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The Parental-Fetal Disconnect

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From the Editor
Perinatal Ethics

Somewhere a young woman gasps—half in horror, half in disbelief—as she learns that she will soon become a mother; elsewhere, at the same moment, a man sheds a silent tear of joy as he discovers that he will soon become a father. In some countries, employers offer incentives in the form of housing or loans to families who limit household size through birth control; in others, governments reward large families with subsidies [1]. In agrarian societies, children have tangible economic value; in industrialized societies, they are—as one author describes—"economically worthless but emotionally priceless" [2].

Parenthood embodies the paradox of being common to all cultures, yet evoking unique responses. The relationship between a parent and child can be among the most intense of human experiences. Its sanctity is revered as the subject of Rudyard Kipling's "Mother-O-Mine"; the tragedy of its loss is reflected in such renowned works as Edvard Munch's "The Sick Child" [3] and Edvard Grieg's "Ballade in G minor," which was written in 1875 following the death of his only child and both of his parents [4]. Undoubtedly, the intimacy of this bond is emotionally provocative and often convolutes ethical decision-making processes in medicine. And whereas in most instances a physician's responsibility is to one patient at a time, in the perinatal period the doctor must be simultaneously and equally concerned with the welfare of two.

We thus devote the September 2007 issue of *Virtual Mentor* to the parental-fetal disconnect. While traditionally conceptualized in the form of a "connection," in medicine and law this relationship has increasingly come to be viewed as one of duality rather than unity [5], and one of bi- rather than uni-directionality. Indeed, there are scenarios in which parents, by actions or biologic circumstances, may exert adverse effects on the fetus. As part of the clinical cases section, Jennifer Hernandez and Scott Roberts elaborate upon the justness of informed refusal in instances of maternal substance use and the societal tendency to hold mothers to what may be considered supererogatory moral standards. Watson A. Bowes Jr. then invokes the principle of autonomy in his discussion of therapeutic options for women diagnosed with cervical cancer during the second trimester. This is a particularly striking ethical case since options that benefit the woman most may bring great harm to the fetus and vice versa. In other situations, a fetus may produce harmful effects on a parent. Arun Jeyabalan highlights such a phenomenon in this month's clinical pearl using the context of preeclampsia as a maternal-fetal competition for limited resources.

Technologic advances have also catalyzed shifts in the parental-fetal relationship. Egyptians first described their methods of predicting gender in the Kahun Medical Papyrus, dating as far back as 1850 BC: "Let the woman water wheat and spelt with her urine…if wheat grows, it will be a boy; if the spelt grows, it will be a girl" [6]. In Roman-Greek mythology, the barren appealed to goddesses of fertility such as Demeter and Persephone.

Today, however, couples seek assisted reproductive technologies (ART) such as in vitro fertilization, gamete/zygote intrafallopian transfer, and preimplantation genetic diagnosis. From such scientific strides arise new ethical debates for the field of obstetrics and gynecology, as critics question whether we are entering into an era of designer babies. In another clinical case, Marta Kolthoff contrasts the appropriate use of preimplantation genetic diagnosis to screen for "disability" with the potentially improper uses that some foresee as the first step onto a slippery slope toward eugenics. Senait Fisseha expands upon this theme in the policy forum by emphasizing the need for professional regulatory governance of such technologies, which now make feasible the unnatural states of posthumous fatherhood and postmenopausal motherhood. Lucy Frith reconciles the rights of anonymous gamete donors with an offspring's right to know his or her genetic heritage in the op-ed.

Importantly, the repercussions of such scientific developments reverberate beyond the field of obstetrics and gynecology to impact other areas of medicine. In this month's medicine and society feature, Andrew M. Courtwright and Mia Wechsler Doron comment on the societal obligations of physicians and infertility specialists to assist those who wish to become parents and the circumstances under which physicians might be justified in restricting access to ART. Kamalkumar P. Kolappa and David A. Gerber review a journal article on the ethics of pregnancy in transplant recipients and the need for transplant teams to adequately counsel this patient population.

Intractable parental-fetal conflicts may enter the legal arena for recourse. For this month's health law segment, Daniel Zank describes the slow ideologic death of HIV exceptionalism, a death that is contributing to the current political climate governing mandatory perinatal HIV testing. In closing, the medical narrative section features *Delivering Doctor Amelia*, a fictionalized memoir of an actual medical malpractice case. With this novel as her basis, Catherine Green reflects on the various professional roles of physicians—who during parturition assist with the severance of the maternal-fetal bond, but may ultimately be called upon to restore the parental-fetal connection—and the consequences when these dual functions are interrupted or frustrated.

I now invite you to read the commentaries that follow. The authors represent a variety of disciplines and departments—reproductive endocrinology and infertility, reproductive medical genetics, maternal-fetal medicine, abdominal transplant surgery, neonatology, and bioethics—and a multitude of universities from across the nation and abroad. Through this diversity, I hope you find a well-rounded discourse

that adequately addresses the complexity of this topic. I am confident that you will gain useful insights regardless of the specialty of your current or future practices.

References

1. David HP. Incentives, reproductive behavior, and integrated community development in Asia. *Stud Fam Plann*. 1982;13(5):159-173.
2. Jones RK, Brayfield A. Life's greatest joy? European attitudes toward the centrality of children. *Soc Forces*. 1997;75(4):1239-1270.
3. Beller GA. Edvard Munch's renditions of illness and dying: their message to contemporary physicians. *J Nucl Cardiol*. 2006;13:309-310.
4. Johannesen KF. *Edvard Grieg*. Miller D, trans. http://nettbiblioteket.no/grieg-samlingen/utskrifter/bio2_eng.html. Accessed August 3, 2007.
5. Ludwig M. Ethics in medicine: maternal-fetal conflict. http://depts.washington.edu/bioethx/topics/matern.html. Accessed August 3, 2007.
6. Bruehl FJ. The development of pregnancy tests. *Am J Nurs*. 1952;52(5):591-593.

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Clinical Case
Pregnant Women and Cervical Cancer: Balancing Best Interests of Mother and Fetus
Commentary by Watson A. Bowes Jr., MD

Mrs. Smith arrived at the clinic nearly 30 minutes late. Patty, the nurse at the front desk, watched her enter. Mrs. Smith's 10-year-old daughter was whining and grasping at her mother's sides while her adolescent son ineffectually instructed the little girl to "stop it or else." When Mrs. Smith came into full view, it was obvious that she was pregnant.

Dr. Daniels quickly glanced over Mrs. Smith's chart before entering the exam room and saw that her last recorded visit was a routine postpartum care appointment nearly one decade prior.

Dr. Daniels greeted Mrs. Smith with a warm smile that had come to be one of her trademarks. "What brings you to clinic today?" she began.

"Well, now, isn't that pretty clear?" Mrs. Smith said jovially while patting her belly. A large smile spread across her face. "I'm probably almost five months along!"

Throughout the course of the interview, it became clear to Dr. Daniels that this pregnancy meant a great deal to Mrs. Smith. She had recently remarried and was carrying the child of her new husband, who was also extremely excited about the recent developments. When Dr. Daniels probed to find if Mrs. Smith had been receiving any form of health care since her last clinic visit, Mrs. Smith disclosed sheepishly that she had been battling unemployment intermittently and had only recently regained her health insurance.

Dr. Daniels then finished the interview. "Today we'll draw blood, do a urinalysis, and perform a Pap smear along with your exam. Then we'll schedule an ultrasound to confirm your dates and ensure that the pregnancy is proceeding normally. Do you have any questions or concerns for me?"

Mrs. Smith did not.

They proceeded with the physical exam. Dr. Daniels was alarmed to find several suspicious lesions involving the cervix, so she told Mrs. Smith that in addition to the Pap smear she would likely need to biopsy these sites.

A week later, Mrs. Smith found herself again in the obstetrician's office—this time alone. Dr. Daniels began to explain that the Pap smear and biopsies showed clear evidence of abnormal cells.

"What do you mean, 'abnormal cells?' Are you saying that I have cancer?" interrupted Mrs. Smith. "How will that affect my baby?"

"Well," began Dr. Daniels, "if a pregnant woman is found to have very early stage disease, most physicians are comfortable delaying interventions until after delivery regardless of how far along in the pregnancy you are. For late stage cancers, we generally recommend that treatment—which might include hysterectomy—begin immediately, again, regardless of the stage of pregnancy. I'd like to do a few more tests today, and we'll go from there."

One week later Dr. Daniels had to deliver the news to Mrs. Smith that she had stage II cancer and discuss with Mrs. Smith her treatment options and their affect on her pregnancy.

Commentary

Mrs. Smith states that she believes she is "probably almost five months along," and there is no data given about the results of the ultrasound performed by Dr. Daniels to confirm gestational age of the fetus. For purposes of this discussion I will assume that the gestational age is 20 weeks. At this time Mrs. Smith has also been found to have stage II cancer of the cervix, which means that the cancer has spread beyond the cervix but has not reached the pelvic side walls or extended beyond the upper one-third of the vagina. The five-year survival rate for this stage of cancer in nonpregnant women managed with either radical hysterectomy or radiation therapy (both of which are considered standard of care) is 64 percent [1]. We are also told that Mrs. Smith, who has a 10-year-old daughter and adolescent son from a previous marriage, had recently remarried and was pleased that she was pregnant. This, then, is a "wanted pregnancy."

The standard advice currently given to women who have stage II cancer of the cervix discovered at 20 weeks' gestation is to commence treatment immediately, either with radiation or radical hysterectomy. Both treatments, however, result in the death of the fetus. If Mr. and Mrs. Smith decide on this course of action, they face the loss of their child-to-be, and Mrs. Smith will no longer have the ability to become pregnant. Alternatively, the Smiths can delay treatment until after the delivery of the baby. Given the relatively lenient requirements for receiving an abortion for medical reasons and the standard of care for women with stage II cancer of the cervix at 20 weeks' gestation, there would be no legal restrictions on Mrs. Smith's terminating the pregnancy either before or during treatment of her cancer.

The major ethical principle involved in this situation is respect for autonomy [2]. It is essential that the patient's right to make an informed decision be supported by her physician and other health care givers. Respecting the patient's autonomy means that

the physician must give Mrs. Smith the best possible information about the risks and benefits of the treatment options and that this information should be provided in an unbiased manner.

Nondirective counseling is very difficult, if not, in fact, an oxymoron. The information that is provided by a physician who has much more medical knowledge than the average patient, and the emphasis that he puts on that information, influence the patient's decision making. For example, a male ob-gyn who sees the consequences of cancer of the cervix daily, may counsel the patient from a perspective that is different from that of, let's say, a nurse who is opposed to abortion and who is personally dealing with infertility. Nevertheless, all of those who counsel Mrs. Smith must deal with the fundamental issue of balancing the value of her child-to-be against the possible (but largely unknown) harmful effects on her own mortality risk by temporarily delaying treatment of her cancer.

The counseling dilemma is complicated by the fact that no one knows what the prognosis is for stage II cancer of the cervix in a patient who delays treatment to achieve neonatal viability. There are several small studies of patients with stage I cancer of the cervix (where the tumor has not extended beyond the cervix) in which treatment was delayed until after delivery of a viable infant [3-5], and there was no untoward effect on survival related to such a delay. Because stage II cancer of the cervix in pregnancy is so uncommon, however, there is simply no evidence that 5-year survival of stage II cancer of the cervix in pregnancy is worse if treatment is delayed until after delivery.

Another option for Mrs. Smith to consider is chemotherapy during pregnancy followed by definitive therapy with radical surgery or radiation after the infant is born. Trials have shown benefit in combining chemotherapy with radiation for stage II cervical cancer [6], and a number of case reports of chemotherapy with cisplatin during pregnancy found no adverse effects on the fetus or newborn [7, 8]. The rationale for such treatment is to avoid metastatic spread of the cancer during pregnancy while awaiting definite treatment with radiation or surgery after the birth of the infant. Still, the Smiths must make their decision based on a substantial degree of medical uncertainty.

