Genetic Screening Raises Questions For Employers and Insurers

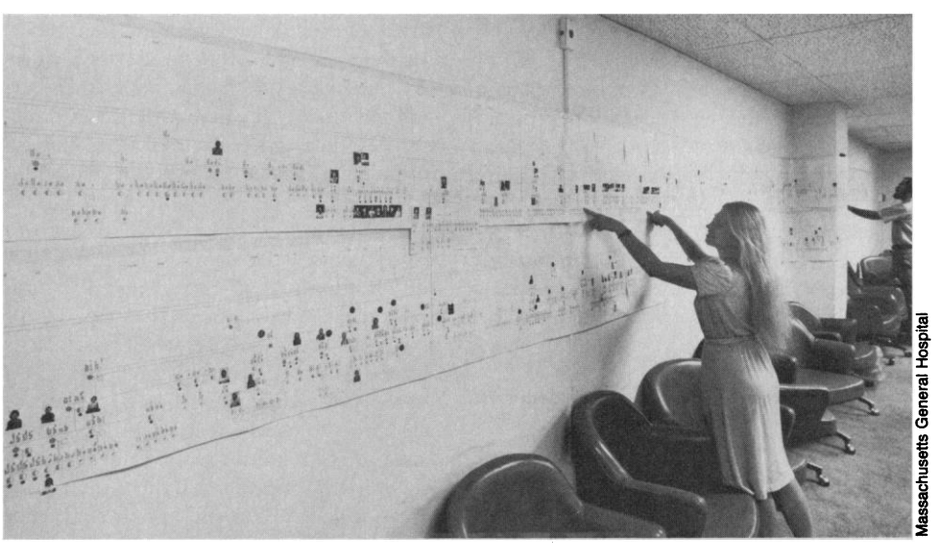
As genetic tests to detect susceptibility to diseases are developed, policy-makers will have to decide how these tests are to be used, and by whom

A few weeks ago, geneticist P. Michael Conneally of Indiana University Medical Center got a call from an adoption agency. The agency was trying to place a 2-month-old girl whose mother had Huntington's disease. But the prospective adoptive parents said they did not want the child if she was going to develop the disease. So the agency asked Conneally if he would test the baby with a new probe that can identify carriers of the Huntington's disease gene.

Conneally declined to do the testing, saying that he feels it is unethical to test someone so young. Because there is no way to prevent or treat Huntington's disease and because it usually strikes in adulthood, Conneally believes people should have an opportunity to decide for themselves whether they want to know if they have the gene. Some people who are at risk for developing this devastating, progressive, and irreversible neurological disorder say they would rather live their lives without knowing if they inherited the gene. The knowledge that they did inherit it would be too hard to bear. Everyone who inherits the gene sooner or later gets the disease. Yet Conneally predicts that the story of the adoption agency is only the beginning of the ethical difficulties that will arise as molecular probes for a number of diseases come into use.

The issues involve more than just the interests of children. They also include protecting the privacy of employees and yet protecting the interests of employers who may not want to hire or promote a person, for example, if they know he is likely to develop a debilitating genetic disease. They involve life insurance and health insurance companies. Should a person carrying a gene for Alzheimer's disease be covered by a company's health insurance? "To a large extent, these questions have not yet been resolved," says Mark Rothstein, a law professor at the University of Houston.

The questions came into sharp focus when a probe for the Huntington's disease gene was discovered 3 years ago (*Science*, 25 November 1983, p. 913), allowing molecular biologists to detect a small piece of DNA that is so close to the as yet unidentified Huntington's disease gene that it is inherited along with the gene. By tracing the inheritance of this nearby segment of DNA, researchers are planning to tell many people at risk for the disease whether they inherited the gene.



Massachusetts General Hospital

Huntington's family pedigree. *Nancy Wexler stands before the pedigree of a large Venezuelan family in which the inheritance of Huntington's disease can be traced through generations.*

Shortly after the discovery of the disease probe, molecular biologists found markers for other relatively rare classical genetic diseases—Duchenne muscular dystrophy, cystic fibrosis, and polycystic kidney disease. Now researchers are using the same techniques to look for genetic markers for more common diseases, including Alzheimer's disease, manic-depression, malignant melanoma, and breast cancer.

