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Embracing personal and community empowerment

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Embracing personal and community empowerment: genetic information policy making in Israel

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Introduction

Thirty years ago, researchers from an American group collected blood and DNA samples from Indian Amazon tribes and sold it to scientists around the world for \$85 a sample. In 1996, another team came to collect more blood samples in exchange to medicine. Recently, Karitiana and other Amazon tribes have decided to demand compensation and to stop the distribution of their blood and DNA by American private companies (Rohter, 2007). Similarly, during the 1990s, researchers from the U.S. National Institutes of Health indicated that Ashkenazi Jews had an extremely strong history of breast cancer. This was the first genetic mutation positively associated with cancer risk in a particular ethnic group. Some leaders within Ashkenazi Jewish community have expressed concerns that these research findings linking a racial or ethnic population to a disease or disorder might stigmatize the group involved or the Jewish community (Hodge and Harris, 2001).

The participation of individuals and social or ethnic groups in genetic research raises some concerns, such as discrimination, stigmatization, and breaches of privacy. Thus, this article offers to view regulatory guidelines that apply specifically to genetic testing and data handling including privacy and confidentiality of genetic test results, research profits and benefits sharing, and avoidance of the misuse of genetic technologies and information in employment or insurance as an appropriate response to specific public concerns.

This paper suggests that the key strategic concept guiding such regulations is empowerment (Zimmerman and Rappaport, 1988). Empowerment aims at the improvement of individual and collective skills to regain control over living and working conditions and their impact on well-being (Henderson and Thomas, 1987). In public policy studies, empowerment refers to a constant process of enabling individuals and groups to enhance their individual and collective skills and to take part in collective action (Rocheffort and Cobb, 1994). It is suggested that in the case of genetic information, empowerment is manifest in the dilemma between one's interest in protecting sensitive personal information and the general will to obtain this information, for instance, in order to undertake research for the benefit of the society as a whole (Rocheffort and Cobb, 1994; Gottweis, 2005).

Indeed, regulation of the use of genetic information needs to assess the basic questions concerning the relations between state and society. The questions here became more complicated during recent decades due to the shifting role of the state. These changes are often explained by the growing influence of international actors, private actors, and civil society actors (Coleman and Skogstad, 1990; Atkinson and Coleman, 1989).

The present paper aims to analyze how the state's relationship with non-governmental actors influences individual and community empowerment in the field of genetic information regulation. This paper suggests that legal protection for individuals and communities should follow the social nature of genetic information. Moreover, growing

empowerment can result in a policy network exemplified by the state as a dominant actor whereby the state consciously tries to exclude organized interests from policy-making. As such, it should be emphasized that states should enact laws to protect individuals and ethnic communities from genetic discrimination instead of self-imposed regulation in the insurance market.

This article is divided into two sections. The first section briefly outlines the nature and implications of genetic information, the second will examine the relationship between state and non-governmental actors in designing genetic information regulation in Israel.

Genetic Information vs. Medical Information

Mapping and identifying human genes enables obtaining information concerning each person. Genetic information has been seen to be different from other kinds of information concerning our health and lives in general, in that genetic information has a probabilistic character in which health risks can be accurately predicted by genetic test (Beskow et al., 2001; Issa, 2002). Moreover, medical information is considered to be uniquely personal while genetic information is usually – by its very nature – a social (family) concern. Genetic information can reveal information not only on a particular, unique individual, but about those who are genetically related to him or her, such as members of a particular family (parents, children, siblings), or an even larger ethnic or racial population. In the context of political and legal decision-making, this paper will briefly outline three main aspects which guide the ethical grounds behind the legislation calling for special regulation where genetic information is concerned: genetic privacy protection, sharing in research profits and advantages, and avoiding misuse of genetic information by private sectors.