To counsel the patient from a perspective of optimism and hope, it would be safe to say to the Smiths that, given the information we have about the lack of adverse effects from delaying treatment for stage I cancer of the cervix in pregnancy, it is reasonable to believe that a delay of treatment for stage II cancer would have a similarly benign effect. This counseling might draw attention to the benefits of having a son or daughter for Mrs. Smith and her husband.

To counsel the patient from a perspective of caution and reserve, it would be reasonable to emphasize that the standard of care practiced by many ob-gyns is to begin treatment without delay in the interest of giving Mrs. Smith the best prognosis, even though it involves the loss of her child-to-be and her child-bearing potential.

This counseling would draw attention to the importance of Mrs. Smith's having the best chance of continuing her life with her children and her husband. It is also appropriate to mention here the option of using chemotherapy during pregnancy. The physician, however, must stress that it is a new treatment option and not yet the standard of care.

The counseling that best respects Mrs. Smith's autonomy includes both of these perspectives. Above all it is essential that the Smiths be given as much information as possible about patients with stage II cancer of the cervix during pregnancy, including what is known and what is unknown about the disease and the treatments.

If Mrs. Smith chooses to delay treatment, she faces another decision to be made by her and her health care team that, again, weighs benefits for her health against maximum benefit for her infant: the timing of delivery. Some will recommend delivery of the infant at the earliest sign of lung maturity as determined by tests on amniotic fluid in order to shorten Mrs. Smith's treatment delay. This sense of urgency (on behalf of possible reduction of risk for Mrs. Smith) must be tempered with the knowledge that the closer the gestational age can get to 40 weeks, the lower the newborn's risk for developing serious respiratory disease and other complications, especially when an elective cesarean delivery is performed, which is usually the recommended method of delivery in patients with cervical cancer.

A final ethical issue in this matter is the right of Mrs. Smith's physicians to conscientiously object to certain treatment options. One or more of them might have reservations about induced abortion and, in light of the uncertain prognosis of a delay in treatment, might oppose any intervention that resulted in the termination of pregnancy before a gestational age compatible with newborn survival. It is imperative that physicians and all health care givers make their views known on sanctity of life and induced abortion upfront. Doing so allows time for Mrs. Smith's care to be transferred to another qualified professional if her decisions cannot be carried out.

References

1. Stenchever MA, Droegemueller W, Herbst AL, Mishell DR Jr. *Comprehensive Gynecology*. 4th edition. St. Louis, MO: Mosby; 2006:901-910.
2. Beauchamp TL, Childress JF. *Principles of Biomedical Ethics*. 4th edition. New York, NY: Oxford University Press; 1994:120-188.
3. Duggan B, Muderspach LI, Roman LD, Curtin JP, d'Ablaing G 3rd, Morrow CP. Cervical cancer in pregnancy: reporting on planned delay in therapy. *Obstet Gynecol*. 1993;82(4 Pt 1):598-602.
4. Takushi M, Moromizato H, Sakumoto K, Kanazawa K. Management of invasive carcinoma of the uterine cervix associated with pregnancy: outcome of intentional delay in treatment. *Gynecol Oncol*. 2002;87(2):185-189.

5. Van der Vange N, Weverling GJ, Ketting BW, Ankum WM, Samlal R, Lammes FB. The prognosis of cervical cancer associated with pregnancy: a matched cohort study. *Obstet Gynecol*. 1995;85(6):1022-1026.
6. Eifel PJ. Chemotherapy in the treatment of cervical cancer. *Semin Radiat Oncol*. 2006;16(3):177-185.
7. Bader AA, Petru E, Winter R. Long-term follow-up after neoadjuvant chemotherapy for high-risk cervical cancer during pregnancy. *Gynecol Oncol*. 2007;105(1):269-272.
8. Karam A, Feldman N, Holschneider CH. Neoadjuvant cisplatin and radical cesarean hysterectomy for cervical cancer in pregnancy. *Nat Clin Pract Oncol*. 2007;4(6):375-380.

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The people and events in this case are fictional. Resemblance to real events or to names of people, living or dead, is entirely coincidental.

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Clinical Case
Assisted Reproduction and *Primum Non Nocere*
Commentary by Marta Kolthoff, MD

Mr. and Mrs. Jones were in many ways not unlike the other couples that had come to the infertility clinic. They were pleasant-appearing, affectionate towards one another and eager to become parents. They were extremely organized and had brought copies of their relevant medical records. Nevertheless, they managed to capture the attention of the entire waiting room: they both had the characteristic body size and features of achondroplasia.

Mrs. Jones began to rattle off facts in the examining room before Dr. West could even introduce himself. "We understand achondroplasia *very* well. It has autosomal-dominant genetics. When inherited homozygously, it is lethal, but…"

"Well, you certainly have done your homework very well," chuckled Dr. West. "I'm Dr. West. How exactly is it that I can help you?"

"We have been trying to become pregnant for years now," chimed in Mr. Jones. "We have been to numerous doctors and had every test performed. They finally figured out that I have a slight blockage in the passage of sperm. We were referred to you for in vitro fertilization. Your colleagues say that you're one of the best."

Dr. West went on with a mixture of modesty and pride to describe the clinic's excellent success rates for in vitro fertilization.

Mr. Jones then lowered his voice slightly as he elaborated to Dr. West his fears regarding the psychological repercussions on his wife should she conceive a homozygous child who was essentially born only to die. The couple also expressed their strong opposition to abortion. They were simply unwilling to accept a 25 percent chance that their baby would be homozygous for achondroplasia.

"Given what you have just told me," Dr. West asserted, "in conjunction with the complexities of your genetic background, we would consider preimplantation genetic diagnosis to be appropriate in avoiding this outcome and increasing the probability that you would have a child of normal stature."

Mr. and Mrs. Jones looked shocked. "Well, actually, we were hoping that you might assist us in having a child *with* achondroplasia. How would we care for or understand a child who was not like us?"

Realizing his false assumption, Dr. West thought carefully about his next words. He had never been asked to perform preimplantation genetic diagnosis and specifically choose embryos that would become what many would consider "impaired" children. While medically it may be safe, something didn't sit right with Dr. West.

Commentary

The argument against using preimplantation genetic diagnosis (PGD) to select for a disability, such as achondroplasia, relies primarily on the principle of nonmaleficence, a physician's obligation not to inflict evil or harm [1]. Achondroplasia, the most common type of short-limbed dwarfism, is associated with significant medical disabilities including spinal cord compression, spinal stenosis, orthopedic problems, and surgical and anesthetic complications [2].

Achondroplasia has generally been viewed as a social disability, since many believe that significantly short stature can limit future opportunities. Most physicians would agree that it is morally indefensible to injure an otherwise healthy embryo or fetus in order to achieve the traits observed in achondroplasia (regardless of parental preferences). Similarly, for example, if an obstetrician complied with a deaf couple's wish to have a deaf child by puncturing the developing tympanic membranes of their fetus with a needle, the obstetrician's actions would be in clear violation of the principle of nonmaleficence and would be deemed ethically repugnant. Or if a physician prescribed Accutane (isotretinoin) to a pregnant patient with acne in accordance with her request for this treatment, this physician would also violate the principle of nonmaleficence because his or her action might *result in direct injury* to an otherwise healthy fetus.

By contrast, in vitro fertilization (IVF) followed by PGD and implantation of an embryo with the genetic mutation that causes achondroplasia does *not* represent *direct harm* on the part of the physician [3]. A physician does not cause direct harm through the selection and implantation of an affected embryo; it is the *abnormal gene* that *causes harm* to the future individual [4]. The distinction is an important one. Achondroplasia is caused by a mutation in the FGFR3 gene on chromosome 4. This mutation results in the activation of processes that inhibit growth and produce the appearance and traits associated with achondroplasia [2]. But, in contrast to the examples of the two physician acts described above, the physician's action here—embryo selection and implantation—does not cause the disability. The physician indeed facilitates the conception of an individual with the FGFR3 gene mutation via reproductive genetic technology, but he or she does not cause the mutation, and selecting *that* embryo to become a living child does no harm to *that* child. The physician is responsible for the conception of a particular individual, an individual with achondroplasia.

Nonmaleficence has also been defined as the obligation to *prevent or avoid harm* [5], and a "prevention of harm" argument may seem to apply in this case; a physician can prevent the disability associated with achondroplasia by refusing to implant an

embryo with the FGFR3 mutation for this couple as requested. Although the physician's refusal conflicts with the couple's wishes, it would satisfy this "prevention of harm" argument. The implications of this argument become apparent when it is applied to alternative reproductive scenarios. A review of the basic genetics of achondroplasia, a classical Mendelian disorder, will assist in an understanding of those implications.

Achondroplasia demonstrates autosomal dominant inheritance: *carriers* of the gene mutation (those with one affected and one unaffected gene, i.e., heterozygotes) display the classic disease traits; those with two copies of the affected gene (i.e., homozygotes) do not live—the homozygous state is incompatible with life [6]. In natural conception between two persons with achondroplasia (where, by definition, each partner is heterozygous for the FGFR3 gene mutation), one expects a 25 percent chance of an unaffected pregnancy, a 50 percent chance of an affected, heterozygous pregnancy, and a 25 percent chance of a pregnancy with the lethal condition. So, excluding the lethal outcome, the couple has approximately a 66 percent chance of having a living child with achondroplasia. Given these chances, compare each of the following reproductive scenarios to the original case:

1. The couple presents for in vitro fertilization followed by PGD in order to exclude the possibility of having a pregnancy with the lethal condition. PGD reveals only one embryo that satisfies that criterion, and that embryo is heterozygous for the FGFR3 gene mutation. The couple wishes to proceed with the embryo transfer.
2. The couple presents for ovulation induction and in utero insemination (IUI) due to infertility. The couple is opposed to prenatal diagnosis and selective abortion and is willing to take their chances.
3. The couple conceives naturally. They are opposed to prenatal diagnosis and abortion and are willing to accept the consequences of natural conception.

In scenario one, the chance that, if conception succeeds and gestation occurs, the couple will have a child with achondroplasia is 100 percent [7]. In scenarios 2 and 3, the chance is approximately 66 percent. While the intention of the couple in each scenario differs from that of the couple in the original case, the outcomes in each scenario are similar, ranging from a 66 to 100 percent chance of having an affected child. A similar chance occurs when only one partner has achondroplasia (a 50 percent chance). If a child whose conception could have been prevented is born with achondroplasia, the risk percentages do not matter at all. In other words, the means (IVF/PGD, IUI, and natural conception) do not excuse the ends, and the extraordinariness of the technology or unusual parental preferences do not matter [8]. If the creation of an individual with a disability constitutes a direct or preventable harm, then, in a context where it is possible not to have such a child, all of the scenarios violate the principle of nonmaleficence [9].

The corresponding implication, then, is that the physician should refuse to help the couple in any of the scenarios unless the couple agrees to either IVF/PGD with

implantation of unaffected embryos or prenatal diagnosis with selective abortion. Scenarios 1-3 are neither extreme nor unrealistic, and a physician who believes that he or she must intervene to prevent harm whenever possible could consistently refuse to help any of these couples. But such a blanket refusal is unsettling because it violates our accepted understanding of reproductive autonomy and justice. If the nonmaleficence argument does not ethically forbid a physician's assisting the couples in these three scenarios, then, taking the next step, one could argue that the principle should not create an ethical dilemma for the physician who is asked to assist a couple with achondroplasia to have the child they want.

Some may object to this reasoning with the counterargument that there is an ethical difference between allowing a couple to procreate naturally or to forgo aborting an affected embryo, on the one hand, and performing IVF/PGD to select for an embryo with the genetic mutation that produces achondroplasia, on the other. Pragmatically, however, the line between refusing to perform PGD in the original case and refusing to assist the couples in the three later scenarios is a fine and easily transgressible one. And it is again a small and easy step from not helping those three couples to counseling a couple with achondroplasia not to procreate naturally at all. Respect for the reproductive autonomy requires practical consistency. The use of reproductive technology to implant affected embryos, as proposed in the initial case for discussion, should not alter the requirement for respect of reproductive autonomy.