The promise of this research is great. For the first time, investigators may be able to get at the causes of these diseases by isolating the relevant genes and learning what the genes do. But the ethical problems arising from this research have no easy solutions. Already, as the search for more and more markers gets under way, a long-standing debate over the uses of genetic screening is beginning to change its context.

A decade ago, or even 5 years ago, the argument was over genetic screening of industrial workers. Researchers thought they could find tests to predict who is most susceptible to harm from toxic substances in the workplace. For example, it was suggested that workers with alpha-1-antitrypsin deficiency, which predisposes them to lung disease, might be excluded from jobs requiring exposure to asbestos or cotton dust.

Some hailed the development of such tests. Herbert Stokinger and John Steele, for example, wrote in the *Archives of Environmental Health*, "This is preventive toxicology in its highest form; no previous single development in toxicology has opened such prospects for the medical supervision of workers." Others criticized such screening as paternalistic and discriminatory. "The social costs of unemployment incurred by the discriminatory nature of this screening method far outweigh the nonexistent benefits to the health and well-being of the individual,"

said Kenneth B. Miller, medical director of the Workers' Institute for Safety and Health, testifying before Congress in 1982.

No one has any good figures on how much genetic screening is actually going on in the workplace. The companies themselves are not releasing any figures and data are hard to come by. "I've talked to any number of people who have tried to see how much genetic screening is taking place in industry, but no one has had any success," says Thomas Murray, an ethicist at the University of Texas in Galveston. Perhaps because it is unclear how much testing is actually going on, this particular debate has died down recently.

But now, with the likely development of tests to predict susceptiblity to diseases such as Alzheimer's, the same questions that were raised about genetic screening in the workplace are being asked again, and with more urgency than ever. This time the issues affect the entire population. The possiblity of genetic screening is touching all groups of workers. Vexing ethical questions will ultimately have to be answered. "It is one thing

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to screen out those who are more likely to get asbestosis or lead poisoning and it is quite another thing to screen out people because they are at high risk for a disease not related to occupational exposure," says Rothstein. "We are talking about conditions for which all workers are possibly at risk. It broadens the question and, I think, points out that the use of ever more encompassing medical tests raises serious issues." Murray agrees. "We've been climbing up a long hill and now we are going to start sliding down," he says.

The ethical questions are of increasing concern to researchers and administrators at Massachusetts General Hospital and at Johns Hopkins University Hospital, which, very shortly, will be the first institutions to offer screening for the Huntington's disease gene. In this respect, the Huntington's disease screening programs will be a test case. The ways that these program administrators deal with the seemingly intractable problems of genetic screens will likely set the tone for screening programs to come.

The first thing to be said about the Huntington's disease programs is that they are moving ahead very slowly. So far, what the researchers have is a marker for the gene, not the gene itself. This means that they can tell some people whether they inherited a piece of DNA that, in their family members who got the disease, seems to travel with the Huntington's disease gene. Those who inherit such a piece of DNA near the gene have a 95% chance of inheriting the gene. If they have the gene, they have a 100% chance of eventually developing the disease. But the molecular probe is useless for persons who have no living family members with the disease. It can provide no information. So, until molecular biologists close in on the gene itself, the test is not universally applicable.

In addition, the researchers still want to assure themselves that there is in fact only one Huntington's disease gene. All indications so far are that there is just one gene but, says James Gusella of Massachusetts General Hospital, who isolated the Huntington's disease marker, "It's a real leap of faith for us to use the marker for every small family until we know there is only one gene. The only way to find out if there is only one gene is to look at lots of large families." For this reason, Gusella will only send out his probe to investigators who want to use it for research purposes. He does not want it used yet for widespread screening. Nonetheless, he has already sent out his probe to 45 or 50 research labs.

