

# Privacy and Civil Liberties Implications of Testing Employees in the Workplace

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### Introduction

The focus in this section shifts from the monitoring of work to the testing of employees. It looks at some of the tests that can be given by employers in hopes of predicting some aspects of an employee's future work quality. Can technology help employers predict how good an employee will be before the person is hired? Could there be some corporate equivalent of a carnival "weight and fate" machine, capable of succinct predictions: "This woman will try to embezzle money; don't trust her." "This man will have a heart attack at 45; don't invest in training him." "This one uses drugs; don't hire him." "This is a healthy, honest worker; hire her!"

Clearly, such a single tool for personnel selection does not exist, but a growing number of employers are relying on tests for employees and job applicants to try to predict behavior or personal characteristics that may affect their job performance. Limited evidence suggests that over the past few years workplace testing has been undergoing a revival that may surpass the heyday of psychological testing in the 1950s. The future trend may well be in the direction of more testing. If this is the case, then the controversy about worker rights, workplace privacy, and privacy of personnel records, may intensify.

Issues such as those explored in earlier chapters will continue to arise and become more prominent concerning what information is reasonable and necessary for an employer to have, who should have access to it, and how it ought to be used, and where the line should be drawn between information that is personal and private and that which is not.

As noted earlier, the past pattern has been for these new capabilities to come into use in a piecemeal fashion over time. Sometimes, however, they are put to use almost immediately, before adequate research can be conducted, as with polygraph testing, and before consideration can be given to the long-term consequences for society. When this happens, issues arise that have no established legal, ethical, or other useful framework for evaluation.

This appendix focuses on three technologies that are already in use today: polygraphs, drug tests

by urinalysis, and genetic screening. In addition, the appendix will review some research in the field of brain wave analysis that could give rise to new forms of worker testing in the next few years.

Some of the technology used for testing is not new. The polygraph, for example, has had limited use in law enforcement for 60 years. Now, however, its dominant use is in personnel screening; of 2 million polygraph tests given annually, about 98 percent are given by employers to job applicants and employees.<sup>1</sup> Medical screening for drug or alcohol use, formerly used primarily as a diagnostic tool in clinical settings, began to be used by the Department of Defense in the 1970s to identify returning military personnel with drug problems. Now, nearly all military personnel, millions of private employees, and a growing number of government employees find that their jobs depend on passing the drug test.

Genetic screening, an emerging technology for predicting a person's likelihood of developing diseases, is now used only in a few workplaces, usually to identify workers who maybe hypersusceptible to chemicals found in those workplaces. However, tests for many common diseases will be commercially available within the next 5 years, and employers may want to include them in pre-employment physicals.

Still in the research stage are tests based on brain waves. Currently under study is the possible use of brain wave analysis in monitoring concentration, detecting lies, and predicting certain illnesses. A computer-based system to detect drug use by measuring brain waves is already on the market.

Controversy about worker testing focuses on the accuracy and predictive value of the tests. Employers who test employees for drug use or honesty may believe that the tests work or at least that the fear of testing discourages the unwanted behavior. Washington Area Metropolitan Transit Authority, for example, noted a decrease in drug use and in accidents since beginning its drug test

<sup>1</sup>Harrison Donnelly, "Privacy in the Workplace," *Editorial Research Reports*, Mar. 21, 1986, p. 214, citing figures from the American Polygraph Association.

<sup>2</sup>Kenneth F. Englade, "The Business of the Polygraph," *Across the Board*, October 1982, pp. 20-27.

program. Officials of the Eckerd Drug Co. believe that requiring a test of all applicants and periodic tests of employees, is the best way to deter theft and “keep basically honest people basically honest.” But there have been no systematic studies of employee theft to support this claim.<sup>2</sup>

On the other hand, there are concerns about testing, and many argue that these gains, if they exist, are achieved at a heavy cost: undue intrusion into private lives of employees; creation of an atmosphere of fear and intimidation in the workplace; and false accusation and denial of job opportunities for many innocent people.

This chapter outlines some trends in worker testing—who uses it, what can be learned, and directions of research. The chapter also explores why worker testing is controversial, and looks at some of the ethical and legal questions raised by its use.

## Polygraph Testing

### Extent of Honesty Testing

Employee theft is a major business problem, resulting in losses estimated at \$5 billion to \$10 billion annually.<sup>3</sup> To counteract it, employers are increasingly using “honesty testing” on workers, either using the polygraph (“lie detector”) or paper-and-pencil honesty tests. One major object is to cut down on employee theft by screening out potential thieves before they are hired. In addition, a number of employers use polygraphs as part of internal investigations of theft and other wrongdoing, and some administer polygraph tests on a regular or random basis as a deterrent to wrongdoing.

A testing industry has grown in response to this demand, and perhaps has helped to fuel the demand. While some large firms have in-house polygraphers (one Florida drug firm has a staff of 40), most rely on detective or personnel security firms who provide polygraph services on a contract basis. There is no good estimate of the total number of such firms throughout the country, but a gauge of their growth can be found by looking at selected cities. In 1970, for example, there were only three such firms listed in the Atlanta yellow pages. By 1975 there were 20, and in 1985 there were 33.<sup>4</sup>

<sup>2</sup>Susan Gardner, “Wiretapping the Mind: A Call to Regulate Truth Verification in Employment,” *San Diego Law Review*, vol. 21 No. 2, March 1983, pp. 295-323.

<sup>3</sup>Kenneth F. Englade, “The Business of the Polygraph,” *Across the Board*, October 1982, pp. 20-27; Atlanta Yellow Pages, 1985-86.

