenia, Alzheimer's disease, heart disease, cancer).\textsuperscript{210} Where there is a lack of privacy, and these

\textsuperscript{202} 41 C.F.R. § 60-741.6(d) (1986).
\textsuperscript{203} 45 C.F.R. § 84.12(c)(1)-(3) (1987).
\textsuperscript{204} See OTA Report, \textit{supra} note 2, at 130.
\textsuperscript{208} See Palisano, \textit{supra} note 1, at 70.
\textsuperscript{209} See President's Commision, \textit{supra} note 6, at 42-43. An American Civil Liberties Union ("ACLU") committee is investigating the privacy issues of genetic testing in the workplace and will issue a report of its conclusions and recommendations. Palisano \textit{supra} note 1, at 69.
\textsuperscript{210} See Kingsley, \textit{Listen to Your Genes}, NEW REPUBLIC, Aug. 11, 1986 at 4. See also, Palisano, \textit{supra} note 1, at 69.
overreaching test results do not remain confidential between the employee and the physician, it appears that the benefits are no longer intended for the worker's health, but for the employer's best interests.

An employee's rights to privacy and confidentiality can be implicated as a result of the relationships existing between the employer, the company physician and the employee. Traditionally, no physician-patient relationship exists between the company physician and job applicants. However, the doctor does act as an agent to the employer. Consequently, an applicant's interest in the confidentiality of test results is often regarded as secondary to company interests. Furthermore, where current employees are tested, the results can easily be made available to employers.

Along with questions concerning an employer's access to medical test results, debate continues over the availability of test data to other third parties, such as insurance companies, potential employers, unions and family members. The possibility that applicants could be "blackballed" for revealing their genetic makeups to other employers has raised significant concern that privacy rights may be infringed, and that many applicants will be classified as undesirable workers for future employment. Unions also have an interest in obtaining information in order to aid them in their negotiations with employers over workplace conditions and safety.

A Presidential Commission Report recommends that genetic testing information should be given to third parties only where the person screened has provided explicit consent. However, the Commission Report suggests that confidentiality is only a qualified right and, under some circumstances, it may be overridden. Moreover, a waiver of confidentiality may be implied.

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211. Samuels, supra note 18, at 9-10. The OTA Report states that this view may be changing. A physician-patient relationship may stem from several factors, including the nature of the examination, the expectations of both physician and the applicant, the existence of a continuous medical relationship and whether the applicant consented to the examination. OTA Report, supra note 2, at 115.

212. Samuels, supra note 3, at 576. See also OTA Report, supra note 2, at 115.

213. Samuels, supra note 3, at 576. See also, OTA Report, supra note 2, at 117-18.

214. See OTA Workshop, supra note 45, at 40. Generally there are no industrial policies pertaining to either confidentiality of employee records or the use of employees' private doctors for medical surveillance purposes. Hearings, supra note 30, at 35 (statement of Howard D. Samuels).


216. Diamond, supra note 29, at 246.

217. President's Commission, supra note 6, at 42.

218. These circumstances include: (1) where reasonable efforts to elicit voluntary consent to disclose have been unsuccessful; (2) where there is a high possibility that harm will occur if information is not disclosed and, once revealed, the test results will prevent the harm from occurring; (3) where the harm would be serious if not averted; (4) where appropriate precautions
where an employee has consented to an employment examination, and has
knowledge that the test is for his own benefit and that no duty of confidenti-
ality is owed to him by the company physicians.219

The likelihood of unauthorized disclosure of employee medical information has generated some action. For example, OSHA provides that all legal
and ethical obligations pertaining to the confidentiality of employee medical records must be upheld.220 It also requires employers not to reveal an em-
ployee's identity where his medical records are requested by a third party.221
Additionally, state governments have become involved in determining the
scope of disclosure. California, for example, enacted legislation mandating
employers to devise procedural protections to ensure confidentiality and pre-
clude unauthorized disclosure of employee medical information.222 California also requires the employee's written consent to authorize release medical information.223

Inevitably, without guarantees of privacy and confidentiality, employees
will be unwilling to participate in employment testing programs established
only for research purposes. Where tests are used as conditions of employ-
ment, the most effective protections should be proffered so as to prevent in-
fringement of workers' rights. This is not to suggest that third parties' interests in having access to the information be disregarded entirely. The
objective is to reach a balance between the competing rights and interests in
each case by weighing the severity of the risks and burdens caused by not
disclosing the information against the degree by which employees' rights will
be infringed.224

Employee Access to Medical Records: The Right to Know

Information given to employers or third parties is not the only concern
over the accessibility of genetic testing results. Employees themselves cer-

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tainly have a legitimate interest in obtaining tests results. An important function of genetic testing is to inform people of their biological makeup and to allow them to make informed choices about their futures and well being. OSHA, for example, guarantees workers access to their medical records to promote this objective.