Procreative Beneficence: Another Obligation?

Up to this point, the focus has been on the moral duty of the physician to avoid or prevent harm in the context of genetic disease and reproductive technologies. Do physicians and prospective parents have a further obligation—a positive duty—to facilitate the creation of children who are free of disease [10]? Ethicist Julian Savulescu argues in favor of this type of moral obligation, at least in reference to the prospective parents, characterizing it as the principle of "procreative beneficence" [11]. According to Savulescu, procreative beneficence requires that:

> Couples…should *select* the child, of the possible children they could have, who is expected to have the best life, or at least as good a life as the others, based on the relevant, available information (emphasis added) [12].

In particular, he argues, procreative beneficence implies the use of genetic testing and reproductive genetic technology to create the child with the "best life." Thus, the physician and couple are each distinctly obligated to conceive and implant the "best possible" embryo of all that couple's possible embryos. Continuing with this logic, an embryo free of the FGFR3 gene mutation would be the "best possible" embryo and should be implanted, if available.

Yet, as an argument against selecting for disability via IVF/PGD, procreative beneficence is problematic. First, it requires that judgments be made about what constitutes the "best child" and the "best life"[13]. Judgments such as these are fraught with bias and ambiguity. Furthermore, the application of procreative

beneficence directly conflicts with our deeply held notions of reproductive autonomy. Savulescu himself acknowledges and addresses this irreconcilable conflict, saying, "The implication of this is that those with disabilities should be allowed to select a child with disability, if they have a good reason" [14]. Thus, even adherents to procreative beneficence appear to concede that, while parents are ethically bound to select the best child, the definition of "best" ultimately rests with the parents alone. If the couple truly believes that their "best child" would be one with achondroplasia, then procreative beneficence should not impair the physician's ability to comply with their wishes.

Reproductive Autonomy and Equity

The main arguments against the use of reproductive technology to select for disability rely on the principles of reproductive nonmaleficence and procreative beneficence, but these principles provide inadequate justification to refuse implantation of an affected embryo given their negative implications with regard to reproductive freedom. In order to uphold the principles of reproductive autonomy and equity, the physician should not refuse to assist the couple in any of the three scenarios discussed above. Despite the extraordinariness of the technology and the unusual parental request, selection for disability via PGD is justified. Individuals with genetic disability deserve the same reproductive choices as the rest of society.

Notes and References

1. Beauchamp T, Childress J. *Principles of Biomedical Ethics*. 5th ed. New York, NY: Oxford University Press; 2001:112-115.
2. Horton WA, Hall JG, Hecht JT. Achondroplasia. *Lancet*. 2007;370(9582):162-169.
3. Although it has been alleged that significant harm can be associated with IVF/PGD, arguments that support that position have not been persuasive.
4. Davis D. A short discussion of harm. In: *Genetic Dilemmas: Reproductive Technology, Parental Choices and Children's Futures*. New York, NY: Routledge; 2001:35-48.
5. Beauchamp, Childress, 113-119.
6. The homozygous state for achondroplasia is prenatally lethal.
7. Assuming that the IVF cycle is successful and that pregnancy is achieved.
8. Extraordinary means include IVF/PGD.
9. If the creation of an individual with a disability when it was possible to not create an individual with a disability does not constitute a direct harm, then the case under discussion does not present an ethical dilemma for the physician.
10. An example of this facilitation would be advising the couple not to implant the affected embryos. Another example would be the physician's refusing to perform IVF/PGD unless the couple agreed to implant only unaffected embryos.
11. Savulescu J. Procreative beneficence: Why we should select the best children. *Bioethics*. 2001;15(5-6):413-426. Savulescu focuses on selection for nondisease genes. Disease-conferring genes are more likely than nondisease-

conferring genes to prevent an individual from leading the best life possible. His argument is easily extrapolated to the case under discussion.
12. Savulescu, 413.
13. Parker M. The best possible child. *J Med Ethics*. 2007;33(5):279-283.
14. Savulescu, 425.

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Clinical Case
Pregnant Women Who Smoke: A Challenge to the Patient-Physician Relationship
Commentary by Jennifer Hernandez, MD, and Scott Roberts, MD

Ms. Davis had many attributes that suggested she would become a successful parent. She was pleased with her current career position, had a strong support network of friends and family, and enjoyed a healthy relationship with her partner. She began prenatal care early in her pregnancy and was now at 20 weeks. The pregnancy had a single complication.

"I know what you are going to ask me," she began defensively as Dr. Golden stepped into the room. "Yes, I am still smoking. You have told me the risks at each of my visits: low birth weight, preterm birth, placental abnormalities, sudden infant death syndrome," she listed. "I just cannot seem to quit. Each time I think I have gathered enough willpower, all it takes is the sight of another smoker before I start having these terrible cravings again. All of my friends smoke. The baby's father smokes. I *do* care about the health of my baby, but this addiction is very strong. I almost think that going through the physical and emotional upheaval of quitting now would be worse for my baby. I can't help but also feel that this is ultimately my body and my choice. Wouldn't you agree, Dr. Golden?"

Commentary
Ms. Davis is a healthy young woman in the 20th week of her pregnancy. The pregnancy has gone well with one exception—cigarette smoking—a problem that Ms. Davis understands but has been unwilling and unable to change. She is not alone. About 22 percent of women over the age of 18 smoke—that's 23 million American women [1]. And although the smoking rate during pregnancy has decreased considerably over the years, it remains at about 12 percent (down from 20 percent in 1989) [2].

The risks of smoking in pregnancy are well known—low birth weight (due to preterm birth or fetal growth restriction), placental abruption, fetal deaths, and sudden infant death syndrome (SIDS). These complications have all been linked to cigarette smoking, but it is unknown how many cigarettes cause the respective harms. Is it one cigarette a day? One pack a day?—we do not know. What we do know is that eliminating smoking during pregnancy would reduce infant deaths by 5 percent and reduce the incidence of individual low-birth-weight infants by 10.4 percent [3]. Stopping smoking before becoming pregnant is ideal, but discontinuing as late as the third trimester eliminates much of the reduced birth weight caused by maternal smoking. But Ms. Davis has heard all this before, and she continues to

smoke. So what is the next step for her physician and for many of us who face this same maternal-fetal conflict everyday?

Balancing Patient Autonomy and Fetal Well-Being

The general principles that guide health care professionals include a responsibility to save or preserve life, relieve or minimize suffering, and avoid harm. The ethical theories that guide these professional principles are nonmaleficence (do no harm) and beneficence (do good). Individual patients have autonomy—a capacity, or at least potential, for self-determination (self-governance and freedom of choice) [4]. Patient autonomy is a firmly established value, and implicit in the concept is the necessity for informed patient consent. Informed consent means that individuals who are being offered a medical opinion—be it medications, surgeries, or substance abuse rehabilitation—are given objective information about the risks and benefits of a procedure or therapy so that they can make educated decisions about their plan of treatment, including refusal of care. Informed refusal by any competent nonpregnant patient is absolute, but once a fetus is involved, the "two-patient" model comes into play, and informed refusal is suddenly questioned. In the two-patient model the pregnant woman and fetus are neither physically separate nor indistinguishably fused [5]. Because of this, a physician's concern about fetal well-being sometimes supersedes a woman's judgment about what is best for her and her unborn child.

An example of a woman's autonomy being overridden by concern for the health of a fetus is the case of Melissa Rowland, pregnant with twins, who was charged with the murder of her stillborn child when she rejected the medical advice to have a cesarean delivery for oligohydramnios and fetal growth restriction while both of her twins were still alive. Ms. Rowland agreed to the cesarean 11 days later for the remaining viable twin after the demise of the growth-restricted fetus. The murder charges were dropped when she pled guilty to child endangerment due to her use of cocaine during pregnancy [6]. Ms. Rowland's competence was never doubted, but because her informed refusal was considered detrimental to her fetus, her autonomy was not absolute. Not only was her autonomy not guaranteed, but her informed refusal was considered criminal.

Most appellate courts have held that maternal decisions regarding medical treatment take precedence regardless of presumed fetal consequences of those decisions. In South Carolina, however, a woman was convicted of homicide after the birth of a stillborn due to regular use of cocaine during the pregnancy [7]. These examples are related to illegal drug use, but could they be a prelude to the future of maternal versus fetal rights? Ms. Davis, our patient, is only using tobacco. But when she delivers a low-birth-weight infant that requires extensive time in the neonatal intensive care unit or dies of SIDS, should she be held responsible? Where do we draw the line? But more importantly, on what basis do we decide where to draw the line?

First and foremost, we must uphold the importance of the patient-physician relationship. We must treat our patients with respect and dignity in order to form a

therapeutic alliance. This is particularly true in the case of substance abuse and rehabilitation. It is undeniable that addiction, be it tobacco, alcohol, illegal drugs, or anything else, is a disease—a compulsive disorder that requires medical attention. Techniques that have been shown to help patients stop smoking include counseling, cognitive and behavioral therapy, hypnosis, acupuncture, and pharmacologic therapy [3]. Ms. Davis has clearly been counseled, but that approach has not been successful. Women who smoke cite weight control, stress reduction, anxiety relief, and social support as reasons why they were drawn to and continue smoking. Physicians should discuss these factors with patients who smoke as a way to better understand the reasons for the addiction and why it persists.

Ms. Davis states that her partner and friends all smoke. Bringing the baby's father in for a prenatal visit and a joint counseling session may give the Davises motivation to quit together. Do they want their newborn to be in a household filled with secondhand smoke? Having her significant other's support and possibly even a "quitting buddy," may be all Ms. Davis needs to work towards a smoke-free pregnancy.

Although these cases can be frustrating for a physician, the fundamental goal of optimizing the outcome of the pregnancy should never waver. That said, however, we must also remember that medical knowledge has its limitations and medical judgment is fallible. We may anticipate certain outcomes from certain behaviors, but we never know for sure. It is our responsibility as physicians to counsel, inform, and advise. But the autonomy of the patient must be upheld and respected, even if a woman's autonomous decision seems not to promote our beneficence-based obligations to the fetus. We face difficult dilemmas everyday as physicians, and maternal-fetal conflict is one of the most difficult. We are, however, not the police, nor should we resemble them. In order to champion the health of children, we must champion the rights of the mothers who bear them—and that, as physicians and members of society—is our biggest challenge of all.

References

1. Christen AG, Christen JA. The female smoker: from addiction to recovery. *Am J Med Sci*. 2003;326(4):231-234.
2. Cunningham FG, Gant NF, Leveno KJ, Gilstrap LC 3rd, Hauth JC, Wenstrom KD. *Williams Obstetrics*. 22nd ed. New York, NY: McGraw Hill; 2005:209.
3. American College of Obstetricians and Gynecologists. ACOG Committee Opinion Number 316. Smoking cessation during pregnancy. *Obstet Gynecol*. 2005;106(4):883-888.
4. Informed consent. In: American College of Obstetricians and Gynecologists. *Ethics in Obstetrics and Gynecology*. 2nd ed. Washington, DC: American College of Obstetricians and Gynecologists; 2004:9-17. www.acog.org/from_home/publications/ethics/ethics009.pdf. Accessed July 30, 2007.

5. American College of Obstetricians and Gynecologists. ACOG Committee Opinion Number 321. Maternal decision making, ethics, and the law. *Obstet Gynecol*. 2005;106(5 Pt 1):1127-1137.
6. Minkoff H, Paltrow LM. Melissa Rowland and the rights of pregnant women. *Obstet Gynecol*. 2004;104(6):1234-1236.
7. Affidavit in Support of Arrest Warrant D-038033 (Feb. 5, 1992), *State v Whitner*, No 92-GS-39-670 (SC Ct Gen Sess Pickens County 1992).

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The people and events in this case are fictional. Resemblance to real events or to names of people, living or dead, is entirely coincidental.

