Genetic Testing, Organ Transplantation, and an End to Nondirective Counseling

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INTRODUCTION

The late twentieth century saw the development of a range of medical miracles, genetic diagnostics and organ transplantation among them. Organ transplantation is heralded as standard or hopeful therapy for a variety of end-stage, life- threatening, or debilitating diseases, including genetic maladies. Here I argue that rather than looking to organ transplantation as a cure for genetic malady, we ought instead to work toward preventing genetic disease through preconceptual and prenatal testing. I argue that health care providers and people who plan to procreate have a moral responsibility to prevent genetic disease where they can. One result of my argument is that the oxymoronic term "nondirective counseling" be replaced with an explicit standard-of-care perspective that moves genetic screening into mainstream medical practice.

I will start with a look at the intersection of genetics and organ transplantation.

GENETICS AND ORGAN TRANSPLANTATION

One of the many common-sense notions that we are proving through the Human Genome Project is that none of us is perfect. It is estimated that "every individual carries a "genetic load" of about 20 genes which are not functioning optimally and which can potentially produce medical or developmental complications. However, —and as a matter of luck, time or outbreeding—most of us are blissfully unaware of the deleterious genes that we carry."[1] It is a matter of luck in that we may inadvertently avoid environmental factors that would trigger the expression of genetic problems, a matter of time in that we may not be aware of late-onset disorders that we carry, and a matter of outbreeding in that "everyone carries four to six genes that are harmless when inherited from one parent but can be deadly when inherited from both."[2] The more genetically similar the partners, the more likely it is that they will both be carriers of the recessive gene that results in a 1-4 chance that each child born will express the genetic disorder. Diseases of this type include Tay-Sachs, cystic fibrosis, sickle cell anemia, Goucher's disease, and Canavan's disease.

Whether through genetic disease, or gestational assault of one sort or another, "about 3% of newborns have anomalies or malformations at birth."[3] "Established genetic disorders now account for almost 50 percent of all childhood deaths in the United States. They also account for as much as 25 percent of all hospital admissions for children."[4]

Transplantation is an expensive treatment of choice for some genetic diseases, specifically for children, who constitute the overwhelming class of transplant recipients for genetic disease. Genetic disease is second only to biliary atresia as the cause of pediatric liver failure.[5] Of all the pediatric transplants, an estimated 35% are provided for genetic illnesses.[6]

These transplants are performed to bring about one of the following results: replacement of an organ that did not develop or is irreparably damaged, providing a site for processing or detoxifying bodily substances, or to manufacture a congenitally absent substance or cell type.[7]

However, transplantation does not always offer a cure. In some cases, transplantation restores a damaged organ, but does not resolve the underlying genetic disease. For example, some children with cystic fibrosis suffer liver failure. Liver transplant restores normal liver function, but cannot change the progress of the fundamentaldisease. In fact, the immunosuppresents required to prevent rejection may make the lung disease worse.[8]

In other cases, transplantation may bring about a delayed or partial cure for genetic disease. An example of this is Hurler's syndrome. This is an early-childhood-onset disease resulting in growth failure, skeletal deformity and progressive mental deterioration leading to death between 7 and 10 years of age. Bone marrow transplant can stop the progression of the disease. At the time of diagnosis, most children will have some loss of function and will continue to lose function for 4-12 months after bone marrow transplant.[9]

Even in cases in which transplantation provides a cure for the manifestations of the disease and something like a normal, albeit complicated or compromised lifespan, transplantation does not address the underlying genetic cause or the likelihood of the disease's being passed on to yet another generation by the affected individual or to another child through repeated pregnancy. The fact that one child is treated for genetic disease, either through transplant or other means, does not imply that parents understand how to prevent further problems.

Indeed, there is indication that treating physicians may not be educating affected persons or parents of affected children as to the genetic cause for the illness. A study in France of patients with Alport's syndrome regarding knowledge and attitudes toward prenatal testing showed that only 59% of the interviewees knew that gender was the determinant in the progression of the disease; knowledge of the mode of inheritance of the disease was adequate in only 25% of those interviewed.[10] Alport's syndrome results in renal failure and the need for kidney transplant in affected males and has a varying degree of severity in affected females from renal failure to healthy carrier.