Notwithstanding federal statutory rights, several states also provide for employee access to employment medical records. The common law also imposes a duty on employers to warn their employees of dangers in the workplace. Arguably, this includes a duty to make medical records that contain such warnings available to employees. However, because applicants are not considered employees, the “right to know” guarantees may not be applicable to them. Thus, many job applicants remain at risk of being excluded from employment on the basis of their medical records without ever knowing the reasons for that decision.

**Autonomy**

Closely linked to the issues of employee access to medical records is the employee’s right to decide how or if to proceed once he receives the information. Based on an individual’s informed judgment, should he be given the right to self-determination regarding his employment, regardless of whether this decision is in his best interest? Some commentators support the argument that where the individual demonstrates sufficient competency, his decisions should be respected and not interfered with by others. However, autonomy may be limited by such factors as the particular job requirements, available resources or information, and accepted rules of behavior. Autonomy may, however, be compromised if an employee is not made fully aware of the possible consequences of a worker’s health condition or is un-

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225. President’s Commission, supra note 6, at 59.
226. See generally 29 C.F.R. § 1910.20(e)(1986). However, company physicians still retain a certain degree of discretion over disclosure to employees where the tests indicate that an individual is suffering from a terminal illness or psychiatric condition. 29 C.F.R. § 1910.20(e)(2)(ii)(D)(1986).
227. A further restriction on employee access arises where a disclosure results in revealing a company “trade secret”. 29 C.F.R. § 1910.20(f) (1986). In such circumstances, the employer is required to provide alternative information to aid employees in identifying the cause of their illness. Id.
230. See generally OTA Report, supra note 2, at 142.
able to understand its severity.\textsuperscript{231} In the case of preemployment genetic screening, an applicant's autonomy could be constrained by exclusion from an occupation without any regard for his judgment or willingness to take any attendant risks.

Because the right to self-determination enjoys significant importance in American society, it has been recommended that participation in screening programs be voluntary.\textsuperscript{232} In the employment context, genetic screening or monitoring tests could not be used as conditions to employment, and an employee's refusal to be subjected to the tests could not preclude or remove him from a particular job. Currently, however, "unless the test procedure violates a specific statute, regulation or collective bargaining agreement, there is no constitutional or common law right to refuse."\textsuperscript{233}

THE FUTURE OF GENETIC SCREENING IN THE WORKPLACE

Progress in the field of genetic testing is increasing in geometric proportions. Many commentators predict that genetic screening of employees will soon become a common industrial practice.\textsuperscript{234} There are others who contend that because there are tests already capable of identifying the link between the occupational environment and specific disease, such tests should be employed without delay.\textsuperscript{235} Despite any debate over the exact time in which this astonishing technology will actually be put to further and more common use, there is significant agreement that it will inevitably become a reality and that there is an urgency to settle the attendant legal, ethical and social issues before that time arrives.

One step in this direction was the approval by Congress to establish a Biotechnology Ethics Board.\textsuperscript{236} In addition, much time and effort has been contributed to plans for resolving the many controversial issues surrounding