At present 3,000 polygraphers belong to the American Polygraph Association, but it is estimated that there are 8,000 to 9,000 full-time polygraphers nationally. Some are employed by law enforcement agencies, some by detective agencies, and some are part of in-house security departments of large firms.<sup>5</sup>

Paper-and-pencil honesty testing has gained popularity in the past few years, partly in response to criticism of polygraphs and partly as a lower cost alternative. Compared to a cost of \$40 to \$50 per test for polygraph, paper-and-pencil tests can be administered and scored for \$8 to \$15 a piece.<sup>6</sup> At the present time, about a dozen firms nationwide are dominant producers of these tests, two of the largest being John E. Reid & Associates in Chicago and Stanton Corp. in Charlotte, NC. At least 2 million of these tests are given annually in preemployment screening.

Thirty-two States have legislation limiting the use of polygraphs in employment, including 12 with an outright ban on employers’ requiring or requesting that employees take a polygraph test. Nine States require licensing for the polygraph operator. Four States have legislation regarding the types of questions that maybe asked, prohibiting questions on such topics as sexual preference, religion, union affiliation, or politics. Twenty-one States have laws providing that polygraph tests be voluntary<sup>7</sup> (see table 22).

At the present time there seem to be few State laws dealing directly with paper-and-pencil honesty tests. One 1986 Massachusetts law outlaws honesty tests that amount to paper-and-pencil polygraph tests. There have been several attempts to pass polygraph legislation at the national level, including bills in the 99th Congress.<sup>8</sup>

Part of the reason for the growing use of honesty testing is the increasing difficulty and high cost of doing good background checks. A thorough check might cost as much as \$250, and many employers hesitate to give detailed information about former employees, partly due to fear of libel suits.<sup>9</sup>

<sup>5</sup>Joseph Buckley, III, President, John E. Reid & Associates, personal communication, Aug. 19, 1986.

<sup>6</sup>Susan Denzler, et al., “Can YOU Pass The Job Test,” *Newsweek*, May 5, 1986, pp. 46-53; Kenneth F. Englade, “The Business of the Polygraph,” *Across the Board*, October 1982, pp. 20-27.

<sup>7</sup>William E. Hartsfield, “Polygraphs,” *Labor Law Journal*, vol. 36, November 1985, pp. 817-834.

<sup>8</sup>Employee Polygraph Protection Act of 1985 (H.R. 1524) passed the House; Polygraph Protection Act of 1985 (S.1815) was reported out by the Committee on Labor and Human Resources but not acted on by the Senate.

<sup>9</sup>“The High Cost of Employee Theft,” *Dun Business Month*, October 1982.

**Table 22.—State Legislation on Polygraph Testing**

	Employer may not test or request test	Employer may not require test	Employee must be told test is voluntary	Certain personal questions prohibited	License for polygraphers
Alabama			X		
Alaska	X				
Arizona			X		
Arkansas			X		
California		X			
Colorado					
Connecticut	X				
Delaware		X			
District of Columbia	X				
Florida					X
Georgia					X
Hawaii		X			
Idaho		X			
Illinois				X	
Indiana					
Iowa		X			
Kansas					
Kentucky					X
Louisiana			X		
Maine	X				
Maryland		X			
Massachusetts	X				
Michigan	X				
Minnesota	X				
Mississippi					X
Missouri					
Montana		X			
Nebraska		X			
Nevada			X	X	
New Hampshire					
New Jersey	x				
New Mexico	X				
New York	X				
North Carolina					X
North Dakota					X
Ohio					
Oklahoma			X		
Oregon	X				
Pennsylvania		X			
Rhode Island	x				
South Carolina			X		X
South Dakota					
Tennessee			X		X
Texas			X		
Utah		X			
Vermont					X
Virginia <sup>a</sup>					
Washington		X			
West Virginia	X				
Wisconsin		X			
Wyoming					

applicant or employee must give written consent and be told all questions in advance.

SOURCE: Adapted from William E. Hartsfield, "Polygraphs," *Labor Law Journal*, vol. 38, November 1982, pp. 817-834

Technological Considerations

Polygraph technology has not changed substantially since it came into use in 1921.<sup>10</sup> The polygraph measures and records a number of physiological responses, including skin resistance, respiration, and blood pressure, while the subject answers a series of questions posed by an interviewer. The most commonly accepted theories of polygraph hold that the subject's guilt and nervousness will produce measurable physiological reactions when he or she is lying. These reactions must be interpreted by a trained polygraph interviewer.

Critics argue that the physiological change during lying is still not well understood, and even proponents of polygraph agree that a unique set of physiological reactions to lying has not been found. The reactions often attributed to lying can also be caused by anxiety, anger, or humiliation. Being required to take a polygraph test elicits precisely these feelings in many people.

In determining the accuracy and reliability of polygraph tests, it is important to consider whether the test is used for investigating a specific criminal incident or for screening. The questioning technique is also important, as discussed in a previous OTA report.<sup>11</sup> The polygraph appears to be most reliable when the interviewer is asking relevant questions about a specific event (e.g., "Did you take \$200 out of the cash drawer yesterday afternoon?") and comparing the reactions to a list of irrelevant control questions (e.g., "except for what you told me already, did you even steal anything before the age of 21?").<sup>12</sup> Subjects that react more strongly to relevant questions than control questions are believed to be deceptive. OTA's previous review of research on polygraph validity found that most research has focused on use in specific incidents. Methodological problems and differences made it difficult to draw overall conclusions about validity. In the studies reviewed, accuracy rates ranged from 0 to 100 percent, and innocent people were more likely to be assessed deceptive than vice versa. A summary of the findings of the OTA review is shown in table 23.