Even the possibility of partial cure may not be available to some children because of the shortage of organs. Among transplant candidates younger than 2 years of age, 30% to 50% die before an organ becomes available.[11] In the U.S., "between 1980 and early 1990, 169 infants under 1 year of age underwent heart transplantation. During the same interval, however, approximately 80–100 other infants were registered with organ procurement agencies but died while awaiting donor hearts."[12] Another way to look at this collection of statistics is that if the pediatric transplant candidates who are there for genetic disease were not competing for organs, which constitutes an estimated 35% of the whole, the supply of pediatric organs would come close to matching demand.

My suggestion is not that we deny transplantation to existing victims of serious genetic disease, but that as we move into the twenty-first century, we—policymakers, health care practitioners, and scholars working in the realm of genetics— make a concerted effort to promote prevention as the treatment of choice for serious genetic disease.

PREVENTING GENETIC DISEASE

Preventing detectable genetic disease is not unlike many of life's choices. But before the lay population can be expected to integrate the new tools of genetic screening and diagnostics into their decision-making, those working in the field need to dodge labels like "eugenics," need to accept that selective abortion is not conceptually different from elective abortion, and need to put to rest the myth of nondirective counseling. That is what I hope to do here.

First, let me discuss how and why I think that genetic screening and diagnosis can be easily adopted into individual and community life. Then I will talk about the timing of genetic screening and how "selective" abortion creates a false distinction with "elective" abortion. Finally, I will end with an argument for explicitly directive genetic counseling.

Prevention of genetic disease should become as commonplace as other attempts to prevent fetal injury. The idea that health-care providers and intended parents have obligations to a potential baby is not a new idea. Couples are encouraged to refrain from having children until they can provide a healthful environment for them. Pregnant women are expected to provide as good nutrition to their developing fetus as they are able; they are expected to refrain from exposure to substances that may damage the developing fetus.

What is new is a new collection of new screening and diagnostic tools. With our present state of prenatal diagnosis, knowledge and technology, it is possible to detect, *in utero*, 200 to 300 of the 5,000 hereditary diseases or malformations known to date. The daily discoveries of anomalous genes and genetic combinations through the Human Genome Project guarantees that the number of anomalies we can detect will certainly increase.

But new knowledge brings about new responsibilities. Specifically, if policymakers, health-care providers, and individuals intending to procreate know that certain diseases can be avoided, then they have the moral responsibility to avoid creating children with preventable disease.

Because of the universal, minimalist moral dictate *do not cause unjustified harm,* individuals ought not knowingly produce children with serious genetic disease. In addition to this causal responsibility, those intended to procreate have a role-related responsibility as well. If pregnant women have a responsibility not to cause potential prenatal injury, then it is consistent to argue that they ought not cause avoidable genetic injury as well. New technology does not simply expand reproductive choice; it also expands reproductive responsibility.

Some individuals, communities and nations are already moving in this direction. Individuals who know themselves to be at risk for various genetic disorders are seeking genetic counseling. The Former Soviet Union had a program in place to provide

prenatal diagnosis and abortion of affected fetuses for Hurler's and other lysosomal storage diseases. In 1993, cost-benefit analysts in Israel explored the possibility of a nation-wide screening program for cystic fibrosis among the Ashkenazi population. The analysis regarding screening for the five mutations that result in 97% of all CF cases suggest that a voluntary screening program would detect 94% of the Ashkenazi couples with a 1-4 risk for an affected child, and predicted that 92% of persons who voluntarily participated in a CF screening program would be willing to abort if found to be carrying an affected fetus.[14] According to those authors, "Perhaps the major benefit of publicly funded screening is that it provides an option for all individuals to voluntary choose whether or not to be screened, thereby helping persons make more informed reproductive decisions."[15]

A *de facto* national screening program is in place in the United States for prenatal detection of neural tube defect and Down's syndrome. It is the standard of care in the U.S. for every pregnant woman receiving prenatal care to be offered a triple screen —a maternal blood test that analyzes the possibility that the fetus is at increased risk for a neural tube defect or Down's syndrome. Diagnosis of Down's syndrome in the U.S. through amniocentesis carries more than a 90% abortion rate and diagnosis of neural tube defect carries a 75% abortion rate.[16]