Genetic Information and Privacy Protection

The use of genetic information invokes policy debate over the ethical grounds behind the special legislation for genetic information. Some believe that parts of existing medical information privacy laws could be interpreted to include genetic information privacy (Lemmens, 1999). They claim that the same argumentation that is relevant to the use of genetic information is, in many ways, relevant also to other kinds of health information which reveals illness or probabilities of particular health conditions for people. Others claim that the use of genetic information challenges a number of existing legal tools such as intellectual property, privacy, and informed consent in private-funding research (Wolf, 1995). As such, they suggest that as part of the disclosure for consent, individuals must be informed of possible future uses of the specimen, whether identifiers will be retained, and, if so, whether the individual will be re-contacted. However, in multiplex genetic testing for more than one condition, there is no possible way to re-contact participants and obtain informed consent from them for each test (Rechtes, 2003).

Genetic Information and Research Benefits Sharing

With the rapid development of high-throughput technologies allowing for the screening of very large numbers of samples, and with growing recognition of the important role genetic variation can play, there has been a tendency to try to generate large national population collections in various countries (Iceland, Estonia, Latvia, Sweden and the UK, for example), or to investigate sub-populations with defined characteristics (in Italy and Finland, for instance). These collections, considered as national research resources, are usually supported with private funds in combination with public funding, although they are occasionally supported with private funds alone. Thus collections which are partly held by the private sector could be set up on a commercial basis,

using tissue collected from hospitals or extra tissue taken from a medical research trial, processed for research, and sold to pharmaceutical, diagnostic, or biotechnology industries. Therefore, ownership of the data becomes a significant question that needs to be addressed by both researchers and communities. It is argued that the concept of ownership (e.g., of research results or human tissue) needs to be clarified, and that ownership of data should be defined to include the communities providing the data, as well as the researchers studying the data.

Genetic Information and Discrimination

Expansion of the range of genetic tests and other genetic information available to physicians, insurance companies, employers, and the general public could lead to genetic discrimination based solely on the nature of an individual's genotype. The practice of genetic discrimination has the potential to create a new group of disadvantaged people who would need the same protections now accorded those suffering from racial and sex discrimination (Billings et al., 1992; Natowicz et al., 1992; Alper et al., 1994).

The tragedies of race and sex discrimination illustrate the dangers of basing employment decisions on inborn characteristics. Like these, discrimination on the basis of genetics ignores the present abilities and health status of workers and substitutes questionable stereotypes about future performance. Less absenteeism, reduced life and health insurance costs, and longer returns on investments in employee training all reduce the costs of labor. Insurance companies also face strong economic incentives to identify individuals perceived to be at increased risk for ill health in the future in order to raise the premium.¹ Despite the extension of using the self-regulation model by the private sector, some states in the U.S.A., such as Texas, Georgia, Virginia, and New Jersey, have enacted laws which prohibit the use of genetic information by employers and insurance companies.²

In the future, the extent to which government will be able to influence the distribution of goods and services will depend on achieving coordination and control among these disparate actors. (Orenlicher, 1995; Brownsword et al., 1998; O'Neill, 1998; Hall and Rich, 2000; Murray et al., 2001; Annas, 2002) Coordination of multiple actors becomes an important precondition for the increasing capability of government to perform an active role in designing genetic testing policy. Therefore, this paper claims that a state's relationship with non-governmental actors provides a fertile field for analysts who wish to investigate the structure and decision modes of governments, the interaction between government and groups, the types of policies which result from such interactions, and their impact on non-discriminatory genetic policy.

The Israeli Genetic Information Policy Making

The unique characteristics of the genetic information presented above will be strengthened if it can be supported by empirical data. In this section, we will examine how state-civil society relations affects policy outcomes, namely providing support for individuals' and communities' empowerment or leading individuals and communities to become more vulnerable to potential risks from the use of genetic technology.