Table 23.—Accuracy of Polygraphs for Specific Incident Criminal Investigations<sup>a</sup>

Field studies	Range	Average
Six prior reviews . . . . .	64-980/.	
OTA review of 10 individual field studies:		
Correct guilty . . . . .	70.6-98.60/o	86.30/o
Correct innocent . . . . .	12.5 -94.1	76.0
False positive <sup>b</sup> . . . . .	0-75.0	19.1
False negative <sup>c</sup> . . . . .	0-29.4	10.2
OTA review of 14 individual analog studies:		
Correct guilty . . . . .	35.4-1 00.00/0	63.7%
Correct innocent . . . . .	32.0 -91.0	57.9
False positive . . . . .	2.0-50.7	14.1
False negative. . . . .	0-28.7	10.4

<sup>a</sup>Includes some investigations at WOFK site

<sup>b</sup>False positive—innocent persons found deceptive

<sup>c</sup>False negative—guilty persons found nondeceptive

SOURCE: Adapted from U.S. Congress, Office of Technology Assessment, *Scientific Validity of Polygraph Test/rig: A Research Review and Evaluation—A Technical Memorandum*, OTA TM-H-15 (Washington, DC: U.S. Government Printing Office, November 1983), p 97

Validity in screening situations, where questions are of a more general or hypothetical nature ("Have you ever taken something that didn't belong to you?") and responses cannot be easily compared to control questions, is more problematic. Some critics suggest that screening polygraph tests are strongly biased against honest people. In this view, the basically honest person, the one who feels guilty about small past wrongdoings or angry at a challenge to his or her integrity, is likely to do worse on a polygraph test than a person with less developed conscience.<sup>13</sup> The American Psychological Association, for its part, charges that polygraph tests produce "an unacceptable number of false positives."<sup>14</sup> The OTA report found no studies evaluating whether polygraph testing is valid in personnel security situations.<sup>15</sup> OTA is currently reviewing the Defense Department's polygraph test and research programs.<sup>16</sup>

The validity of pencil-and-paper honesty tests has also been called into question, and there appears to be a dearth of independent research on their validity. Some critics note that many "correct" test answers are based on values and definitions of honesty that may not be shared by all test takers.<sup>17</sup>

<sup>13</sup>David T. Lykken, "Detecting Deception in 1984," *American Behavioral Scientist*, March/April 1984, pp. 481-499.

<sup>14</sup>"Can You Pass the Job Test," *Newsweek*, May 5, 1986, pp. 46-53.

<sup>15</sup>For a description of the various polygraph techniques and an evaluation of scientific research on polygraphs, see, U.S. Congress, Office of Technology Assessment, *Scientific Validity of Polygraph Testing: A Research Review and Evaluation—A Technical Memorandum* OTA-TM-H-15 (Washington, DC: U.S. Government Printing Office, November 1983).

<sup>16</sup>OTA, *Review of the Defense Department's Polygraph Test and Research Programs* forthcoming (1987).

<sup>17</sup>Quoting Michael Merbaum in "Can You Pass the Job Test," *Newsweek*, May 6, 1986, p. 49.

<sup>10</sup>Kenneth F. Englade, "The Business of the Polygraph," *Across the Board*, October 1982, pp. 20-27.

<sup>11</sup>For a description of the various polygraph techniques and an evaluation of scientific research on polygraphs, see, U.S. Congress, Office of Technology Assessment, *Scientific Validity of Polygraph Testing: A Research Review and Evaluation—A Technical Memorandum* OTA-TM-H-15 (Washington, DC: U.S. Government Printing Office, November 1983).

<sup>12</sup>Ibid.

## Legal and Ethical Considerations

The privacy issue pits the employees' interest in being left alone, and in keeping certain information private, against the employers' interest in protecting their businesses and selecting employees by their standards.

However, questions addressed to workers in on-the-job polygraph tests sometimes go beyond job-related topics and probe into sensitive areas of personal life. Several critics have charged that the purpose of such questioning is not only to intimidate workers but to screen out minority group members or those who may show dissident tendencies or an inclination to join unions. At least four States have legislation prohibiting employers from asking questions about politics, religion, union affiliation, or sex life.<sup>18</sup>

## Drug Abuse Testing

### Rationale and Extent of Drug Testing

The problem of drug abuse on the job has gained increased attention in the past few years, but it is not a *new* problem. In fact, *overall* abuse of most drugs in the United States has held steady or declined since 1979.<sup>19</sup> Substance abuse is still a major problem, however, and the current public awareness and concern should help to reduce it further.

Alcohol abuse is estimated to cost the U.S. economy a total of \$89.5 billion per year in lost employment, illness, reduced productivity, and death and injury due to automobile accidents. Other types of drug abuse are estimated to cost society about \$46.9 billion per year.<sup>20</sup> The U.S. Chamber of Commerce estimates the direct costs of drug and alcohol use among workers costs employers \$60 billion per year in reduced productivity, increased medical claims, and absenteeism.<sup>21</sup> Workers who are dependent on alcohol or other drugs tend to have more accidents, which may increase their employers' insurance costs. Addicts are also more likely to steal money or property from the employer or from co-workers in order to support their habits.

In order to ensure a drug-free workplace, some employers have resorted to testing their workers for drug and alcohol use. About 25 percent of the

Fortune 500 firms now do some testing of employees, as compared with 10 percent in 1982.<sup>22</sup> As of mid-1986 nine Federal agencies had drug-testing programs in place, and at least eight were planning to begin testing in the immediate future.<sup>23</sup> An Executive Order of September 1986 established a "drug free workplace" as the policy of the U.S. Government.