But since MGH is planning to start screening members of some Huntington's disease families soon, some decision had to be made on how to proceed. Richard Myers of Boston University School of Medicine is the clinical coordinator for MGH's screening program and, as a population geneticist and genetics counsellor, he began by studying the attitudes of Huntington's disease families toward genetic screening. There are 250 families and 1250 persons from these families who are at risk for Huntington's disease living in New England and in contact with Myers. He estimates that these constitute about half of all the Huntington's disease families in the region.

Myers questioned children of Huntington's disease patients about whether the test for the gene should be made available and whether they would want to take the test. He restricted his sample to those who are at least 18 years old, so they are old enough to understand the implications of being tested for the gene, but younger than their parents were when they developed the disease, so they are still at high risk themselves. Of that population, 96% thought the test should be made available and 66% said they wanted to be tested. Forty-six percent thought children should be tested, a finding that surprised Myers because his group does not intend to test anyone under age 18, reasoning like Conneally that people should have the opportunity to decide for themselves whether they want to know if they have the gene.

Genetic Screening Issues Studied

Over the past decade, genetic screening of industrial workers has been debated in Congress and studied by the Office of Technology Assessment, among other. On 14 and 15 October 1981 and again on 6 October and 22 June 1982, the House Committee on Science and Technology held hearings on genetic screening in the workplace. No action was taken, but the legal and ethical issues were brought to public attention.

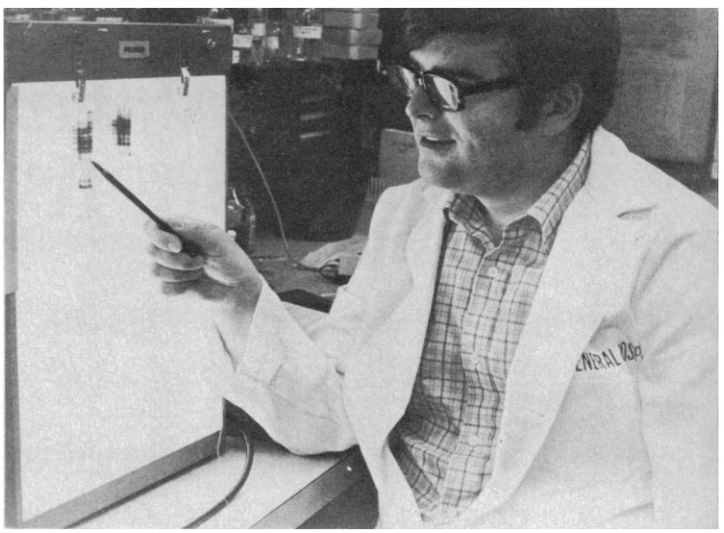
In April of 1983, the OTA published a report on "The Role of Genetic Testing in the Prevention of Occupational Disease." The report included results from a survey of U.S. companies that revealed that 18 companies were already doing some genetic screening of workers and 59 others thought they might begin such screening within 5 years. For some reason, the most frequently cited test was one for sickle cell trait, which identifies people who inherit one gene for sickle cell anemia. Persons with sickle cell trait become anemic only when their blood oxygen is greatly reduced. It is not at all clear that they are any more at risk in industry than workers without the sickle cell trait. The OTA concludes in its report that "The purpose of this [sickle cell trait] testing is not known."

The OTA data continue to be cited as the best available indicator of industry's interest in the tests. The OTA report also listed options for actions that Congress could take to regulate genetic testing in the workplace. So far, Congress seems to have taken the OTA's option, which is "maintain the status quo." ■ **G.K.**

The population surveyed by Myers also did not express any particular concern about the use of this test by employers and insurance companies. "Actually, we're more concerned about these issues than they are," Myers remarks. "The people from the Huntington's disease families are more concerned about finding out if they are gene carriers and are worried about how they will live with the results if they find out that they are carriers."

"We've spent a lot of time worrying about insurance, especially if the test is funded by third-party payments," Myers says. "When you have third-party payments, you lose a tremendous amount of control." Essentially, when an insurance company pays for a procedure, it has the right to look at the patient's medical records to learn the results of the test.