\begin{footnotes}
\item\textsuperscript{231} \textit{Id.}
\item\textsuperscript{232} \textit{All the same}, President's Commission, \textit{supra} note 6, at 47.
\item\textsuperscript{233} OTA Report, \textit{supra} note 2, at 116.
\item\textsuperscript{234} \textit{All the same}, President's Commission, \textit{supra} note 6, at 11. (predicting that, before the end of the century, genetic screening and counseling will have significant influence in both public health and individual medical care); \textit{Hearings, supra} note 20, at 29 (statement of Congressman Gore) (estimating that genetic tests will become significantly accurate and predictive within 2 to 10 years); Palisano, \textit{supra} note 1, at 67 (suggesting that within 15 years genetic screening tests will be an integral part of preemployment examinations); Englade, \textit{supra} note 13, at 21 (quoting a prediction that genetic screening will be "in full force" by the end of the century and will "call forth a major national debate on social policy").
\item\textsuperscript{235} Otten, \textit{supra} note 11, at 8, col. 3 (quoting Gilbert Omenn). \textit{But compare Hearings, supra} note 11, at 52 (statement of Kenneth B. Miller, Medical Director, Workers' Institute for Safety and Health) (stating that genetic screening will rarely, if ever, have a significant impact on occupational health).
\item\textsuperscript{236} Palisano, \textit{supra} note 1, at 68.
\end{footnotes}
genetic testing while, at the same time, promoting its research and eventual use. One interesting model is a type of “three-way arrangement” between unions, management and universities that plan to conduct research, identify the occupational health problems and make recommendations collectively. Such cooperative activity has been used in the past and could serve to protect the relevant competing interests.\textsuperscript{237} Labor organizations have also suggested the enactment of “risk management” legislation that would prescribe the conditions under which medical surveillance could take place. These proposals include: (1) protecting confidential counseling, (2) maintaining environmental controls in the workplace, (3) promoting employee participation in medical surveillance and treatment programs, (4) providing community based programs to help past and currently exposed workers and their families, and (5) promoting educational and research programs to improve the accuracy of tests and their interpretation.\textsuperscript{238} There are also requests for government regulation, of public and private employers that implement genetic testing, in order to ensure the protection of hypersusceptible workers’ rights and a safe workplace for all employees.\textsuperscript{239} Finally, biotechnology companies are increasing their efforts to develop predictive tests. In fact, it is believed that the market for genetic screening tests, while growing slowly, will be significant by the end of the century.\textsuperscript{240}

While Congress has already been instrumental in bringing many of the important issues to the forefront, it will undoubtedly be again called upon to serve as a forum for debate and regulation. To address the problem, Congress will have several options available. First, it could refuse to take any action, thus allowing the courts and private parties to decide the issues amongst themselves. This seems a highly unlikely course for Congress to pursue, however, in light of its demonstrated interest and concern. Second, it could encourage research and development by appropriating funds; a somewhat unlikely course of action given its current zeal to reduce spending for domestic programs. Third, genetic screening in the workplace could simply be banned. However, considering the advancements that have been made and are expected, such action would seem precipitous, at best. However, if the costs of genetic testing were deemed to outweigh the benefits, Congress might at least consider such prohibitions. Finally, Congress could require establishment of regulations allowing research to continue but ensuring that the important rights and duties that exist in industrial relations are

\textsuperscript{237} Omenn, \textit{supra} note 56, at 373.

\textsuperscript{238} Samuels, \textit{supra} note 3, at 576.

\textsuperscript{239} Appleson, \textit{supra} note 245, at 1062-63.

\textsuperscript{240} Applications of Biotechnology, \textit{supra} note 45, at 30.
CONCLUSION

It is anticipated that genetic screening will play an important role in the area of employment testing. Genetic tests could have a significant impact on minimizing incidents of occupational disease, and thus affect employers' medical and legal expenses, decrease employer insurance costs and liabilities, and lessen the burden on taxpayers. However, the potential benefits cannot divert attention from such testing's serious legal ramifications. Genetic testing in the workplace could infringe upon the privacy and confidentiality rights of employers, discriminate against groups of "hypersusceptible" workers, and relieve employers of their duty to maintain a safe workplace. Notwithstanding these concerns, genetic tests have already been used absent any guidelines or concern for its legal and ethical implications.

The benefits and costs of genetic testing demonstrate the need for legal intervention, supervision and regulation. Because Congress has already begun the process, there is strong support, particularly by labor unions, for its continued presence in this new area of employment relations. Additionally, while those concerned over the future of genetic employment testing are searching for existing statutory protections, most have been found to be inadequate. Thus, it is expected that federal and state governments will need to enact new legislation, or amend current statutes, to provide the proper safeguards. Whatever authority ultimately asserts jurisdiction over genetic testing, the primary objective is to design highly predictive tests and administer them by means of a nondiscriminatory system that offers effective legal, social and economic protections to hypersusceptible workers and their families.

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241. For a general discussion of these options see OTA Report, supra note 2, at 167-72.