A number of firms that have instituted drug-testing programs have reported dramatic decreases in on-the-job accidents and injuries—90 percent in the case of Georgia Power and 70 percent at the Southern Pacific Railway.<sup>24</sup> However, there are some who dispute that testing is responsible for these results; for example, in the case of Georgia Power, the accident rate began its decline before testing started.<sup>25</sup> In addition, the tests have also led to charges that they are invasive of privacy, that tests are sometimes inaccurate, and that testing programs are sometimes used to intimidate, discriminate against, or harass certain groups of workers.

Public concern with the substance-abuse problem, on the one hand, and concern about the advisability of on-the-job drug testing, on the other, reached a head in 1986. In March of that year, the President's Commission on Organized Crime recommended that Federal employees and contractors be subjected to "suitable" drug testing as an essential step in reducing the demand for drugs. Several months later, President Reagan held "voluntary" testing for the White House staff and suggested that government agencies and private industry follow suit. Executive Order 12564 of September 1986 directed the Office of Personnel Management to develop governmentwide guidelines on testing. Objections to widespread use of testing have been voiced in the press and in a report by subcommittees of the House Committee on Civil Service.<sup>26</sup>

<sup>22</sup>Mark A Rothstein, "ning Workers for Drugs: A Legal and Ethical Framework," *Employee Relations Law Journal*, winter 1985/1986, pp. 422-437.

<sup>23</sup>U. S. Congress, House Committee on Post Office and Civil Service, Subcommittee on Civil Service, "Drug Testing in the Federal Government," Staff Report, June 20, 1986, pp. 7-10.

<sup>24</sup>Stephen R. Dujack, "An Unhealthy Specimen: Drug Tests Are Unconstitutional and Sometimes Wrong," *Washington Post*, Aug. 17, 1986.

<sup>25</sup>Testimony of Ms. Leslie Price before the Subcommittee on Human Resources, House Committee on Post Office and Civil Service, Sept. 16, 1986.

<sup>26</sup>U.S. Congress, House Committee on Post Office and Civil Service, Subcommittee on Human Resources, "Drug Testing Federal Employees," Hearings, Mar. 18, 1986, Serial No. 99-46; Subcommittee on Civil Service, "Drug Testing in the Federal Government," Staff Report, June 20, 1986.

<sup>18</sup>William E. Hartsfield, "Polygraphs," *Labor Law Journal*, vol. 36, November 1985, pp. 817-834.

<sup>19</sup>Research Triangle Institute, *Economic Costs to Society of Alcohol and Drug Abuse and Mental Illness*, Research Triangle Park, 1984. The continuations of this trend is supported by statistics of the National Institute of Drug Abuse.

<sup>20</sup>Ibid.

<sup>21</sup>Susan Denzler, et al., "Can you Pass the Job Test?" *Newsweek*, May 5, 1986, pp. 46-53.

Drug testing is rapidly growing into a multi-million-dollar industry. Total sales of urine test kits in 1986 were estimated at \$115 million worldwide and \$80 million in the United States, and some expect sales to double by 1990. Of the \$73 million total test kit sales in 1985, only about 12 million dollars' worth were purchased by hospital labs (where primary use is to monitor levels of medication prescribed by physicians). About 20 million dollars' worth of test kits were purchased by the Department of Defense, \$10 million by employers for onsite screening, and \$22 million by commercial laboratories, which primarily do testing for employers.<sup>27</sup> In response to the booming market, many firms that have heretofore specialized in diagnostic tests for hospitals are hurrying to introduce kits for identifying drug abusers in the workplace.

In addition to manufacturing the reagents and test kits, several of the largest test manufacturers are also in the consulting business, helping their clients set up drug test programs and cope with the personnel and legal problems associated with drug testing. For example, Diagnostic Dimensions—a joint venture of test manufacturer Hoffman-LaRoche and Development Dimensions International, a management training company—helps employers to implement testing programs and to fight legal challenges by employees. Similar service is offered by Psychiatric Diagnostic Laboratories of America.<sup>28</sup>

### Technological Considerations

Tests for use of drugs such as marijuana, cocaine, heroin, or amphetamines have relied on chemical analysis of urine or blood specimens. Typically, in the employment context, urinalysis is used. This requires taking the sample from an employee under conditions that satisfy "chain of custody" requirements (i.e., treating each urine specimen as though the results may be introduced in court). Careful security and labeling procedures must be maintained in sending the specimen to a laboratory, performing chemical tests on the specimen (and often a second "corroborating" test), and then returning the test results to the employer.

Among the more widely used tests are EMIT (Enzyme Multiplied Immunoassay Technique), manufactured by the Syva Co., and the ABUSCREEN system, manufactured by LaRoche Diagnostics,

Inc. Both these tests are based on immunoassay techniques, are fairly low in cost (\$13 to \$15 per test), and are generally used for mass screening of large batches of samples. Tests using the gas chromatography (GC) or gas chromatography/mass spectrometry (GC/MS) techniques are more accurate, require more highly trained technicians, cost more (\$60 to \$80 per sample), and are usually used to confirm any positive results (finding the evidence of drug use) from a screening test.

One major problem with these tests is that they do not measure the current level of intoxication, but rather the levels of chemical byproducts created as the body metabolizes the drug. Thus, the tests can only show that some drug has been used but do not show that a person is currently impaired.

Other problems relate to the accuracy of the tests themselves and the ability of commercial labs to provide accurate results on a regular basis. Although manufacturers and proponents of screening tests claim accuracy rates of 95 to 99 percent, other researchers have found accuracy to be much lower in typical commercial laboratories. Inaccurate results can arise from poor laboratory procedure or from mislabeling or mishandling of specimens en route to the lab. In 1984 the Air Force had to reinstate 6,500 airmen dismissed for drug use because their tests were invalidated by poor lab procedures and improper "chain of custody" procedures for handling specimens.