Israel was faster than other states to respond to the concerns about commercial use of genetic information. In fact, the special nature of DNA and genetic information with respect to individual rights has been recognized in the law on

genetic information, adopted in Israel in 2000.³ The Genetic Information Law 5761-2000 and other existing ethical guidelines cover most issues of informed consent, confidentiality, and rules of accession relating to either identified or non-identified DNA samples or genetic information in the usual individual or family-based, small scale, collections. The law indicated a communitarian approach in addressing the issues of genetic testing, which set boundaries within which personal autonomy was to be exercised. The specific responsibilities and goals set out in the new legislation provided inter-relationships of individual values, rights, and needs with communal values, civic duties, and responsibility and public welfare.⁴

In 2000, the Genetic Information Law was enacted in Israel. The law as a government regulation initiative contains protection from genetic discrimination in insurance and in applying for employment (see esp. sections 23 and 24). However, genetic information policy-making did not end in preliminary legislation. Other ethical and legal aspects of the use of genetic information were being further considered by the Knesset Committee of Scientific and Technology Research and Development. One of the Committee's challenging regulatory issues was the management of DNA sample collections from Ashkenazi Jews by the Israeli commercial company IDgene Pharmaceuticals Ltd. IDgene is a privately owned population genomics company focused on identifying the genetic basis of common diseases.

The commercial interest of IDgene in the use of genetic information raised public concerns over the regulation of large population-based genetic studies. During 2001, this issue was reviewed in two reports: One was issued by the Bioethics Advisory Committee of the National Academy of Sciences, headed by Prof. Michael Ravel and the second was issued by the Ethics Bureau of the Medical Association, headed by Prof. Avinoam Reches. (Reches, 2003) Most of the recommendations specified in these reports are similar, especially in their call for the establishment of new statutory authority, which will assure quality control of both the collections and the ethical management of genetic databases. Such authority will be implemented to evaluate and monitor the current use of existing biobanks throughout the state and constitute a biobank of its own. The report of the Israel Academy Bioethics Committee emphasized the concern of groups' genetic discrimination in research: "Genetic profiling of a collectivity that can be defined by ethnic or national origins could lead to risks of stigmatization of all those who belong to the collective. Worse, this could lead to discrimination in various forms – moral, physical or economic."⁵ The deliberations of the Ethics Bureau of the Medical Association were aimed at defining a broader set of principles, dealing in balancing the privacy of genetic information and the benefit of research to improve public health of ethnic communities and society as a whole. Prof. Kasher, one of the members of the Israel Academy Bioethics Committee, suggested considering the community from which the samples are collected as the owner of such information. According to Kasher, "...it is actually the community property."

The description of the Israeli network in genetic information policy-making enables us to specify the influence of state regulation on individuals' and communities' empowerment. A practical investigation of the Israeli policy can be found in the responses of an Arab Bedouin community

¹ <http://www.managed-care/mag.com/archives/9701/9701/genetics.shtml> Date last accessed: 27 March 2006.

² I refer to Information Nondiscrimination Act of 2003: <http://www.gene-watch.org/programs/privacy/genetic-disc-position.htm> Date last accessed: 27 March 2006.

³ Passed by the Knesset on 16 Kislev 5761 (December 13, 2000); bill and explanatory memorandum published in *Hatsaot Chok* 2786, 11 Tevet 5759 (December 30, 1998), p. 290. *Kovetz HaTakanot* 5741, p. 292.

⁴ Knesset protocol no. 71, Science and Technology Committee meeting (19 November 2001); Knesset protocol no.1041, Research and Technology Development Committee meeting (8 November 2004).

⁵ <http://www.academy.ac.il/bioethics/hebrew/report2/report2-h.html> Date last accessed: 20 November 2006.