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Journal Discussion
Should Women with Transplanted Organs Be Discouraged from Becoming Pregnant?
Kamalkumar P. Kolappa and David A. Gerber, MD

Ross LF. Ethical considerations related to pregnancy in transplant patients. *N Engl J Med*. 2006;354(12):1313-1316.

A woman's pregnancy can be one of the most emotion-laden experiences in her life. Though society's views on the necessity of having children have evolved continuously, there is little question about the impact that a woman's choice to bear children has on her and on her family. The choice to become pregnant gets tested, though, when the woman is an organ transplant recipient because pregnancy may endanger the graft, the mother, and the child. Whether or not women who are transplant recipients should be discouraged from becoming pregnant is a discussion that is a complex kaleidoscope of science, law, and ethics. Even though a consensus on the consequences of pregnancy in transplant patients has yet to be reached, more and more women with transplanted organs are becoming mothers, and greater attention should be given to the issue.

In "Ethical Considerations Related to Pregnancy in Transplant Recipients," Lainie Friedman Ross asserts that women who have received transplants are having children in significant numbers [1]. She notes that since the first documented pregnancy in a transplant recipient in 1958, more than 7,000 such pregnancies have occurred. That transplant recipients are becoming pregnant with greater frequency has been corroborated by other authors who cite increasing rates in patients with liver, heart, lung, bone marrow, and pancreas-kidney transplants [2, 3].

Clinical Considerations
Ross begins by eloquently framing her ethical discussion with a review of the clinical implications of organ transplantation on pregnancy by examining, in turn, its effect on the allograft, the mother, and the fetus.

Regarding the first of these—effects of pregnancy on the allograft—Ross says that, in renal transplant patients, one of the concerns has been that "…the increased glomerular filtration rate caused by pregnancy might lead to hyperfiltration and consequent glomerulosclerosis" [4]. She then states that, while there is evidence of decreased renal function during pregnancy, this impairment mirrors the natural course of organ dysfunction in all kidney recipients, which would seem to rule out pregnancy as an independent contributor to allograft morbidity. She strengthens this

assertion by citing expert opinion on stability of solid organ transplants during pregnancy: "…consensus is that pregnancy does not compromise the function of a renal or liver allograft when the allograft is stable before pregnancy" [5]. Finally Ross highlights current recommendations based on data from the National Transplantation Pregnancy Registry that organ recipients wait two years after transplantation before considering pregnancy, allowing sufficient time for graft stability, after which pregnancy should be feasible with lower risks of permanent decrease in function of the allograft [6].

Next Ross considers the impact of pregnancy on maternal health outcomes. She notes that having transplanted organs has been correlated with an increased risk for conditions such as ectopic pregnancy, preeclampsia, and infection. There also seems to be a greater need for cesarean delivery, particularly in renal transplant patients [5]. The magnitude of this increased risk is unclear, however, as Ross does not further elaborate on this point.

Ross invests more detail in describing risks to the child, discussing the potential teratogenic effects of transplant immunosuppressive therapy that have been demonstrated in animal models. She acknowledges that some immunosuppressive drugs like muromonab-CD3 (Orthoclone OKT3) and antithymocyte globulin do not have animal research data on fetal effects and that there is, in general, a paucity of data regarding long-term medical complications of immunosuppressive therapy. She summarizes her view about the lack of compelling evidence on the risks of these drugs by saying that, "To date, the frequency of birth defects in infants born to women receiving immunosuppressive agents is not statistically different from that in the general population" [5]. Ross does concede that rates of prematurity and low birth weight are higher in infants born of mothers with transplants. This in itself is cause for concern because both prematurity and low birth weight have been decisively linked to increased risk of cognitive and neurodevelopmental abnormalities.

Ethical and Legal Considerations

The discussion of pregnancy in transplant recipients would be incomplete if only the science were considered. Pregnancy and the creation of life spark diverse reactions throughout society, and Ross concisely reviews the major ethical and legal considerations of pregnancy in transplant recipients.

She begins with the physician's duty to review fertility options and their consequences with women who have transplanted organs. Ross initiates the ethics portion of the discussion by stating that, "A major issue is how and when physicians should address fertility issues with female transplant recipients of childbearing age" [5]. Given that as many as half of all pregnancies are unintended [7] is it safe for physicians to wait until a woman expresses an interest in becoming pregnant before initiating a conversation about the implications of organ transplantation on pregnancy? A related point made by Ross is that, even though some doctors discourage women from becoming pregnant when they have shorter-than-average

life expectancies, "…a child is not ethically wronged by being born to a woman who is a transplant recipient, because there is no guarantee that any parent will be healthy and be able to rear her child until adulthood" [8].

Ross also offers insight concerning the ethics of a second transplant should the first graft fail after pregnancy. Since, in most cases, retransplantation is riskier for the patient, and the second organ is less stable than the primary transplant, should a woman whose first graft may have been compromised by the burden of pregnancy have the chance for a second graft, when some patients on the waiting list have yet to receive a first? Ross compares this situation to that of patients who continue to abuse alcohol while waiting for a liver. Though intuitively it seems inappropriate to equate pregnancy with alcoholism, the underlying tie is the choice of voluntary behaviors that predispose one to an increased risk of graft failure. In the end, Ross rejects this argument because "…it is not understood why some organs fail during pregnancy," and therefore one can incorrectly blame organ failure on pregnancy rather than on another etiology. Ross cites Robert Veatch's argument that organs be allocated so that priority is given to younger patients with more quality-adjusted life years (QALYs) regardless of prior transplantation status rather than older patients awaiting first transplant [9]. Based on this model of allocation, Ross feels that women who lose an organ during pregnancy should be eligible for a second transplant.

Perhaps the most controversial aspect of this discussion is raised when Ross asks, "When a transplant recipient becomes pregnant, who is actually the patient?" [8]. This question fuels debate about many ethical-legal concepts including a competent woman's decision-making rights over her own body and the politics of the maternal-fetal conflict of interest. Should a woman have complete control over the health of her unborn child in addition to the rights over her own body? Is it appropriate for society to intervene if certain behaviors of the mother place the fetus in jeopardy? Though the same questions apply in every case of pregnancy, they take on added significance when known risks are greater than those for pregnancies in which the mother does not have a transplanted organ.

Approaching the Ethics of Maternal-Fetal Conflict in Transplant Recipients: Lessons from a Parallel Case

Though maternal-fetal conflict is often thought of as a matter of maternal choices, including behaviors that can impact fetal health during pregnancy, it can also apply to the decision to become pregnant in situations where parents have genetic or infectious conditions that may be passed to the child.

An insightful and parallel discussion regarding the ethics of a pregnancy in which maternal circumstances can impact fetal health can be found in Howard Minkoff and Nanette Santoro's "Ethical Considerations in the Treatment of Infertility in Women with Human Immunodeficiency Virus Infection" [10]. The authors consider infertility treatment in HIV couples in light of the historically controversial outcomes of vertical transmission of HIV from mother to child and the likelihood that a mother will die before her child reaches majority. The clinical course of HIV has changed

drastically with the advent of modern antiretrovirals. When HIV was initially identified, approximately 25 percent of mothers transmitted HIV to their children, and the prospect for infected children was grim. Minkoff and Santoro believe that a new perspective on assisting these women with pregnancy is warranted by the change of disease status. The authors conclude that the decision to treat infertility in women with HIV depends on principles of autonomy, beneficence, and social justice but that autonomy is the deciding factor because,

> …decisions involving infertility are not different from other reproductive choices women make. If, as the courts have recognized, women can be entrusted to strike the sometimes complex balance between their own health interests and those of their fetuses, there is no reason to assume that they are not equally capable of understanding the consequences of childbearing and child rearing in the context of HIV infection [11].

Conclusion

Similarly, Ross concludes with regard to this conflict of interest that, "…physicians should respect the decision that each recipient makes about the risk and benefits [of pregnancy]" [12]. But the potential for conflicting interests continues to inspire varied reactions from expecting mothers and physicians to lawyers and the rest of society. Given the theoretical risks to children from immunosuppressive drugs, the higher rates of prematurity, and the low birth weight in infants, to what extent should women be discouraged from becoming pregnant after having received a transplant? Though there is no compelling evidence that immunosuppressives can be blamed for malformations in developing children, the long-term implications of many of these agents are not clearly defined at this time [13]. Are transplant recipients exposing their potential children to undue risk? Should physicians be satisfied with the National Transplantation Pregnancy Registry's recommendation that women wait at least two years for graft stability before recommending pregnancy, or should they encourage alternative means of having children such as adoption? How aggressive should physicians be with contraception education in this patient population considering the high prevalence of unintended pregnancies in the general population?

Though the legality of transplant recipients becoming pregnant and having children is not yet in dispute, the unanswered societal question weighs the wishes of transplant recipients to have children against the health implications for the child that results from the pregnancy.

References

1. Ross LF. Ethical considerations related to pregnancy in transplant patients. *N Engl J Med*. 2006;354(12):1313-1316.
2. Alston PK, Kuller JA, McMahon MJ. Pregnancy in transplant patients. *Obstet Gynecol Surv*. 2001;56(5):289-295.
3. Nagy S, Bush M, Berkowitz R, et al. Pregnancy outcome in liver transplant patients. *Obstet Gynecol.* 2003;102(1):121-128.

4. Ross, 1313.
5. Ross, 1314.
6. Armenti VT, Radomski JS, Moritz MJ, et al. Report from the National Transplantation Pregnancy Registry (NTPR): outcomes of pregnancy after transplantation. *Clin Transpl*. 2002:121-130. http://www.transplantliving.org/ContentDocuments/Pregnancy_Outcomes_Report.v2.pdf. Accessed July 31, 2007.
7. Colley Gilbert BJ. Johnson CH, Morrow B, Gaffield ME, Ahluwalia I. Prevalence of selected maternal and infant characteristics, Pregnancy Risk Assessment Monitoring System (PRAMS), 1997. *MMWR CDC Surveill Summ.* 1999;48(5):1-37.
8. Ross, 1315.
9. Veatch R. *Transplantation Ethics*. Washington, DC: Georgetown University Press; 2000:277-413, cited by Ross, 1315.
10. Minkoff H, Santoro N. Ethical considerations in the treatment of infertility in women with human immunodeficiency virus infection. *N Engl J Med*. 2000;342(23):1748-1750.
11. Minkoff, Santoro, 1750.
12. Ross, 1317.
13. McKay DB, Josephson MA. Pregnancy in recipients of solid organs—effects on mother and child. *N Engl J Med*. 2006;354(12):1281-1293.

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Clinical Pearl
Preeclampsia: A Perturbation of the Maternal-Fetal Balance?
Arun Jeyabalan, MD, MSCR

Introduction
Preeclampsia is a pregnancy-specific disorder that affects many organ systems and is recognized by new onset of hypertension and proteinuria after 20 weeks of gestation. Affecting 5-8 percent of all pregnancies, preeclampsia can cause substantial maternal, fetal, and neonatal morbidity and mortality. The term *eclampsia* is derived from Greek meaning "sudden flashing" or "lightning" and refers to the seizures that can accompany this syndrome. Although this disorder was described by the Egyptians and Indians more than 2,000 years BCE, the only known cure for preeclampsia remains delivery of the fetus and placenta.

In the developing world, preeclampsia and hypertensive disorders of pregnancy are among the leading causes of maternal mortality [1]. Although maternal death due to preeclampsia is less common in developed countries, maternal morbidity remains high worldwide and is a major contributor to intensive care unit admissions among pregnant women. The fetus is at increased risk for growth restriction and death. Iatrogenic preterm delivery and the associated complications of prematurity may also lead to neonatal death or serious neonatal morbidity [2].

Diagnosis
The nomenclature for preeclampsia has changed over the years, with terms such as "toxemia" and "pregnancy-induced hypertension" now considered outdated. The Working Group Report on High Blood Pressure in Pregnancy [3] defines mild preeclampsia as:

- new onset of sustained elevated blood pressure (≥140 mmHg systolic or ≥90 mmHg diastolic), and
- proteinuria (at least 1+ on a dipstick or ≥ 300 mg in a 24 hour urine collection) first occurring after 20 weeks of gestation.