One highly successful, if highly controversial, global screening program that takes place preconceptually rather than prenatally is Dor Yeshorim. Dor Yeshorim was begun in 1983 by Rabbi Josef Ekstein, of Brooklyn, New York, after facing the tragedy of having four of his ten children die from Tay-Sachs disease. The idea for the screening was simple. Orthodox boys and girls of marriageable age would have their blood drawn and tested for Tay-Sachs. As being identified as a Tay-Sachs carrier was stigmatizing, the results of the test would be held in confidence. Before a couple began dating seriously or before the matchmaker suggested a pairing, the couple or the matchmaker would contact the Dor Yeshorim hotline, give the number codes of the couple and be told if they were "compatible" or not. Only if both young people were carriers of the Tay-Sachs gene would the couple be notified that they were incompatible. The program has expanded to include testing centers in Israel, Europe, and Canada in addition to the U.S. and now tests for cystic fibrosis, Canavan's disease, Fanconi's anemia, and Gaucher's disease as well. As of November 1997, the test results for more than 80,000 people are now in the computer bank; Dor Yeshorim provides about 8,000 genetic assessments each year. More than 180 prospective couples have been found to be carriers for the same disease and have been given this information. Follow-up genetic counseling for incompatibility is provided as part of the program. Selection of a different, genetically compatible mate might be the decision of choice in traditional communities, but need not be the choice for all individuals.

SELECTIVE ABORTION AND GENETIC TESTING

What about the couple who are both carriers for cystic fibrosis or Tay-Sachs disease and who wish to have an unaffected child? Prenatal genetic testing and the option of selective abortion make these pregnancies possible. While it should be within the couple's choice to abort for fetal anomaly (where culturally acceptable), it is not

appropriate to differentiate selective abortion from elective abortion. While I argue this point elsewhere,[17] I will mention two problems with the purported distinction. First the distinction inappropriately creates normative distinctions between women seeking abortion. Abortions performed in the best interest of the fetus are seen as altruistic; those performed regardless of fetal characteristic may be seen as self-centered, not as morally worthy. Yet, if one examines groups of women who abort for fetal characteristic and those that abort for other reasons, the differences blur and disappear. One woman may choose to abort a fetus regardless of characteristics because she believes that she simply can't handle parenthood right now; another woman in identical circumstances may choose to carry the pregnancy to term. One woman may choose to abort a fetus with particular characteristics because she believes that she cannot handle parenting a child with those particular problems; another may make the opposite choice. All selective abortions are elective in that say more about the characteristics of the intended parents than they say about characteristics of the developing fetus. Even in cases of prenatally diagnosed Tay-Sachs disease or anencephaly, the decision of whether to abort or not reflects the worldview of the couples, not the seriousness of the fetal condition.

One unfortunate difference between policies governing selective abortion and elective abortion in the United States is that of availability. Elective abortion is theoretically available up to the point of fetal viability, usually interpreted as 24 weeks from last menstrual period (LMP). Selective abortion can be performed in some states up to actual delivery. Except in the cases of certain fetal or maternal demise, allowing abortion of viable fetuses with anomalies does creates a subclass of the disabled. According to one writer, "States protect fetuses by prohibiting abortions at a time when it is believed that the fetus should be given human consideration. Yet, if "human" consideration and/or legal status is given to a fetus with a defect at a much later date than it is given to a fetus without defects, it is more than a contradiction in terms—not a mere dichotomy of view, but clearly established disparate treatment."[18]

TIMING OF GENETIC TESTING

While selective abortion ought be a legitimate response to genetic disease, at least as long as other sorts of elective abortion are morally permissible, people generally would like to know their genetic risks before conceiving.

For example, Ginsberg *et al.* found that, "98% of Caucasian women in the USA, with similar carrier frequency rates [for cystic fibrosis] to Ashkenazi Jews, said screening should be offered before pregnancy, whereas only 69% said they would accept carrier screening during pregnancy."[19]

In the study of patients with Alport's syndrome, a majority were interested in prenatal testing to determine whether they were carrying an affected fetus, but only two-thirds of them would use selective abortion. This finding is consistent with other studies that found a difference between interest in prenatal testing and the decision to terminate a pregnancy. In a U.S. study of adult onset polycystic kidney disease, slightly more than half of affected or at-risk individuals would use prenatal testing to identify affected fetuses; less than 10% of them, however, would not terminate a fetus with adult polycystic disease, although they claimed that they would terminate

the pregnancy for other problems.[20] Consistently respondents report an unwillingness to abort for conditions with which they are familiar. That is, someone who grew up with deaf parents is less likely to abort for congenital deafness.