in Israel to a genetic counseling program for spouse selection. While health professionals designed the program to fit local norms such as consanguinity, matchmaking, and the Muslim ban on abortion, for the Bedouin, it also meant the medicalization of marriage arrangements and family planning. Research has shown that during the last decade, the Bedouin infant mortality rate was 15.3% of 1,000 new births compared to 3.3% in the Jewish community. In 1994, Soroka Hospital in collaboration with the Institute of Genetics at Ben-Gurion University of the Negev and Ministry of Health, decided to implement a Premarital Carrier Screening program of couples at risk. (BGU, 2000) In 2002, inborn defect was the explaining cause of 36% of infant mortality. Another community-based premarital program that uses carrier matching is *Dor Yeshorim*, a program developed by the ultra-orthodox Ashkenazi Jewish community. The Tay-Sachs genetic screening program was established to follow the ultra-orthodox Ashkenazi Jewish community's law under which birth control and abortion are forbidden and engagements are pre-arranged through matchmaking procedures. The program tests young adults for disease carrier testing before they begin matchmaking procedure so the engagement can be canceled at the earliest possible stage. The success of *Dor Yeshorim* screening program derives from the strong support of the religious leaders of the Jewish community, the confidentiality of the storage data and the availability of shared biomedical information with community members. According to Raz, "The compliance rate with *Dor Yeshorim* is over 90 percent; in recent years hardly any children affected with Tay-Sachs or cystic fibrosis have been born in this community to couples who married during the last decade." (Raz, 2005: 18) Although, The Bedouin program was drawn upon *Dor Yeshorim* model, with which professionals at the local medical center were quite familiar, the genetic screening program for the Bedouin community did not require community involvement in all aspects of this research, including follow-up with the results (Raz, 2003). When obtaining community empowerment, special attention must be given to preliminary research to identify potential issues and problems that may cause turmoil in the community. Researchers also should strive to select community partners (leaders, organizations) knowledgeably and carefully to ensure that these individuals can adequately represent the multiple and diverse views within a community. These regulatory mechanisms are crucial to obtaining community empowerment in participation in genetic screening programs and to promote general welfare instead of narrow private interests.

Conclusion

This paper has indicated that the possibility of individual and community empowerment depends on the extended role of governmental actors in genetic information policy making. The Israeli case of genetic information policy-making demonstrates that the existence of state's autonomy in which jurisdictions found that the benefits of a comprehensive, coherent, and principled regime would displace the perceived need (as well as the political pressure) to treat genetic information distinctly from other types of data. Indeed, civil servants are liable to include provisions of accountability and responsibility in policy-making. These provisions might include entailing "collective" termination to privacy rights and informed consent due to the fact that the collection and the use of genetic information do not concern only those individuals from whom samples are collected; requiring researchers, in their research grant proposals, to justify their selection and definition of communities; demonstrate sensitivity for the larger ethical, legal, and social implications of their research; anticipate potential group harms; specify actions to educate and inform the community about the research and to obtain consensus for the study; indicate ways

to communicate research results back to the community for the benefit of the society as a whole. In the context of individuals and community empowerment, it urges the need to create a distinct corpus of rules specific to genetic information. For that, this policy has the obvious advantages of providing additional and more tailored protections specific to this type of information, while also addressing some of the familial and communal interests in that information.

It is argued that in the future, National Bioethics Advisory committees will take a leading role in shaping genetic information regulation. The fact that these committees' members are coming from different disciplines – ethics, law, science, religion, etc. – promotes dialogue with the public about the ethical, legal, and social implications of genetics research. Indeed, growing public involvement in the meetings and deliberations of the National Bioethics Advisory Commission and the broad dissemination of the Commission's reports to researchers and the public is essential for justifying public participation in research on the one hand and commercial investment on the other, for the sake of society's welfare as a whole.