Preeclampsia is considered severe when any of the following is also present:

- blood pressure greater than or equal to 160 mmHg systolic or 110 mmHg diastolic,
- urine protein excretion of at least 5 grams in a 24 hour collection,
- neurologic disturbances (visual changes, headache, seizures, or coma),
- pulmonary edema,

- hepatic dysfunction (elevated liver enzymes or epigastric pain),
- renal compromise (oliguria or elevated serum creatinine concentrations),
- thrombocytopenia,
- placental abruption, fetal growth restriction, or oligohydramnios.

The term eclampsia is used when seizures occur with this disorder.

HELLP syndrome, often considered a variant of preeclampsia, is defined by the presence of hemolysis, elevated liver enzymes, and low platelets. Elevated blood pressure alone after 20 weeks of gestation is referred to as gestational hypertension, and gestational hypertension that resolves postpartum is called transient hypertension. Hypertension that persists beyond the postpartum period is considered to be chronic hypertension. These diagnoses often can be made only in retrospect, unless hypertension precedes pregnancy or develops before 20 weeks of gestation. Preeclampsia can also develop in women with chronic hypertension. This superimposed preeclampsia is characterized by a sudden and sustained increase in blood pressures with or without substantial increase in proteinuria.

Risk Factors

Preeclampsia is more common in first pregnancies and new paternity and in women with personal or family histories of preeclampsia, multifetal gestation (twins and above), obesity, or certain medical conditions such as hypertension, diabetes, certain thrombophilias, renal disease, and lupus. Paradoxically, cigarette smoking reduces the risk of preeclampsia.

Pathophysiology

Preeclampsia is more than just hypertension. It is a syndrome involving multiple organ systems that is characterized by vasoconstriction, endothelial dysfunction, activation of the coagulation cascade, oxidative stress, metabolic changes, and an excessive inflammatory response. Although extensive research in this arena is ongoing, the precise pathophysiology of preeclampsia is not yet known. Conceptually, preeclampsia can be thought of as having two stages [4]. The first stage—abnormal vascular remodeling of the maternal uterine spiral arterioles by invasive placental trophoblasts and reduced placental perfusion—occurs early in pregnancy and is considered the cause. The second stage—which includes the maternal syndrome of vascular dysfunction and multi-organ system involvement—is considered to be a consequence of the first stage. Current research focuses on two key questions: (1) why do some, but not all women, with reduced placental perfusion develop preeclampsia? and (2) what links the two stages?

Regarding the first question, recent research has focused on the interaction of maternal natural killer cells in uterine decidua and trophoblastic HLA-C antigens (major histocompatibility complex class I molecule) [5] because immune-mediated interactions at the maternal-fetal interface are important for signal regulation between the mother and fetus. Certain combinations of receptors on uterine natural killer cells and trophoblast HLA-C polymorphisms can lead to the abnormal vascular

remodeling and inadequate placental perfusion that is characteristic of preeclampsia. Such maternal-fetal interactions may, in part, explain the increased risk of preeclampsia in first pregnancies or new paternity and in women who have received donor eggs to achieve pregnancy.

Regarding the second question, the precise link(s) between reduced placental perfusion (stage 1, i.e., the cause) and the maternal syndrome (stage 2, i.e., the consequence) is not well understood. Teleologically there is no apparent benefit in severe maternal—and possibly fetal—illness during pregnancy. One proposed evolutionary theory is that preeclampsia is a case of maternal-fetal competition for limited maternal resources [6]. Normally, the fetus influences the flow of nutrients and blood which sustains it while not adversely affecting its mother's health. But adaptive feto-placental signals to increase oxygen and nutrient delivery to the fetus may not be tolerated by certain women, resulting in an inappropriate or exaggerated maternal response that leads to the serious systemic manifestations observed with preeclampsia.

Recent research has focused on placenta-derived angiogenic growth factors and their role in the pathogenesis of preeclampsia. Prior to and with clinically recognized preeclampsia, circulating concentrations of anti-angiogenic factors, such as soluble vascular endothelial growth factor receptor—also known as soluble fms-like tyrosine kinase receptor-1 (sFlt-1)—and soluble endoglin are increased, while concentrations of pro-angiogenic factors such as placental growth factor are decreased [7, 8]. In rats, adenovirus transfection with sFlt-1 results in systemic features similar to preeclampsia [9]. Thus, sFlt-1 can be considered a feto-placental signal that can result in a harmful maternal response.

Clinical Management

The only known cure for preeclampsia is delivery of the fetus and placenta [10]. Vaginal delivery is usually appropriate unless other obstetric complications indicate the need for or advisability of cesarean section. If preeclampsia becomes clinically apparent at term (greater than or equal to 37 weeks), delivery at that time benefits both the mother and the neonate. Intravenous magnesium sulfate is used to prevent seizures. In general, this approach results in favorable maternal and neonatal outcomes.

With pregnancies that are preterm, especially those less than 34 weeks of gestation, delivery provides clear maternal benefit but may be disadvantageous to the neonate because of the complications associated with prematurity, such as respiratory distress syndrome, intraventricular hemorrhage, necrotizing enterocolitis, retinopathy of prematurity, and developmental delay. Delaying delivery in early-onset or severe preeclampsia may be acceptable in certain circumstances [11] to improve neonatal outcome, but must be carefully considered so that maternal risks are not excessive. The health of the mother must be constantly weighed against the potential benefits of delayed delivery for the baby. Close inpatient maternal and fetal surveillance in a

tertiary care facility with 24-hour obstetric, neonatology, and anesthesia services is a necessity.

Women who have had preeclampsia are at increased risk for cardiovascular disease later in life [12, 13]. Many predisposing factors are common to both conditions [14]. Thus, preeclampsia may have implications for a woman's health over the course of her lifetime, and close follow-up is recommended.

Conclusion

Preeclampsia is a heterogeneous pregnancy disorder. Its precise cause is unknown, and research efforts are ongoing. We know that the normal balance between the mother's interests and those of the fetus are perturbed in pregnancies complicated by preeclampsia. While this perturbation may be adaptive in certain situations, the resultant imbalance can lead to serious complications for the mother and the baby. Striking an appropriate balance between maternal and fetal well-being can also be challenging in the clinical management of preeclampsia. The ultimate goal with preeclampsia and other pregnancy complications is a favorable outcome for both patients—the mother and the baby.

References

1. Duley L. Maternal mortality associated with hypertensive disorders of pregnancy in Africa, Asia, Latin America and the Caribbean. [See comment in *Br J Obstet Gynaecol.* 1992;99(11):937-938.] *Br J Obstet Gynaecol.* 1992;99(7):547-553.
2. Goldenberg RL, Rouse DJ. Prevention of premature birth. [See comments in *N Engl J Med.* 1998;339(25):1858-1860.] *N Engl J Med.* 1998;339(5):313-320.
3. Gifford RW, August PA, Cunningham FG, et al. Report of the National High Blood Pressure Working Group on Research on Hypertension in Pregnancy. *Am J Obstet Gynecol.* 2000;183:S1-S22.
4. Roberts JM, Gammill HS. Preeclampsia: recent insights. *Hypertens.* 2005;46(6):1243-1249.
5. Hiby SE, Walker JJ, O'Shaughnessy KM, et al. Combinations of maternal KIR and fetal HLA-C genes influence the risk of preeclampsia and reproductive success. *J Exp Med.* 2004;200(8):957-965.
6. Haig D. Genetic conflicts in human pregnancy. *Q Rev Biol.* 1993;68(4):495-532.
7. Levine RJ, Maynard SE, Qian C, et al. Circulating angiogenic factors and the risk of preeclampsia. [See comments in *N Engl J Med.* 2004;350(7):641-642; and *N Engl J Med.* 2004;350(19):2003-2004.] *N Engl J Med.* 2004;350(7):672-683.
8. Levine RJ, Lam C, Qian C, et al. Soluble endoglin and other circulating antiangiogenic factors in preeclampsia.[See comment in *N Engl J Med.* 2006;355(10):1056-1058.] [Erratum appears in *N Engl J Med.* 2006;355(17):1840]. *N Engl J Med.* 2006;355(10):992-1005.

9. Maynard SE, Min JY, Merchan J, et al. Excess placental soluble fms-like tyrosine kinase 1 (sFlt1) may contribute to endothelial dysfunction, hypertension, and proteinuria in preeclampsia. [See comment in *J Clin Invest.* 2003;111(5):600-602.] *J Clin Invest.* 2003;111(5):649-658.
10. Lindheimer MD, Roberts JM, Cunningham FG. *Chesley's Hypertensive Disorders in Pregnancy.* 2nd ed. Stamford, CT: Appleton and Lange; 1999.
11. Sibai BM, Barton JR. Expectant management of severe preeclampsia remote from term: patient selection, treatment, and delivery indications. *Am J Obstet Gynecol.* 2007;196(6):514.e1-9.
12. Irgens HU, Reisaeter L, Irgens LM, et al. Long term mortality of mothers and fathers after pre-eclampsia: population based cohort study. *BMJ.* 2001;323(7323):1213-1217.
13. Funai EF, Friedlander Y, Paltiel O, et al. Long-term mortality after preeclampsia. *Epidemiol.* 2005;16(2):206-215.
14. Funai EF, Paltiel OB, Malaspina D, Friedlander Y, Deutsch L, Harlap S. Risk factors for pre-eclampsia in nulliparous and parous women: the Jerusalem perinatal study. *Paediatr Perinat Epidemiol.* 2005;19(1):59-68.

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Health Law
Is It Time to Revisit Prenatal HIV Testing Laws?
Daniel Zank, MS

Of the many unfortunate situations brought on by the HIV/AIDS epidemic, few evoke the same sympathetic and visceral response as the image of a child born HIV-positive. Legislators must consider far more than this image, however, if they are to create ethical and responsible policies for prenatal and perinatal HIV testing. Lawmakers must carefully weigh issues of maternal privacy, stigmatization, and informed consent in addition to the potential benefit to the infant. The dynamic nature of the risks against which these policies protect also necessitates periodic review to determine whether the appropriate protections are provided to both mother and child.

Because HIV testing is not mandatory for pregnant women, the exact number of infants born to seropositive mothers is not known. In 1998, an estimated 6,000 to 7,000 infants were born to HIV-positive mothers in the U.S., a number that had remained stable for five years [1]. The Centers for Disease Control and Prevention (CDC) estimates that in 2002 only 144-236 children were born HIV-positive [2]. This was the smallest number of perinatally infected infants since the HIV/AIDS epidemic took hold in the early 1980s. Many of these cases of transmission could have been prevented by better prenatal management of maternal HIV infection, but prevention is complicated by the fact that many HIV-positive pregnant women are asymptomatic, unaware of their serostatus, or fail to seek prenatal care.

As HIV/AIDS treatments have evolved, so too has the rationale for testing. Initially, there were no treatment options to prevent vertical transmission, and 25-30 percent of infants born to HIV-positive mothers contracted the disease during pregnancy, parturition, or breastfeeding [2]. The turning point came in 1994, when researchers demonstrated a reduction in perinatal transmission rates to less than 2 percent as a result of (1) antepartum maternal treatment and postpartum neonatal treatment with the antiretroviral (ARV) drug zidovudine, (2) use of elective cesarean delivery when appropriate, and (3) avoidance of breastfeeding [3, 4]. Due to increasing patterns of resistance, the Public Health Service Task Force and the CDC now recommend combination ARV therapy in place of zidovudine monotherapy [5]. Implementation of this prophylactic regimen is contingent upon determining maternal serostatus.