Proficiency tests of laboratories have revealed that many have high error rates.<sup>29</sup> According to some experts, competition for drug testing contracts has led many to cut prices and overwork their technicians and equipment, thus pushing error rates even higher.<sup>30</sup> There are no mechanisms to put incompetent labs out of business. Even the few States with regulations and proficiency standards do not have manpower to enforce their regulations. Federal regulations affect only labs that test specimens sent across State lines, and these regulations are hard to enforce.<sup>31</sup>

A number of other substances, including prescription and over-the-counter drugs, herbal teas, and culinary poppy seeds can be mistaken for drugs in some of the tests. A controversial set of studies has found that tests can mistake melanin (the substance responsible for skin color as well as other

<sup>27</sup> Calvin Sims, "Boom in Drug Tests Expected," *New York Times*, Sept. 8, 1986, pp. D1, D21.

<sup>28</sup> Fern Schumer Chapman, "The Rukus Over Medical Testing," *Fortune*, Aug. 19, 1985.

<sup>29</sup> See for example Hugh J. Hansen, Samuel P. Candill, and D. Joe Bogg, "Crisis in Drug Testing," *JAMA*, Apr. 26, 1985.

<sup>30</sup> Lawrence K. Altman, "Drug Tests Gain Precision But Can Be Inaccurate," *New York Times*, Sept. 16, 1986.

<sup>31</sup> Walt Bogdanich, "False Negative: Medical Labs, Trusted as Largely Error Free, Are Far From Infallible," *Wall Street Journal*.

functions of the body) for a byproduct of THC (the active ingredient of marijuana), thus producing higher false positive rates among black people.<sup>32</sup> There is also controversy over the cutoff points to be used for tests. While some experts suggest that tests for marijuana should be considered positive only if they have a concentration of over 50 nanograms per milliliter (ng/ml) a more typically used cutoff point is 20 ng/ml and some organizations use even lower cutoff points. Inaccuracies in all tests are much more likely at low concentrations.<sup>33</sup> Even the use of confirmatory tests has not stilled controversy about accuracy, especially since some commercial labs rely on lower cost tests for confirmation as well as screening.<sup>34</sup>

### Ethical and Legal Issues

**Privacy.** -There are several reasons why employees have objected to drug testing on privacy grounds. For one thing, it can reveal details of personal life outside of work. Current methods of drug screening reveal recent use of a drug, not current impairment; people who use drugs outside of work test positive, even though they might be sober and fit for duty during work hours. Is after-hours use of legal or illegal drugs an employer's concern?

In addition, producing a urine sample before witnesses violates most people's reasonable expectation of privacy for bodily functions. Both these objections apply to deficiencies of urinalysis, not to the concept of drug testing in general.

**Methods and Conditions of Testing.**-The first question is whether testing is the appropriate response to perceived drug use in workplaces. In many populations a testing program may cast too broad a net, subjecting many workers to testing in order to identify a very few drug users. The next question is who should be tested? Should all employees be tested or only those with jobs that pose special problems of safety or security if there is drug abuse? If only some employees are tested, does this create equal protection problems if those tested are disproportionately racial minorities or blue collar workers? What drugs should be tested for? Is it an employer's job to identify only users of illegal drugs? Many legal drugs are also abused.

<sup>32</sup>Jarnes Woodford, Ph. D., personal communication Aug. 25, 1986, based on studies conducted at the U.S. Army Forensic Lab, Wiesbaden, Germany. See also "The Melanin Defense, Debated by Woodford and McBay," *Substance Abuse Report*, Dec. 1, 1986, p. 3.

<sup>33</sup>"The Melanin Defense, Debated by Woodford and McBay," *Substance Abuse Report*, Dec. 1, 1986, p. 3.

<sup>34</sup>Table on "Modified Drug Screen" from conference material produced by SmithKline Clinical Laboratory, Memphis, TN.

On the other hand, some employees that are using a legal drug for legitimate medical reasons maybe impaired using it.

Is there a socially acceptable need for an employer to mandate periodic or random substance-abuse testing for the workforce, or should testing be limited to specific instances where an employee's conduct raises "reasonable suspicion" of substance abuse? Random or periodic testing seems contrary to the principle that people are innocent until proven guilty; such a testing scheme requires everyone to prove his or her innocence on a regular basis. In a number of cases to date, the courts have required that employees be tested only when there is reasonable suspicion of drug use. Random testing of Iowa prison guards and compulsory testing of New York City teachers applying for tenure were struck down by the courts.<sup>35</sup> In both cases, however, the employers were government entities, whose employees are protected by the Fourth Amendment to the Constitution against "unreasonable search by their employer." A number of private employers make use of random testing, and some of their programs are also being challenged.

Another important point is what drugs should be covered by the tests. A survey of drug testing programs in the Federal Government found wide variation in the types of drugs being screened.<sup>36</sup> While many employers focus on illegal substances like cocaine and marijuana, a number of legal substances are also abused. However, testing for these drugs will also reveal their use by individuals who use them legitimately, thus raising another privacy issue.

One interesting point is the lack of interest of many employers at the present time in testing for alcohol abuse in the workplace, despite all the evidence that alcohol is responsible for far more workplace accidents and absenteeism than the illegal drugs. (Alcohol intoxication is usually tested by breath or blood tests, rather than urinalysis.)

<sup>35</sup>For example, cases of New York City teachers, New Jersey government workers, Jesus Rangel, "Government Bars Drug Testing of Teachers," *New York Times*, Aug. 12, 1986, p. B1; Alfonso A. Narvaex, "U.S. Judge Blocks Urine Drug Tests," *New York Times*, Sept. 19, 1986, p. A1.