References

- Alper, J.S., Geller, L.N., Barash, C.I., Billings, P.R., Laden, V. and Natowicz, M.R. (1994) 'Genetic Discrimination and Screening for Hemochromatosis', *Journal of Public Health Policy* 15(3): 345–58.
- Annas, G.J. (2002) 'The Limits of State Law to Protect Genetic Information', *New England Journal of Medicine* 345: 385–8.
- Atkinson, M.M. and Coleman, W.D. (1989) 'Strong States and Weak States: Sectoral Policy Networks in Advanced Capitalist Economies', *British Journal of Political Science* 19: 47–67.
- BGU Faculty of Health Sciences. (2000) *The Negev Statistical Annual Review*, Beer-Sheva: Ben-Gurion University of the Negev.
- Beskow, L.M., Burke, W., Merz, J.F., Barr, P.A., Terry, S., Penchaszadeh, V.B., Gostin, L.O., Gwinn, M. and Khoury, M.J. (2001) 'Informed consent for population-based Research involving Genetics', *Journal of American Medical Association* 286, 2315–21.
- Billings, P., Kohn, M.A., de Cuevas, M., Beckwith, J., Alper, J.S. and Natowicz, M.R. (1992) 'Discrimination as a Consequence of Genetic Testing', *American Journal of Human Genetics* 50: 476–82.
- Broide, E., Zeigler, M., Eckstein, J. and Bach, G. (1993) 'Screening for carriers of Tay-Sachs disease in the ultraorthodox Ashkenazi Jewish community in Israel', *American Journal of Medical Genetics* 47: 213–215
- Brownsword, R., Cornish, W.R. and Llewelyn, M. (1998) (Eds.), *Law and Human Genetics*. Oxford: Hart Publishing.
- Coleman, W.D. and Skogstad, G. (1990) 'Policy Communities and Policy Networks: A Structural Approach', in W.D. Coleman and G. Skogstad (eds.), *Policy Communities and Public Policy in Canada*, New York: Oxford University Press.
- Hall, M.A. and Rich, S.S. (2000) 'Laws Restricting Health Insurers' Use of Genetic Information: Impact on Genetic Discrimination', *American Journal of Human Genetics* 66: 293–307.
- Gottweis, H (2005), 'Governing Genomics in the 21st Century: Between Risk and Uncertainty', *New Genetics and Society*, 24, 175-194.
- Hodge, J.G. and Harris, M.E. (2001) 'International Genetics Research and Issues of Group Privacy', *Journal of Biolaw and Business Special supp*: 15–21.
- Issa, A.M. (2002) 'Ethical Perspectives on Pharmacogenomic Profiling in the Drug Development Process', *Nature Reviews* 1: 300–8.
- Lemke, T. (2005) 'Beyond Genetic Discrimination: Problems and Perspectives of a Contested Notion', *Genomics, Society and Policy* 1(3): 22.
- Lemmens, T. (1999) 'Private Parties, Public Policy?' in A.K. Tompson and R.F. Chadwick (eds.), *Genetic Information*, New York: Kluwer Academic Publishers, pp. 31–40.
- Moran, M. (2000) 'Understanding the Welfare State: The Case of Health Care', *British Journal of Politics and International Relations* 2: 135–60.
- Murray, W.D., Wimbush, J.C. and Dalton, D.R. (2001) 'Genetic Screening in the Workplace: Legislative and Ethical Implications', *Journal of Business Ethics* 29(4): 365–78.

- Natowicz, M.R., Alper, J.K. and Alper, J.S. (1992) 'Genetic Discrimination and the Law', *American Journal of Human Genetics* 50: 465–75.
- Nelkin, D. and Tancredi, L. (1989) *Dangerous Diagnostics: The Social Power of Biological Information*, Chicago: The University of Chicago Press.
- O'Neill, O. (1998) *Genetics, Insurance and Discrimination*, Manchester: Manchester Statistical Society.
- Orentlicher, D. (1995) 'Genetic Screening by Employers', *Journal of the American Medical Association* 263: 1008.
- Rappaport, J. (1987) 'Terms of Empowerment/Exemplars of Prevention: Toward a Theory of Community Psychology', *American Journal of Community Psychology* 15: 121–44.
- Raz, A. E. (2003). "Aysha": Genetics Education and Community Engagement in a Consanguineous Arab-Bedouin Population in Israel', *Health* 7(4): 439–61.
- Raz, A.E. (2005) *The Gene and the Genie: Tradition, Medicalization and Genetic Counseling in a Bedouin Community in Israel*. Durham, NC: Carolina Academic Press.
- Reches, A. (2003) 'Recommendation and guidelines in Large Population-based research Report', *Chamber of Ethics*, 8: 1–45
- Rocheffort, D. and Cobb, R.W. (1994) 'Problem Definition: an emerging Perspective', in D. Rocheffort and R.W. Cobb (eds.), *The Politics of Problem Definition: Shaping the Policy Agenda*, Lawrence, KS: University Press of Kansas, pp. 1–31.
- Rohter Larry, 'In the Amazon, giving blood but getting nothing' *New York Times*, 27.6.2007
- Sagi, M. (1998). 'Ethical aspects of genetic screening in Israel', *Science in Context* 11(3–4): 419–429.
- Thompson, A.K. and Uhlemann T. (1999) 'Genetic Engineering and German Health Insurances', in A.K. Thompson and R.F. Chadwick (eds.), *Genetic Information*, New York: Kluwer Academic, pp. 71–8.
- Wolf, S. (1995) 'Beyond Genetic Discrimination: Towards the Broader Harm of Geneticism', *Journal of Law, Medicine and Ethics* 23: 345–53.
- Zimmerman, M. and Rappaport, J. (1988) 'Citizen Participation, Perceived Control, and Psychological Empowerment', *American Journal of Community Psychology* 16: 725–50.