Current State Laws
In the interest of preventing perinatal transmission of HIV, 21 states have adopted statutes that specifically address antepartum testing. These statutes can be classified

into two groups. Thirteen states have adopted "opt-in" testing statutes, which dictate that an HIV test must be offered to every pregnant woman at the time she presents for her first prenatal care visit and that the woman must consent to the test before it can be performed [6]. Eight states have adopted "opt-out" statutes, which require that every pregnant woman be informed that she will be tested for HIV as part of a battery of routine screening tests at the time she presents for her first prenatal care visit. In such states, the test will be performed unless the woman refuses either orally or in writing [6]. Both types of statutes generally include provisions for pretest counseling concerning the risks and benefits of prenatal HIV screening so that consent may be considered "informed." The CDC, the American College of Obstetricians and Gynecologists, and the American Academy of Pediatrics have issued statements in support of the opt-out method of prenatal screening, citing evidence that this method improves testing rates among pregnant women [7, 8].

The remaining 29 states do not specifically address prenatal testing for HIV, and in these jurisdictions screening of pregnant women is performed on a voluntary basis subject to the same informed consent laws that govern nonpregnant individuals.

Only two states have adopted statutes that address postpartum HIV testing of newborns without the consent of the mother [9, 10]: New York, which has implemented mandatory HIV screening of all newborns, and Indiana, which permits testing of newborns without consent if the attending physician deems the screening test medically necessary based upon maternal risk factors for HIV. Mandatory newborn testing has the potential to benefit both infant and mother. It expedites treatment of exposed infants to reduce the risk of perinatal HIV infection and confirmation of maternal seropositivity, which allows maternal treatment and the opportunity for behavior modification to prevent spread of infection.

Balancing Health Benefits and Ethical Harms

Nevertheless, these epidemiologic benefits must be balanced with nontrivial ethical harms. A woman's positive test result may precipitate anxiety and depression, compounded by the social stigmatization of being labeled "HIV-positive." Relationships with family, friends, neighbors, and partners may be irreparably altered, sometimes leading to domestic or intimate partner violence. Individuals may be burdened with fears concerning employability and insurability if serostatus is revealed. Although false positives are fewer than 1 in 250,000 with standard screening and confirmatory tests, such results may unnecessarily disrupt the mother's life and cause the infant to undergo unnecessary treatment [11].

The primary legal challenge to mandatory prenatal and perinatal HIV testing has been in defense of maternal rights to privacy and personal autonomy collectively guaranteed by the First, Third, Fourth, and Ninth Amendments. Infringement upon these rights must be justified by a legitimate and compelling state interest and must use the least restrictive means necessary to secure that interest. In *Roe v. Wade* the Supreme Court found that the state has a compelling interest in potential human life, but that interest begins only during the third trimester of pregnancy [12]. *Planned*

Parenthood v. Casey subsequently reaffirmed the central holdings of *Roe*, but extended the state's interest to the cusp of viability, which, due to advancements in neonatal care, is now thought to be during the second trimester [13].

In the case of perinatal HIV infection, the state's compelling interest extends beyond protection of a potential life, since the state may provide financial support for HIV-infected infants in the form of state-sponsored health insurance and social services. While observational data show that the opt-out testing approach may increase testing rates to as high as 85 percent, mandatory prenatal testing could boost HIV screening rates to nearly 100 percent [8]. But is mandatory testing the most narrowly tailored means of achieving prevention?

Other arguments against mandatory testing are rooted in HIV exceptionalism rather than protections of personal autonomy. Early in the epidemic, legislators created HIV treatment and testing policies that increased privacy protections, required a rigorous process of pretest counseling and informed consent, and exempted HIV from many public health interventions. The basis for HIV exceptionalism was the desire to protect individuals from discrimination and marginalization at a time when the virus was closely associated with homosexuality and intravenous (IV) drug use. While men who have sex with men and IV drug users are still among the highest risk groups for HIV infection, the explosion of the disease among the heterosexual population and the development of effective treatments have served to diminish the social stigma associated with it. This normalization may justify assuming a more traditional public health perspective about mandatory prenatal screening.

The precedent for a more utilitarian, public health approach has been established by mandatory prenatal and newborn screening for other diseases and disorders. Syphilis is a curable sexually transmitted disease, although it can be disabling or life-threatening to an infant when passed from mother to child during pregnancy. As a result of the implementation of state mandates requiring serologic assays for syphilis during pregnancy, the rate of congenital syphilis decreased by an average of 14.1 percent per year from 1996-2005 [14]. This reduction demonstrates the enormous public health utility of mandated screening for a preventable disorder. Phenylketonuria (PKU) is a rare genetic metabolic disorder that results in progressive mental retardation in the absence of dietary restrictions during early childhood development. In 2002 all states required testing for PKU in their newborn screening battery. Interestingly, screening mandates for these disorders remain unchallenged [15, 16].

Medical professional organizations, including the American Medical Association, have decried mandatory HIV testing as a threat to patient autonomy and to the patient-doctor relationship. Mandatory testing has the potential to lead to an informalization of the consent and notification process, which increases the likelihood that a patient may be tested without his or her knowledge, thus undermining the public's trust of physicians. Professional organizations have also

expressed concerns that mandatory HIV testing may discourage some pregnant women from seeking medical care [17].

The CDC has recently called for an end to HIV exceptionalism and the requirement for specific informed consent for HIV screening. Consent for HIV testing would come with the blanket consent to receive medical care. CDC recommendations also support opt-out testing of all pregnant women early in pregnancy and again during the third trimester [18]. Ostensibly, the CDC has determined that the risks associated with stigmatization have diminished to the point that they are now offset by the personal benefits of early treatment and the public health benefit of preventing transmission of the virus to others through treatment and behavior change.

How these recommendations will affect state laws regarding prenatal HIV testing remains to be seen. It now falls to legislators to determine whether the current social climate is one in which seropositive individuals no longer reasonably need to fear discrimination and thus no longer require the protections provided by HIV exceptionalism.

References

1. Lindegren ML, Byers RH, Thomas P, et al. Trends in perinatal transmission of HIV/AIDS in the United States. *JAMA*. 1999;282(6):531-538.
2. Centers for Disease Control and Prevention. Achievements in public health. Reduction in perinatal transmission of HIV infection—United States, 1985-2005. *MMWR Morb Mortal Wkly Rep*. 2006;55(21):592-597.
3. Connor EM, Sperling RS, Gelber R, et al. Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment. Pediatric AIDS Clinical Trials Group Protocol 076 Study Group. *N Engl J Med*. 1994;331(18):1173-1180.
4. Cooper ER, Charurat M, Mofenson L; Women and Infants' Transmission Study Group. Combination antiretroviral strategies for the treatment of pregnant HIV-1-infected women and prevention of perinatal HIV-1 transmission. *J Acquir Immune Defic Syndr*. 2002;29(5):484-494.
5. Perinatal HIV Guidelines Working Group. *Public Health Service Task Force Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1 Infected Women for Maternal Health and Interventions to Reduce Perinatal HIV-1 Transmission in the United States*. Rockville, MD: AIDSinfo. http://aidsinfo.nih.gov/ContentFiles/PerinatalGL.pdf. Accessed July 18, 2007.
6. National HIV/AIDS Clinicians' Consultation Center. State HIV testing laws. Updated March 2, 2007. http://www.ucsf.edu/hivcntr/PDFs/WEB2007State%20Laws.pdf. Accessed July 18, 2007.
7. Anderson JE, Koenig LJ, Lampe MA, Wright R, Leiss J, Saul J. Achieving universal HIV screening in prenatal care in the United States: provider persistence pays off. *AIDS Patient Care STDs*. 2005;19(4):247-253.

8. Centers for Disease Control and Prevention. HIV testing among pregnant women—United States and Canada, 1998-2001. *MMWR Morb Mortal Wkly Rep*. 2002;51(45):1013-1016.
9. New York Public Health Law sec 2500f. Human immunodeficiency virus; testing of newborns. www.wadsworth.org/newborn/law.htm. Accessed July 30, 2007
10. Indiana Code sec 16-41-6-4. Testing newborn infants; confidentiality; notice; information on treatment options; objecting; rules. http://www.in.gov/legislative/ic/code/title16/ar41/ch6.html. Accessed July 30, 2007.
11. Chou R, Smits AK, Huffman LH, Fu R, Korthuis PT; US Preventive Services Task Force. Prenatal screening for HIV: A review of the evidence for the US Preventive Services Task Force. *Ann Intern Med*. 2005;143(1):38-54.
12. *Roe v Wade*, 410 US 113 (1973).
13. *Planned Parenthood v Casey*, 505 US 833 (1992).
14. Centers for Disease Control and Prevention. *Sexually Transmitted Disease Surveillance 2005 Supplement, Syphilis Surveillance Report*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention; 2006. cdc.gov/std/syphilis2005/syphsupp2005.short.pdf. Accessed July 30, 2007.
15. Hollier LM, Hill J, Sheffield JS, Wendel GD. State laws regarding prenatal syphilis screening in the United States. *Am J Obstet Gynecol*. 2003;189(4):1178-1183.
16. United States General Accounting Office. *Newborn Screening: Characteristics of State Programs*. GAO-03-449. Washington, DC: General Accounting Office; 2003. http://www.gao.gov/new.items/d03449.pdf. Accessed July 18, 2007.
17. American Medical Association Council on Science and Public Health. *Universal, Routine Screening of Pregnant Women for HIV Infection*. http://www.ama-assn.org/ama/pub/category/13548.html#universal_versus_mandatory. Accessed July 18, 2007.
18. Centers for Disease Control and Prevention. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. *MMWR Morb Mortal Wkly Rep*. 2006;55(RR14):1-17.

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Policy Forum
A Match Made in Heaven: Posthumous Fatherhood and Postmenopausal Motherhood
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Remarkable advances in assisted reproductive technologies (ART) have expanded human reproductive capabilities, overcoming biological limitations such as death and aging. Two such capabilities are postmenopausal motherhood by in vitro fertilization (IVF) using donor eggs from young women and posthumous fatherhood following sperm extraction from deceased men. Both raise difficult moral, ethical, and sometimes legal questions. This article (1) summarizes the current state of postmenopausal and posthumous reproduction in the United States, (2) addresses some of the ethical and legal concerns that arise from these practices, and (3) reviews available guidelines and policies that apply to and govern such practices.

Postmenopausal Reproduction
Postmenopausal reproduction refers to pregnancy after menopause by means of in vitro fertilization using eggs donated by young women. In vitro fertilization using egg donors was initially intended for women with premature menopause secondary to disease, chemo- and radiation therapy, congenital absence of ovaries, or surgical removal of ovaries [1]. Due to the success of the procedure and improvements in IVF technology, access to the procedure has been granted to postmenopausal women who have exhausted their natural ability to have a child due to depleted ovarian function. Although still relatively small, the number of postmenopausal women taking advantage of the technology is increasing. According to the most recently published data from the Centers for Disease Control and Prevention, donor eggs or embryos were used in approximately 12 percent of all ART cycles carried out in 2004 (15,175 cycles). Among women older than 47, about 91 percent of all ART cycles used donor eggs [2].

Ethical arguments for allowing postmenopausal women access to reproductive technologies have been based on gender equality, reproductive freedom, and the societal practice of child-raising by grandparents who often bring maturity, economic stability, and parental stability to the family unit [1]. Those who oppose oocyte donation to postmenopausal women do so on grounds of "scarcity of resources; fairness concerns according to which postmenopausal women have had their chance to be mothers; traditional feminine roles that view postmenopausal women as inappropriate mothers; and concerns for orphaned children" [3].

Medical opposition to donor egg IVF for postmenopausal women is based on the increased risk of pregnancy-related complications such as hypertension, diabetes, preeclampsia, preterm labor, and others in older women. The American Society for Reproductive Medicine (ASRM) guideline on oocyte donation to postmenopausal women states that postmenopausal pregnancy should be discouraged due to the physical and psychological risks involved, and recommends that:

> Medical, psychological, and ethical factors weigh heavily in the decisions to have a child at any age. However, when the sole concern is age of the prospective mother, there seems to be no medical or ethical reason compelling enough to judge the practice as unethical in every case [1].