<sup>36</sup>See U.S. Congress, House Committee on Post Office and Civil Service, Subcommittee on Civil Service, "Drug Testing in the Federal Government," Staff Report, June 20, 1986, pp. 7-10; also Lawrence Miike, "Accuracy and Reliability of Urine Drug Tests," in House Committee on Post Office and Civil Service, Subcommittee on Human Resources, Hearings of Sept. 16, 1986.

## Use of Test Results

Another question germane to any testing program is what to do with the drug abusers when they are discovered. In the case of pre-employment screening, the answer of most firms is not to hire them, although a few do tell the applicants why they have been turned down and invite them to reapply once they are drug free.

In some firms, a current employee who tests "positive" might be referred to an employee assistance program (EAP) for rehabilitation. Some observers have expressed concern that existing EAPs, which heretofore have assisted employees who voluntarily sought help for drug problems, will be severely weakened by an influx of clients who have been "sentenced" to rehabilitation after a positive urine test. An alternative followed by many clients is the dismissal or discipline of drug users. Between 1971 and 1980 the Armed Forces tended to rehabilitate returning Vietnam veterans whose drug problems were detected through urinalysis. In recent years, however, the emphasis has turned to discipline and dismissal. The current guidelines issued by the Office of Personnel Management for Federal agency drug programs directs each agency plan to include an EAP, but also lists disciplinary actions including reprimands, suspension, and dismissal. According to the guidelines, dismissal from Federal service would be mandatory upon a second confirmed finding.<sup>37</sup>

A forthcoming OTA technical memorandum will look in greater detail at some of the technical, administrative, and legal problems involved in drug testing."

## Genetic Screening

### Extent and Rationale for Genetic Testing

Genetic screening is not new, though in many ways it is still an emerging technology. Tests for diagnosing or predicting some genetically based diseases have been available for some time. For example, screening tests for sickle cell trait, a condition especially common among those of African ancestry, were available in the early 1970s. Blood tests of newborns to screen for phenylketonuria (PKU), a genetic ailment that causes mental retar-

ation and death if not treated early, is called for in statutes or regulations of 46 States and is customary in the others.<sup>39</sup>

Genetic screening in the workplace is not yet a widespread practice. In its 1983 report on genetic screening in the workplace, OTA found that few large U.S. firms were using genetic screening in their personnel selection practices.<sup>40</sup> Out of 366 respondents, only 8 said they were currently doing any type of genetic test; 17 had done so in the past; but 59 had plans to do so in the future. While these results indicate that genetic screening in the workplace was not widespread at the time, many researchers in the field assert that it is difficult to get good information about firms that do genetic studies. Such firms may not answer questionnaires or talk about their policies because of the controversies, including charges of discrimination, that have arisen when other firms have publicly discussed screening programs.<sup>41</sup>

Despite the bad publicity that might attach itself to the concept of genetic testing, screening might offer some advantages to employers. It is known that human beings have varying susceptibilities to illness, including illnesses related to exposure to toxic substances at work. Not everyone who mines coal gets black lung disease, for example, just as not everyone who smokes cigarettes gets cancer. If firms could determine that certain people are especially susceptible to a toxin found in the workplace they could decline to hire them or otherwise avoid assigning them to work near the hazardous substance. Thus the employer helps the employee stay healthy while also avoiding the possible costs of a future illness that the employer might have to bear. Employers often pay part or all of their employees health or life insurance costs. Group insurance rates depend on the health experience of the group. Thus it would be to an employer's advantage to identify and eliminate unhealthy or potentially unhealthy employees in order to keep rates low.

<sup>37</sup>Office of Personnel Management, FPM Letter 792, "Establishing a Drug-Free Federal Workplace," Dec. 27, 1986.

<sup>38</sup>Office of Technology Assessment, *Urine Drug Testing*, Technical Memorandum (forthcoming 1987).

<sup>39</sup>American Bar Foundation, *State Laws and Regulations Governing Newborn Screening*, compiled by Lori B. Andrews, Chicago, 1985.

<sup>40</sup>U.S. Congress, Office of Technology Assessment, *The Role of Genetic Testing in the Prevention of occupational Disease*, OTA-BA-194 (Washington, DC: U.S. Government Printing Office, April 1983).

<sup>41</sup>Interview with Elaine Draper, Ph. D., School of Public Health, University of California, Berkeley, September 1986. See also Thomas H. Murray, "The Social Context of Workplace Screening," *The Hastings Center Report*, October 1984.

## Technological Considerations

Although genetic screening might appear to be beneficial to both the employer and the employee, it is controversial for a number of reasons. The validity and accuracy of most screening tests has not yet been firmly established. Even if a person is determined to have a particular genetic trait, he or she may not necessarily develop an illness; and others may develop a disease even though tests do not show them to have the genetic markers usually associated with a trait. Because genetic susceptibilities are unequally distributed among different races or ethnic groups, screening programs can have the flavor of illegal discrimination. In addition, individuals may prefer to assume their own risks in deciding what kind of work to do. Finally, some argue that the way to ensure workplace health is not to exclude hypersusceptible workers, but to design safe ways to handle toxins so that no workers are exposed to them. Thus, genetic screening may offer employers a way to evade responsibility for designing safe workplaces.

New techniques based on recombinant DNA research show promise of allowing scientists to develop better tests, including tests to detect some people at risk for common ailments such as diabetes, heart disease, and manic-depressive illness. Further research is likely to gradually develop tests that are more sensitive, more specific, and more reliable. A forthcoming OTA background paper will look more closely at the technical feasibility and commercial potential of new genetic tests.<sup>42</sup>

The possibility of tests for common diseases only intensifies the controversy about the possible uses of screening in the workplace. If employers could justify these tests as a valid form of pre-employment testing, they could be applied to a larger population of workers, not just those who work with hazardous materials. Possible advantages to employers could be fewer workers' compensation claims, lower insurance premiums, and perhaps, less lost time and wages due to illness.