The group at Johns Hopkins has similar concerns. "Our plan is to treat the data from the testing as research data. All of our research data are kept confidential and are not part of our patients' clinical files," says Jason Brandt of Johns Hopkins University Medical School. "But it can't stay this way forever. Some policy will have to be made on what insurance companies will get access to." Some people at risk for Huntington's disease have already been advised to be well covered by insurance before they even enter a testing program.



Looking for the Huntington's disease gene. *James Guzella examines an x-ray showing a DNA sequence from a person at risk for Huntington's disease. His group has isolated a genetic probe that can predict, in many cases, whether a person has the Huntington's disease gene.*

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Nancy Wexler, who is president of the Hereditary Diseases Foundation and a faculty member at Columbia University's department of neurology and psychiatry, has asked health insurance companies whether they voluntarily will refrain from looking at the results of tests for the Huntington's disease gene. Some companies are sympathetic, yet, Wexler says, "according to our conversations with insurance companies, there is no way they can't see the results." The companies told Wexler that even if they agreed in principle not to look at the test results, they could inadvertently see them when they were reviewing patient files for other reasons.

Murray remarks that there is a difference between the use of results of genetic tests by health insurance and life insurance companies. Leroy Walters of the Kennedy Institute of Ethics at Georgetown University notes that denial of health insurance to those who are found to carry a gene for a disease such as Huntington's places these people in a very difficult situation. "To have insurance companies free to screen would seem to me to sentence people who couldn't do anything about their genes to facing potentially very large costs. The development of these new diagnostic techniques may bring to a point questions of what approach we as a society want to take to people born with a genetic disease."

Life insurance is a different matter. Life insurers have traditionally excluded people because their health is poor or because they are at high risk of becoming seriously ill. "We would need to think awfully hard about forbidding the use of these tests in life insurance," Murray says.

These are some of the same issues now being faced by people at high risk for AIDS (acquired immune deficiency syndrome). Although there is no national legislation, some states have passed laws forbidding insurance companies to require that members of high risk groups be tested for AIDS. Other states permit insurance companies to require the AIDS antibody test. "In a bizarre way, AIDS may be setting a precedent for genetic diseases," Wexler remarks.

Then there are the questions of employment. If an insurance company pays for a genetic test, is it free to give the test results to an employer? In New York, insurance companies that require AIDS tests cannot reveal the results to employers, according to Wexler, but, once again, there is no coherent national policy, even for AIDS. And it would be hard to argue that large corporations that self-insure could somehow keep test results from themselves.

"Employers now ask potential employees whether they have any condition that could impair their ability to do the job. Ultimately, employers might begin to ask about genetic predispositions," says Brandt. People who know they are genetically predisposed to devastating diseases would be in a position like that of epileptics today, Brandt points out. "For years, epileptics have had a terrible time getting jobs," he notes. "Some lie about their condition and in some sense, as long as they can perform their job, it is nobody's business that they have epilepsy."

Nonetheless, Brandt notes, it may at times endanger others when patients lie about their medical conditions. Wexler points out that a medical school might not want to train a physician as a neurosurgeon if he had the Huntington's disease gene, since the early stages of the disease are characterized by tremors and irrational behavior.

No one has any easy answers to these question of balancing individual rights against the rights of companies and society. Yet, says Brandt, the forthcoming genetic tests may force the issue. As tests for genetic diseases leave the protected realm of research projects, their use will be impossible to control. "Would it make any difference what the MGH says if Standard Oil of Ohio decides each employee should have genetic tests?" asks attorney Marvin Guthrie of the MGH. "Ultimately," Brandt predicts,"some decision will have to be made on a health policy level. We will have to decide what information is confidential."

How, when, and by whom these decisions will be made is, of course, the issue. But as genetic testing finally leaves the realm of the hypothetical, it is becoming clear that, somehow, these difficult issues must be faced, and soon. ■ GINA KOLATA

This is the first of a series of articles on the development of genetic tests to determine susceptibility to diseases.