Posthumous Reproduction

Posthumous reproduction refers to the birth of a child after the death of either parent using cryopreserved reproductive material such as sperm, oocytes, ovarian tissue, and embryos. The controversial status of posthumous reproduction derives from the

> …plethora of conflicting interests which need to be forced into the ethical calculus including the wishes and the right to bodily integrity of the deceased, the procreative liberty of the surviving parent, the welfare of the potential child, the interests other members of the family have in emotional and financial relationship with the deceased, and the state's interest in both protecting the basic unit of society (family) and orderly distribution [of property to the legal heirs] [4].

With advances in reproductive technologies, it has now become possible to harvest sperm using various methods from a newly deceased male for later fertilization [5]. The process, referred to as posthumous sperm procurement, is usually performed within the first 36 hours after death [6]. The first case of successful posthumous sperm extraction was reported in 1980 [7], and the first pregnancy, in 1997 with subsequent birth in 1998 [8], sparking medical, legal, and ethical debates. Although the practice is growing in both the United States and internationally, requests are still infrequent [5].

The debate over the practice of posthumous reproduction is not simply about whether a widow has a right to have her dead husband's child. Central to the debate are questions about the significance of reproductive potential and the implications of this potential for decision-making control over one's body, which cannot be separated from the issue of reproductive autonomy [9]. Proponents of posthumous sperm extraction argue that sperm retrieval after sudden death or while in a persistent vegetative state can sometimes be ethical, provided that there is explicit prior or reasonably inferred consent [10]. Opponents argue that such a request should generally not be honored unless there is convincing evidence that the dead man would have wanted his widow to carry and bear his child, and, even with that assurance, the welfare of the potential child must be considered [11].

Law and Policy Statements

As in other technology-driven fields, the law has struggled to keep pace with the rapidly changing field of ART. Laws on posthumous sperm extraction and posthumous reproduction are lacking. National and international policies vary. In Great Britain, unless consent has been obtained from a man prior to his death, posthumous sperm extraction is prohibited [5], while Israel allows posthumous sperm extraction from a dead man at the request of his legal or common-law wife, even in the absence of his prior consent [12]. Australia, Canada, Germany, and Sweden prohibit posthumous sperm procurement, while French law prohibits posthumous insemination [13]. The United States has no legislation or relevant case law on posthumous sperm extraction. A 1997 study by Kerr et al. demonstrated that no ART program had practice policies in place to guide clinicians in dealing with requests for posthumous sperm extraction, although 25 requests had been honored by 14 clinics in the United States for procuring posthumous sperm at the time of the study [14].

Ethical, Social, and Moral Questions

In the absence of explicit law and policy, clinicians face a multitude of ethical, social, and moral dilemmas when dealing with requests for these services. In a 2004 position paper, ASRM provided some guidance by stating that,

> …posthumous reproduction will be employed in instances when a couple faced with imminent death of a partner or in anticipation of radiation or chemotherapy for cancer will ask to have gametes obtained and stored, and should death occur, posthumous reproduction using the stored gametes may be requested by the surviving partner [15].

The paper does not address the question of posthumous sperm extraction at all. In the absence of clear legislation and `sufficient professional guidelines, each request for posthumous sperm extraction should be discussed and authorized by a multidisciplinary committee that includes physicians, attorneys, clergy, psychiatrists, psychologists, sociologists, and other appropriate parties as well as institutional ethics committees.

Given that developments in assisted reproductive technologies are so new, the psychological and social impact postmenopausal and posthumous reproduction may have on children is not yet fully known. Yet full consideration of the potential impact of the practice on the parent-child relationship is essential. Recognizing people's fundamental interest in knowing their heritage, the ASRM ethics committee encourages parents to disclose the use of donor gametes to their offspring. And because the state of the law on ART is inadequate and unsettled, clinicians should advise their patients to seek appropriate legal counseling prior to proceeding with postmenopausal or posthumous reproduction to address issues of custody, inheritance, and legitimacy that may arise in the future.

Conclusion

Assisted reproduction is a field of medicine that is filled with ethical dilemmas in the areas of reproductive autonomy, the right to privacy, informed consent, inheritance, and child welfare. To establish appropriate medical practice, it is important to consider the interests not only of the requesting party and the gamete donor, who may be deceased in the case of posthumous reproduction, but the interests of the future offspring, the treating physician, and society. The ethical and legal policy vacuum creates an urgent and dire need for broad guidelines that consider equally the interests of the prospective parents and gamete donors and those of the resulting child in securing parentage. Until the development of state and regulatory agency policies, clinicians should establish institutional guidelines and seek professional consultation before proceeding to provide services that are full of uncertainties.

References

1. The Ethics Committee of the American Society for Reproductive Medicine. Oocyte donation to postmenopausal women. *Fertil Steril*. 2004;82(Suppl 1):S254-S255.
2. Centers for Disease Control and Prevention. *2004 Assisted Reproductive Technology (ART) Report*. http://www.cdc.gov/ART/ART2004. Accessed August 8, 2007.
3. Parks JA. On the use of IVF by postmenopausal women. *Hypatia*. 1999;14(1):77-100.
4. Collins R. Posthumous reproduction and the presumption against consent in cases of death caused by sudden trauma. *J Med Philos*. 2005;30(4):431-442.
5. Hurwitz JR, Batzer FR. Posthumous sperm procurement: demand and concerns. *Obstet Gynecol Surv*. 2004;59(12):806-808.
6. Batzer FR, Hurwitz JM, Caplan A. Postmortem parenthood and the need for a protocol with posthumous sperm procurement. *Fertil Steril*. 2003;79(6):1263-1269.
7. Rothman CM. A method for obtaining viable sperm in the postmortem state. *Fertil Steril*. 1980;34(5):512.
8. Strong C, Gingrich JR, Kutteh WH. Ethics of post-mortem sperm retrieval. *Hum Reprod*. 2000;15(4):739-745.
9. Pennings G, Wert GD, Shenfield, F, Cohen J, Devroey, P, Tarlatzis B. ESHRE Task Force on Ethics and Law 11: Posthumous assisted reproduction. *Hum Reprod*. 2006;21(12):3050-3053.
10. Strong C. Ethical and legal aspects of sperm retrieval after death or persistent vegetative state. *J Law Med Ethics*. 1999;27(4):347-358, 295.
11. Orr RD, Siegler M. Is posthumous semen retrieval ethically permissible? *J Med Ethics.* 2002;28(5):299-302.
12. Siegel-Itzkovich J. Israel allows removal of sperm from dead men at wives' request. *BMJ*. 2003;327(7425):1187. doi:10.1136/bmj.327.7425.1187-c.
13. Bahadur G. Death and conception. *Hum Reprod*. 2002;17(10):2769-2775.
14. Kerr SM, Caplan A, Polin G, Smugar S, O'Neill K, Urowitz S. Postmortem sperm procurement. *J Urol*. 1997;157(6):2154-2158.

15. The Ethics Committee of the American Society for Reproductive Medicine. Posthumous reproduction. *Fertil Steril*. 2004;82(Suppl 1):S260-S262.

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Medicine and Society
Is Restricting Access to Assisted Reproductive Technology an Infringement of Reproductive Rights?
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The United Nations Universal Declaration of Human Rights includes the right to "found a family" [1]. While families may be established through "social" means—for example, adoption—this statement is often interpreted as conferring a right to reproduce [2].

Rights are expressions of our dignity and shared humanity. When we assert a right, we create corresponding duties not to interfere with us—and possibly to assist—in certain ways [3]. If a right to parenthood exists, what obligation, if any, does it impose on physicians to provide assisted reproductive technology (ART) services, given the uncertain promise of benefit and the potential expense and risk? And when, if ever, can physicians infringe that right?

Rights are not freestanding moral imperatives, nor are they absolutely inviolable. They exist within a network of social relationships and moral and legal principles that both ground them and establish the conditions under which they may be abridged. Potential sources for a right to parenthood include appeals to the value of family, the basic human desire for and interest in having a child, normal human biological and social functioning, a presumptive principle of equal freedom of action (including procreation), and existing laws that support the right. We will not argue the validity of these principles here, but will focus instead on physicians' role in fulfilling (or limiting) individuals' exercise of their *assumed* right to parenthood [4].

Negative and Positive Rights
All rights, and the duties they entail, can be interpreted negatively or positively. Negative rights obligate others not to interfere without justification; in this case, not to restrict a person's ability to become a parent. For physicians, the law and professional practice standards already uphold this liberty. Physicians have a duty to warn patients about the potential fertility-altering effects of procedures or treatments and to avoid damaging patients' reproductive capacity when possible. Hence, sterilization without consent is morally and legally repudiated except in extraordinary circumstances [5].

A positive right to parenthood, however, would go further, obligating others to support a person's attempt to become a parent. It is here that questions about the use of ART are likely to arise. Do physicians have a duty to assist their patients'

procreative efforts, and if so, in what ways [6]? Although we believe that physicians who are not trained to provide ART services have a duty to refer their infertile patients to specialists for further work-up and evaluation, we think this duty arises not from any right to parenthood, but from broader professional obligations within the patient-doctor relationship.

When a patient is trying unsuccessfully to conceive a child, adequate health care includes assessment and possible treatment of infertility, and certainly a physician with expertise in ART who commits to providing the technology to a patient under his or her care has a professional duty to do so. The obligation to use ART comes, not from the right to parenthood, but from the right to have a commitment fulfilled. The real test of a positive right to parenthood, then, is whether specialists with expertise in ART *must* accept as patients those who require their services to become parents and if the kind(s) of ART provided must be those most likely to result in parenthood [7].

In virtue of their training, skills, and sanctioned role as professional caregivers, physicians are thought to be under strong obligations to provide assistance to patients with medical needs when it is in their power to do so. Although the strength of this duty may vary with the need in question—obligations to assist in a life-threatening emergency are stronger than those in less serious cases—a patient's medical needs can, with certain restrictions, create a right to have that need fulfilled. We suggest, therefore, that specialists with expertise in infertility and ART do have a duty to take on patients pursuing parenthood and should commit to providing them with appropriate services. We will have more to say about the extent of this obligation, which, we believe, comes from the right to parenthood.

Can Procreative Rights be Restricted?

We first turn to the general question of whether and when procreative rights can be restricted. In general, negative rights are more stringent than positive rights; stronger arguments are needed to abridge or override them. In practice, physicians tend to ground abridgement of a patient's procreative rights in appeals to that patient's benefit or autonomy or both. For example, such interference may be permissible when it is an unavoidable consequence of medical treatment that is otherwise in the patient's best interest and when the risks or harms to procreation have been agreed to in advance [8].

Positive rights, on the other hand, are, justifiably, more subject to the tempering influences of competing moral and social considerations. It is important to note in this regard that ART is not monolithic; it consists of various particular services that can be provided in different ways. The obligation to assist others in the pursuit of parenthood by providing ART, therefore, need not translate into a duty to assist using *all* possible means under *any* circumstances.

Considerations that might justify physicians in not assisting a patient to achieve parenthood through ART include: ART's potential to produce multiple gestation pregnancies, which increase the risk for maternal and infant morbidity and mortality

and involve significant financial and opportunity costs for couples and society [9, 10]; the competing rights of others who might otherwise have access to the resources used to care for these pregnant women and offspring [11]; and the potential negative impact ART may have on social values such as supporting nonbiological families [12]. It is also legitimate for physicians to consider the availability of alternative ways to found a family (such as adoption), the uncertainty that any of the hoped-for or feared consequences of the use of ART will actually occur, and their own willingness or reluctance to participate in the possible creation of these medical and social consequences.

We believe that the existence of these strong countervailing considerations provide sufficient grounds for physicians to impose some restrictions on access to ART. In doing so, however, they must also be cognizant of the moral problems they might *cause* as a result of these limitations. For example, one common suggestion is to withhold ART from potential parents who refuse to commit in advance to reducing the number of fetuses if a multiple gestation pregnancy occurs. We believe this is not an appropriate restriction for a couple of reasons [13]. First, the positions of the parties in the negotiation for access to ART is unequal. While the physician stands only to lose a patient if someone refuses to accept ART under such conditions, the value and investment that potential patients place on achieving biological parenthood provides a strong motivation to access ART, even under conditions they might later come to regret [14]. Given this disparity, physicians have a responsibility to avoid imposing restrictions to which patients would not agree, were it not for their desperation to achieve their goal.