THE END OF NONDIRECTIVE GENETIC COUNSELING

If we are to assist those making genetic choices, a program of testing potential carriers before they choose to initiate a pregnancy is indicated. The watchword of genetic counseling as been that it is "nondirective." I call "nondirective counseling" an oxymoron because "counseling" implies giving advice or guidance while the word "nondirective" implies an *unwillingness* to supply this advice or guidance.

By whatever name, genetic counseling is and has been value-laden since its inception. Some of the values expressed by the practice of genetic counseling include the belief that the couple may *choose* whether to carry an affected fetus to term or whether to procreate; the counseling indicates a valuing of knowledge about one's self and one's intended offspring. As some counselors will not approve testing if they believe that the couple's reasons for terminating a pregnancy would be trivial (such as fetal sex, the lack of a certain condition or characteristic, or the inability to provide donor bone marrow to an afflicted sibling), normative judgments are clearly in place in the profession. A survey of doctors in France and Canada disclosed admitted judgments about the moral permissibility of bringing to term fetuses with serious genetic disease. Of those surveyed, "a little more than 15 percent of Canadian physicians considered it socially irresponsible to deliberately bring to birth a genetically handicapped child at a time when intrauterine diagnosis and abortion are possible." However, "28 percent of physicians in Quebec and 37 percent in France shared this position."[21]

According to Bouchard, these physicians "think it is impossible to maintain an objective approach to genetic counseling while at the same time wanting to prevent anomalies."[22]

The relationship between medical practitioners and patients has evolved to include the patient as decision-maker, but, generally speaking, medical counseling is far from nondirective. "Physicians, nurses, and psychologists in many areas of clinical practice and public health adhere to professional norms that go beyond value neutrality—they are zealous advocates of the value of health and prevention of disease and disability."[23]

Counselors, doctors, and others in a position to educate intended parents, ought to work explicitly to prevent disease and that includes explicit counseling for prevention. That is their job. These advisors cannot force people to prevent the birth of children with genetic disease any more than medical advisors can prevent people from smoking, drinking, or failing to exercise, but they can assist in creating a culture in which it is acceptable to be tested, to have genetic information about oneself, and to avoid causing genetic injury where possible.

QUESTIONS REMAIN, BUT NOT ALL ARE COMPELLING

Many questions remain regarding the ethics of preventing genetic disease, but I will end by addressing one that I find less than compelling. That is the question of what might have been.

It is interesting that some express concern about what might happen by the elimination of some genetic disorders, but not the elimination of disease caused by virus. It is interesting that some wonder what the world might miss through the avoided conception or birth of some individuals with some genetic diseases without considering this question in the larger context of existing children who are lost to the world because of starvation, neglect, or abuse. The consequences of a "designer" gene pool are not conceptually different from the consequences of other forms of disease prevention.

In a review of 41 articles published between 1966 and 1993 that considered cost-benefits of prenatal testing and selective abortion, the reviewer criticized the articles in that they "generally do not include a discussion of the potential life that is aborted."[24] Another writer says, "Society will not likely lose any scientists, doctors, lawyers, or presidents as a result of genetic testing revealing Down's syndrome.... Is intellectual potential our measuring stick?"[25]

Glover's point that intellectual capacity serves as one of the measures of normalcy is certainly a comment about the state of society at the turn of the century. There are many other aspects of society that make it difficult for some women in some circumstances to have their babies, regardless of fetal characteristics. These comments about society, however, do not imply that it is therefore morally prohibited for individual women to choose abortion in response to their recognized inability to care for the resultant child.

It is true that we never will know what we as individuals or the world as a whole is missing because of the decision to avoid conception or to abort a particular fetus. This is as true, and trivial, as the statement that we will never know what we are missing by having chosen one mate over another. In neither case, do we have a moral responsibility to find out.