A related question is how insurance companies will use the results of genetic testing. If really good tests for susceptibility to common ailments become available, their results might be used to raise the price of coverage or to deny coverage to certain groups.

## Legal and Ethical Concerns

A number of experts in the area have worried that extensive use of genetic screening in the work-

place could create different classes of workers based on genetic fitness or unfitness. One researcher noted that people whose tests show a likelihood of developing a disabling disease might be denied employment or training opportunities in certain professions. Airlines, for example, might prefer to hire pilots who are likely to have a long career, in order to justify the long training; no one wants pilots who are likely to have early heart attacks." The opposite type of discrimination might develop in jobs where training is cheap but pensions are expensive; short-lived people might be preferred for routine jobs.

Even putting aside the question of employment discrimination, a number of other privacy issues arise, particularly regarding the question of access to test results. While tests may be performed by a company's medical personnel, the records may circulate within firms to nonmedical personnel who make management decisions about the worker. A confidential physician-patient relationship usually does not exist in the workplace. This aspect of privacy, which would apply to any kind of medical test, is even more sensitive in this case because decisions may be made on the basis of the future possibility of disease, rather than actual illness. There is also the possibility of stigmatization and diminution of future job prospects because test performed by one employer could become part of the public record, perhaps through workers compensation records or employment clearinghouses. Medical records are sometimes subject to inspection by third parties as well—unions, government agencies, insurance companies, epidemiologists doing research, etc.

That these concerns actually could become a problem seems to be indicated by the current response of employers and insurers to acquired immunodeficiency syndrome (AIDS). The situation with AIDS is not exactly analogous because AIDS is not a genetic disease, and is also a very frightening and fatal ailment that is widely misunderstood. Employers have dismissed workers who showed symptoms such as sudden weight loss, which might be indicative of AIDS. They have also required employees and job applicants to take the currently available AIDS test. In a sense this is a predictive test because it only reveals the presence of an antibody, not the disease itself. Some people have lost their jobs because they tested positive. In addition, insurance companies have used

<sup>42</sup>U.S. Congress, Office of Technology Assessment, *Applications of Biotechnology to Test for Human Genetic Disorders*, forthcoming (1987).

<sup>43</sup>Harold M Schmeck, Jr., "Advances in Genetic Forecasts Increase Concerns," *New York Times*, Aug. 19, 1986, quoting Dr. Kenneth Paigen, University of California, Berkeley.

these tests to screen applicants for insurance coverage, and some have withdrawn from the market in areas where such screening is forbidden by law.

### Brain Wave Research

#### State of the Technology

Brain activity that underlies psychological processes can be recorded from the surface of the head and body in the form of weak electrical and magnetic signals, or “brain waves” as they will be called in this section. Many of these signals are not well understood by scientists despite decades of research. However, some are known to reflect cognitive (memory, language, learning) or sensory (vision, hearing, touch) processes stimulated by external stimuli. These signals, often called “event-related brain potentials” or ERPs, are extremely weak (typically on the order of a few microvolt, or millionths of a volt), but they can be monitored through sensors attached along particular regions of the scalp.” Magnetic recordings of brain activity are also possible by using a specialized magnetic detector termed SQUID (superconducting quantum interference device).

“Cognitive processes are identifiable through ERPs that occur between about 100 and 700 thousandths of a second or more following each stimulus; sensory processes are reflected in ERPs that occur within 100 thousandths of a second following the stimulus.

Research on electrical and magnetic recordings of human brain activity is being conducted in a number of government, government-supported, and academic laboratories. Government funding for research is provided by a variety of Federal agencies, including the National Institutes of Health, the National Science Foundation, and the Department of Defense.

Five areas of focus characterize much of the current research:

1. assessment of neurological function and neurological disorders;
2. assessment of mental disorders;
3. analysis of normal cognitive processes, including perception, memory, language, and decisionmaking;
4. analysis of cognitive disorders; and
5. human factors applications.

Table 24 shows some of the recent research in this area.

The potential benefits to society appear to be in several main areas—as a tool for medical diagnostics and cures, for developing optimal learning and educational techniques, and for enhancing man-machine interfaces. This technology is already in use as an aid to diagnosing brain tumors, multiple sclerosis, dyslexia, epilepsy, and strokes. It has also been used to test for mental retardation, coma, and autism.<sup>45</sup>

<sup>45</sup>Carol Truxal, “Watching the Brain at Work,” *IEEE Spectrum*, Marc, 1983, pp. 52-57.

**Table 24.—Examples of Research on Brain Waves**

Research center	Areas of investigation
National Institutes of Mental Health	Predict risk of psychiatric disorders; tendency toward behavioral problems (substance abuse, antisocial personalities).
University of California La Jolla, CA (ONR, NIMH, NSF funds)	Analysis of sensory and cognitive processes diagnosis, e.g., deafness. Man-machine interface: Analysis of mental workload, e.g., attention and concentration
Veterans Administration Medical Center Westhaven, CT	Detect neurological disorders, multiple sclerosis and make more precise neurological diagnoses. Understanding brain structures and processes responsible for surface electrical activity.
University of Illinois Champaign-Urbana, IL	Cognitive processes, e.g., memory, learning, decision-making. Man-machine interface
Harvard Medical School Boston, MA	Brain electrical activity mapping for detecting mental disorders, e.g., dyslexia, Alzheimer’s disease
Advanced Research and Development, Inc. Columbia, MD {NASA funds)	Man-machine interfaces, e.g., aircraft pilots
Air Force Aerospace Medical Research Lab Dayton, OH	Man-machine interfaces; analysis of mental workload
University of Florida at Gainesville (CIA funds)	Lie detector test (ended 1986)

SOURCE Office of Technology Assessment, 1987

## Workplace Testing Applications

The examples above of brain wave research at least raise the possibility that brain wave analysis could lead to usable technologies with possible applications in the workplace. If developed as practical systems, they could be used to gather extensive information about a subject's psychological state, genetic propensities, or honesty; they might be useful in new means of measuring or pacing work.