through DNA sequencing data, inferred "that the DNA sequences from these fossils fall within the European Neanderthal mt-DNA variation. Thus, the geographic range of Neanderthals is likely to have extended at least 2000 km further to the east than commonly assumed".

Krause et al. (2007) have estimated the date of an adult and a subadult humerus bones by the ¹⁴C technique as nearly 35,000 years old.

In an e-mail letter to Wade (2007) Paabo has said, "We now know that they (Neanderthals) are ('were' would have been better) on the doorstep of Mongolia and even China...".

Neanderthal features started appearing in evolving hominids in Europe about 400,000 years back. The Neanderthals first appeared in western Asia 150,000 years ago. As noted above, the Neanderthal presence in more eastern Asia has been estimated to have been about 35,000 years back. These time estimations suggest eastward migration of Neanderthals after their European origin.

After their movement out of Africa the modern humans were in the Indian subcontinent about 65,000 years back (Verma, 2006). Hence 35,000 years ago presence of moderns in more eastern parts of Asia is quite expected. In fact the museum bony remains from the Uzbekistan and Siberian caves, used by Krause and his team for DNA extraction, were badly contaminated with modern human DNA. Krause et al. (2007) say, "The high ratio of modern human DNA to Neanderthal DNA for the subadult Okladnikov and the Teshik Tash specimens are in agreement with previous observations that modern human mtDNA occurs in most fossil bones.". These facts suggest coexistence of moderns and Neanderthals over a long period (more than 10,000 years in Europe, Verma and Saxena, 2007) in a large geographic range (extending from Gibraltar to the Altai Mountains in south Siberia). This further increases the possibility of some interbreeding between moderns and Neanderthals and assimilation of Neanderthal contribution in the modern human's genome (vide Verma and Saxena, 2007).

Neanderthal Range Extended

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In an earlier communication (Verma and Saxena, 2007), on fate of Neanderthals, it has been said that Neanderthals lived in Europe and south-west Asia. That was the knowledge then. Now the range of distribution of this species of *Homo* is known to be considerably more extensive (Krause et al., 2007).

Before the work of Krause et al. (2007) there were some indications of Neanderthals in more eastern parts of Asia. In the Teshik-Tash Cave in Uzbekistan some hominid bones and artifacts were found; the latter included Mousterian tools, which are associated with Neanderthals. In the Okladnikov Cave in the Altai Mountains in South Siberia some hominid teeth were found, which looked neanderthaline. But these finds were not conclusive evidences in favour of Neanderthal existence in those parts in the past.

In the Krause's team was included S. Paabo, who had experience of sequencing and analyzing Neanderthal DNA from European sites (Wade, 2007). Taking advantage of his experience Krause's team planned to identify Neanderthal mt-DNA in the DNA samples extracted from bony remains from the Teshik-Tash and the Okladnikov Caves. Krause et al.,

References

- Krause, J., Orlando, L., Serre, D., Viola, B., Prufer, K., Richards, M.P., Hublin, J.-J., Hänni, C., Derevianko, A.P., and Paabo, S., 2007. Neanderthals in central Asia and Siberia. *Nature AOP* (Advanced online Publications) (doi: 10.1038/nature06193).
- Verma, K.K., 2006. Arrival and dispersal of the modern man (*Homo sapiens*) in the Indian subcontinent. *Bionotes*, 8(1): 6 – 7.
- Verma, K.K., and Saxena, R., 2007. What happened to Neanderthals? *EJAIB*, 17(5): 133 – 135.
- Wade, N., 2007. Fossil DNA expands Neanderthal range. *The New York Times*, October 2, 2007.