NOTES AND REFERENCES

1. R. Anderson and B. Schaefer, "Genetic Counseling Considerations in Pediatric Organ Transplantation," in C. Greiner and D. Elliott, *Transplantation: Parts and Parity* (Hanover, New Hampshire: Institute for the Study of Applied and Professional Ethics, Dartmouth College, 1995), p. 18.
2. G. Cowley, "Made to Order Babies," *Newsweek* (Winter/Spring 1990), p. 94
3. L. Bouchard, M. Renaud, O. Kremp, and L. Dalliare, "Selective Abortion: A New Moral Order? Consensus and Debate in the Medical Community," *International Journal of Health Services*, Vol. 25, No. 1 (1995), pp. 65–84 at 67.
4. A. Caplan, *If I Were A Rich Man Could I Buy A Pancreas*? (Bloomington: Indiana University Press, 1992), at 121.
5. Bazil Zitelli, Carolton Gartner, Jeffrey Malatack, Andrew Urbach and Karen Zamberlan, "Liver Transplantation in Children: A Pediatrician's Perspective," *Pediatric Annals,* Vol. 20, No. 12/December (1991), pp. 691–698, at 692; Sunita Stewart, David Waller, Betsy Kennard, Margaret Benswer and Walter Andrews, "Mental and Motor Development Social Competence, and Growth One Year after Successful Pediatric Liver Transplantation," *The Journal of Pediatrics* (1989), pp. 574–581, at 575.
6. Carl Greiner and Deni Elliott, *Transplantation: Parts and Parity* (Hanover, New Hampshire: Institute for the Study of Applied and Professional Ethics, Dartmouth College, 1995), p. 5.
7. R. Anderson and B. Schaefer, "Genetic Counseling Considerations in Pediatric Organ Transplantation," p. 1.

8. Anderson, *op. cit.*, p. 4.
9. Anderson, *op. cit.*, p. 5.
10. M. Levy, Y. Pirson, B. Boudailliez, H. Nivet, N. Rance, A. Moynot, M. Broyer and J.P. Grunfeld, "Evaluation in Patients with Alport Syndrome of Knowledge of the Disease and Attitudes Toward Prenatal Diagnosis," *Clinical Nephrology*, Vol. 42, No. 4 (1994), pp. 211–220 at 211.
11. Committee on Bioethics, "Infants with Anencephaly as Organ Sources: Ethical Considerations." *Pediatrics*, Vol. 89, No. 6 (1992), pp. 1116–1119, at 1116.
12. S. Ashwal, A. Caplan, W. Cheatham, R. Evans, J. Peabody, "Social and Ethical Controversies in Pediatric Heart Transplant," *Journal of Heart and Lung Transplantation*, Vol. 10 (1991), pp. 860–876, at 860.
13. X.D. Krasnopolskaya, T.V. Mirenburg, and V.S. Akhunov, "Postnatal and Prenatal Diagnosis of Lysosomal Storage Diseases in the Former Soviet Union," *Wiener Klinische Wochenschrift,* 109/3 (1997), pp. 74–80, at 74.
14. G. Ginsberg, Hannah Blau, E. Kerem, C. Springer, Bat-Seba Kerem, E. Akstein, A. Greemberg, A. Kolumbos, D. Abeliovich, E. Gazit, and J. Yahav, "Cost Benefit Analysis of Program a Screening National for Cystic Fibrosis in an Israeli Population," *Health Economics*, Vol. 3 (1994), pp. 5–23, esp. 5–8.
15. G. Ginsberg *et al.*, *op. cit.*, p. 17.
16. N. Glover, and S. Glover, "Ethical and Legal Issues Regarding Selective Abortion of Fetuses with Down Syndrome," Mental Retardation, Vol. 34, No. 4 (1996), pp. 207–214, at 210.
17. D. Elliott, "The Myth of Selective Abortion," Under consideration by *Science and Engineering Ethics Journal.* Presented at the Association for Practical and Professional Ethics Annual Meeting, February 26-–9, Dallas, Texas (1998).
18. Glover and Glover, *op. cit.*, p. 210.
19. Ginsberg *et al.*, *op. cit.*, p. 17.
20. M. Levy *et al.*, *op. cit.*, pp. 218-219.
21. Bouchard *et al.*, *op. cit.*, p. 73.
22. Bouchard *et al.*, p. 77.
23. Caplan, *op. cit.*, p. 133.
24. T. Ganaits, "Justifying Prenatal Screening and Genetic Amniocentesis Programs by Cost-Effectiveness Analysis: A Re-evaluation," *Medical Decision-Making*, Vol. 16, No.1 (1996), pp. 45–50, at 46.
25. N. Glover, and S. Glover, "Ethical and Legal Issues Regarding Selective Abortion of Fetuses with Down Syndrome," *Mental Retardation*, Vol. 34, No. 4 (1996), pp. 207–214, 210.