Some predictive tests that might be of interest in the area of work monitoring or worker testing could be derived from the above avenues of research. These could include the following:

- predicting whether a person is at risk of certain diseases, such as Alzheimer's disease or alcoholism;
- determining whether a person is concentrating and predicting the speed of mental response to stimuli;
- determining recognition of persons, places, and objects;
- testing for knowledge of a specific subject;
- detecting lies.

Brain waves are also being explored as a possible means of improving man-machine interfaces. Future systems are envisioned that would monitor the operator's ability to cope with information flows and to make decisions. On the basis of the information about his performance, the system could either adjust the rate of information flow to the operator or automatically take on some of the operator's tasks to optimize his performance. Some future applications could include pilots, air traffic controllers, and other computer-based work.

If practical brain wave systems could be developed, the implications for privacy would be tremendous. In the case of workload measurement, for example, the distinction between monitoring the work and monitoring the worker completely disappears. In the case of something like an improved lie detector, such technology might actually give the ability to "read the mind," removing all possibility of a person's keeping information private.

Whether practical systems can be developed, however, is another question. There are serious limitations on our understanding of brain waves, and at least one researcher worries about the "polygraphization" of brain wave research.<sup>46</sup> By this he

<sup>46</sup>Emanuel Donchin, *Psychophysiological Monitoring: Possibilities and Prospects*, contractor report prepared for OTA, September 1986. Also, Dr. Charles Wood, Department of Neuropsychology, VA Medical Center, Westhaven, CT, and Dr. Steve Hillyard, Department of Neuroscience, University of California at La Jolla, concurred with this view in telephone interviews with OTA staff, September 1986.

refers to commercial applications of scientific discoveries before the underlying principles are thoroughly understood:

Polygraphization occurs when the commercial development is done without an anchor in the scientific community. Actions are taken to assure the profitability of the product, and caution and control become less critical. . . I emphasize that all this is done well within the law. But, it remains the case that it is quite possible to have what appears to be an impressive instrument that is essentially worthless.<sup>47</sup>

The danger of using such a device in the workplace, of course, is that decisions affecting people's lives will be made based on flawed technology or flawed principles. Due to the complexity of the nervous system, it is likely that only very general links will be drawn between physiological processes like brain waves, and psychological ones like lying or concentration. Even these tests may only be valid in a very structured environment, such as in a controlled laboratory setting. A workplace setting would introduce too many uncontrollable variables.

Other researchers, however, are more optimistic about the possibility of developing practical systems. Researchers at Westinghouse Research & Development Center have, for a number of years, been exploring the use of brain waves, in particular a wave called the P300, to determine an individual's level of attention and cognitive processing. A Westinghouse researcher has predicted that within the next 10 years, Westinghouse could market "a complete system capable of monitoring the mental processing effort of employees as they worked."<sup>48</sup>

In a slightly different direction, a system for using brain wave analysis for determining whether a person is intoxicated on alcohol or drugs is already on the market. Called the Veritas 100 Analyzer, it is marketed by National Patent Analytical Systems. The Analyzer is small, about the size of a personal computer, and is designed to be used at the workplace. A disposable headband is placed on the subject's head, and the analyzer examines the corneal-retinal potential transmitted along the vestibular nerve. According to the manufacturer, the system recognizes the characteristic brain waves that this nerve group produces when the subject is under the influence of particular substances. The signal is unique because each drug produces a specific "fingerprint," a waveform known as a "drug-evoked potential," according to

<sup>47</sup>Emanuel Donchin, *Psychophysiological Monitoring: Possibilities and Prospects*, contractor report prepared for OTA, September 1986.

<sup>48</sup>Michael Schrage, "Technology Could Let Bosses Read Minds," *Washington Post*, June 3, 1984, p. C1.

the inventor.” Results of the test are available within a few minutes. The analyzer shows a report on the screen and also prints out a report and stores a record of the test.

The manufacturer claims accuracy in the 99 percent range. The device is currently undergoing independent testing, but the results were not available to OTA at this writing. The Veritas Analyzer has already been used by several police departments and in some workplaces.

### Conclusion

While somewhat different issues are raised by each type of employee testing discussed above, there are some common themes. In general, test-

ing pits the interests of the employer in reducing costs, increasing workplace safety, limiting liability and exercising managerial control against employee interests in maintaining personal dignity and privacy. Some of the legal questions involved in testing are discussed in chapter 4 of this report. In addition, listed below are some OTA analyses dealing in detail with the topics of polygraph testing, drug screening, genetic screening, and with the constitutional issues involved in workplace testing:

- *Review of Defense Department Polygraph Test and Research Programs-Health Staff Paper* (March 1987);
- *Tests for Human Genetic Disorders* (forthcoming, 1988);
- *Urine Drug Tests—Health Testimony* (June 10, 1987);
- *Science, Technology, and the Constitution* (forthcoming, 1988).

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<sup>9</sup>S. Thomas Westerman, et al., “Qualitative Measurement of Drugs,” *Laryngoscope*, vol. 94, No. 2, February 1984.