Second, we cannot endorse the idea that an appropriate mechanism for avoiding a possible moral harm—be it bad consequences, the violation of rights, or the undermining of a value—is to create conditions in which a patient might be forced to choose between a prior commitment and a new-found relationship with her potential children. While physicians do have responsibilities to future patients and society, their first obligation is to avoid harming their current patients by, for example, placing them in situations like this [15].

More justified restrictions on access to ART might include offering only technology that has less chance of multiple gestations; prescribing medications at lower doses, even if doing so is more expensive or less effective; frequent ultrasound monitoring of the number of developing follicles, with cancellation of insemination cycles and the requirement that patients commit to refraining from intercourse or using condoms when the number of developing follicles reaches a certain threshold.

In the case of in vitro fertilization, justified restrictions include agreeing to implant only a certain number of embryos and, in general, more conservative medical judgments about thresholds for escalating therapy to achieve a pregnancy [16]. These restrictions are likely to minimize medical and social harms and burdens while still allowing physicians to assist patients in their pursuit of parenthood. Furthermore, such restriction on ART does not undermine the central responsibilities of

nonmaleficence and beneficence in the patient-doctor relationship. As long as both the physician and the individual or couple understand these limitations, there seems to be little basis to claim that the right to parenthood has been violated [17].

Notes and References

1. United Nations General Assembly. Universal Declaration of Human Rights, adopted under Resolution 217 A (III), UN Doc A/810 at 71 (1948). December 10, 1948. http://www.un.org/Overview/rights.html. Accessed August 7, 2007.
2. Office of the High Commissioner for Human Rights. General Comment No. 19: Protection of the family, the right to marriage and equality of the spouses (Art. 23). 39th session (1990). For a discussion of the right to procreate in United States law, see *Carey v Population Serv Int'l.* 431 US 678, 685; 97 SCt 2010, 2016 (1977); *Stanley v Illinois,* 405 US 645, 651; 92 SCt 1208, 1212 (1972); Wu L. family planning through human cloning: Is there a fundamental right? *Colum L Rev*. 1998:1410.
3. Feinberg J. The nature and value of rights. *J Value Inq*. 1970;4:243-257.
4. For a broader discussion of the justification for procreative rights and the use of ART see Warren MA. Does distributive justice require universal access to assisted reproduction? In: Rhodes R, Battin BP, Silvers A, eds. *Medicine and Social Justice: Essays on the Distribution of Health Care*. New York, NY: Oxford University Press; 2002:426-437; and Harris J. Rights and reproductive choice. In: Harris J, Holm S, eds. *The Future of Human Reproduction: Ethics, Choice, and Regulation*. Oxford: Clarendon Press; 1998:5-37.
5. The history of eugenic programs in the United States and abroad suggests that the right to reproduce has not always received such strong endorsement from medical professionals or the general public. Some guidelines regarding nonconsenting sterilization include: American Academy of Pediatrics Committee on Bioethics. Sterilization of minors with developmental disabilities. *Pediatrics*. 1999;104(2 Pt 1):337-340; and ACOG Committee Opinion. Sterilization of women, including those with mental disabilities. *Obstet Gynecol*. 2007;110(1):217-220.
6. We will not consider whether physicians should restrict access to ART from couples who would refuse selective reduction out of an obligation to give some fetus or other the best possible chance of a normal gestation. See Evans MI, Johnson MP, Quintero RA, Fletcher JC. Ethical issues surrounding multifetal pregnancy reduction and selective termination. *Clin Perinatol*. 1996;23(3):437-451. We will also set aside questions regarding the physician's role in assisting adoptive and other "social" efforts to become a parent. Finally, we will not consider what demands the right to parenthood might make on the general public including whether part of the yearly tax revenue should be put aside to help pay for access to ART.
7. Our focus here will not be on physicians who refuse to provide ART based on social judgments about who should be a parent—like single women, gay couples, or older individuals. These objections center on who has a positive

right to parenthood in our society rather than the conditions under which such a right could be limited.

8. A recent case involving a developmentally disabled girl whose parents requested that her growth be attenuated and her reproductive organs removed so that they could more easily care for her may represent a rare exception to this rule, although in this case the patient's best interests are equated with the ability of her parents to care for her. See Verhovek SH. A radical treatment to stunt a 9-year-old disabled girl's growth stirs a deep ethical debate; What about Ashley's dignity? *Houston Chronicle*. January 5, 2007:A4.
9. Callahan TL, Hall JE, Ettner SL, Christiansen CL, Greene MF, Crowley WF Jr. The economic impact of multiple-gestation pregnancies and the contribution of assisted-reproduction techniques to their incidence. *N Engl J Med*. 1994;331(4):244-249.
10. Glazebrook C, Sheard C, Cox S, Oates M, Ndukwe G. Parenting stress in first-time mothers of twins and triplets conceived after in vitro fertilization. *Fertil Steril*. 2004;81(3):505-511.
11. Scholz T, Bartholomaus S, Grimmer I, Kentenich H, Obladen M. Problems of multiple births after ART: medical, psychological, social and financial aspects. *Hum Reprod*. 1999;14(12):2932-2937.
12. Petersen TS. The claim from adoption. *Bioethics*. 2002;16(4):353-375.
13. We also have reservations about extracting a commitment in a situation where there is no mechanism in place for enforcing the terms of the commitment or even the intention to enforce it (i.e., the decision whether or not to reduce will ultimately be left to the mother while the physician presumably has no intention of taking that choice from her regardless of their previous agreement).
14. Although specialists can be under significant pressure to maximize the number of successful pregnancies and thereby attract new patients, we do not believe that this is sufficient to place the parties on equal ground in negotiating access to ART. For a discussion of what information should be available to the public regarding individual physician's "success" rates with ART, see Schieve LA, Reynolds MA. What is the most relevant standard of success in assisted reproduction? Challenges in measuring and reporting success rates for assisted reproductive technology treatments: What is optimal? *Hum Reprod*. 2004;19(4):778-782.
15. In cases where there are other physicians who are easily accessible and are willing to provide ART without requiring a commitment to reduce in advance, then, all else being equal, the availability of this alternative may make it permissible for a physician to adopt the agree-to-reduce-in-advance restriction.
16. Other recommendations are noted in Wilson EE. Assisted reproductive technologies and multiple gestations. *Clin Perinatol*. 2005;32(2):315-328. While we do not believe physicians are required to adopt these measures, we do support the idea that specialists have some responsibility to self-police when using ART, where that may include reasonable efforts to reduce

multiple gestations. Alternatively, regulatory boards or societies within the specialty may help play this role.

17. For more on this point see Chester R. Double trouble: Legal solutions to the medical problems of unconsented sperm harvesting and drug-induced multiple pregnancies. *St Louis U Law J*. 2000;44:451-485.

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Medical Narrative
A Doctor's Journey Back to Practice
Catherine Green, MHS

While pediatricians, geriatricians, and family practitioners often care for parent-child dyads, their obligation ultimately is to one person, one patient. The physician with a pregnant woman for a patient is unique in that his or her charge involves the simultaneous care of two patients—mother and fetus. The ultimate goal is to provide safe passage for both during the pregnancy and the transition of labor and birth; a profound *physical* separation that, once complete, signals the deepening of the *emotional* bond between mother and child. Sometimes though, the physician's obligations are unequal, and the needs of one patient override those of the other. As a society we generally accept that if a pregnancy endangers a woman's life she may terminate it—even relatively late in the process. Alternatively, after 24 weeks, we are willing to employ a great deal of technology to attempt to preserve the life of a premature infant, although not always its *quality* of life.

In his book, *Delivering Doctor Amelia* [1], psychologist Dan Shapiro describes the experience of treating the young obstetrician of the title whose life comes apart when she delivers a baby that suffers from cerebral palsy, an outcome that may have occurred because Amelia lost sight of the needs of the fetus when she attempted to allow the mother to have the natural birth she desired.

Amelia described the child's mother, Stacy, and her husband to Dr. Shapiro.

> She came in for her first visit with her husband. You'd have thought they were going to have the baby that day, that's how excited they were. I like treating people like them. Sometimes we get moms who don't care that they're pregnant. They're numb through the whole thing. Not them [2].

Amelia recounts how, after a slow labor, the child's descent was prolonged and how, at that point, she had a powerful sense that a cesarean was the most appropriate course. "I had this instinct right then that we should do a C-section…but I knew that Stacy didn't want that and the algorithm didn't say it was time" [3]. Just before delivery Amelia noticed some early heart rate decelerations and a less than optimal heart rate variability. Her concern increased. "At this point I felt aggressive about getting the baby out. It's my job to balance my patient's desire for a natural birth against the probability of birth complications" [4]. But still, she hesitated. "Stacy asked if we could wait just a little longer. She had an edge to her voice. I remember feeling like I'd be failing them if I did a C-section" [4]. When the monitoring strip

showed no heart rate variability with contractions, Amelia insisted on the cesarean section.

When the newborn, Miranda, seized soon after delivery and was diagnosed with cerebral palsy, Amelia began to crumble. Her downward spiral continued when the hospital lawyers showed her the full rhythm strip and the ominous late decelerations and bradycardic episodes (indicating fetal distress) that she had missed.
How had Amelia overlooked these indications? Was her error secondary to fatigue or did she lose perspective on the child's well-being in trying to serve the mother? Does it matter? Although Amelia was loved by her patients and esteemed by her colleagues—even after the incident—her sense of failure and inability to forgive herself disabled her to the point where she could not continue to practice medicine.

The cause of cerebral palsy is a mystery. Hypoxia due to uteroplacental insufficiency may be a cause or contributing factor but so might asymptomatic infection. Electronic fetal monitoring—the best measure of fetal hypoxia—is imperfect. If we accept this information, then where did Amelia err, if in fact she did? It is no secret that physicians want to do the right thing and want their patients' approval. The desire to make the patient-physician relationship a true partnership is powerful, appealing, and popular. But this relationship is not one of equal partners—nor should it be. Amelia's obligations to Miranda's well-being supersede Stacy's wishes for a normal delivery. Amelia possessed a fund of knowledge greater than that of her patient, which required her to act less like a partner and more like a leader as the events of the night unfolded.

Expectant parents tend to form hopes about the infant and his or her future. When a child enters the world with a defect, parents frequently cope by detaching themselves psychologically from the once-idealized infant [5]. Yet the needs of disabled infants remain the same as those of any other infant [6]. Could Amelia have changed the course with Miranda and Stacy to foster their attachment in spite of the negative outcome? How could she have overcome the alienation imposed by the legal issues? For the parent of any newborn, but particularly the parent of a newborn with medical problems, one of the most meaningful things a physician can do is to hold, touch, and express affection for the baby. This powerful proclamation by a physician that he or she is an ally can help the parent find normalcy and hope in a difficult situation. Amelia and her patient were denied this potentially healing experience.

Dr. Shapiro encourages Amelia to meet with Stacy and Miranda against the advice of the hospital attorneys. Amelia does as he suggests, and this act initiates her own "delivery" from the burden of guilt and fear to a reconnection with herself as physician and healer. Although the bond between patient and doctor seemed irreparably broken, Stacy was able to tell Amelia about her conflicted feelings: she knew that the cerebral palsy might not have been due to Amelia's management but she also resented the fact that her daughter would never have a normal life. She had valid concerns about how she and her husband would care for Miranda, since she had to leave work and her husband's job did not provide health insurance. Amelia had an

opportunity to apologize for missing the signs of fetal distress—regardless of whether this caused the cerebral palsy. In Shapiro's words Amelia was able to "act like a physician and not like a defendant" [7]. In her own words Amelia says, "I didn't feel like a defendant, or a scared girl, or a timid medical student. I felt like a doctor being honest. I felt good inside my own skin" [8].

References

1. Shapiro DE. *Delivering Doctor Amelia*. New York, NY: Harmony Books; 2003.
2. Shapiro, 60.
3. Shapiro, 63.
4. Shapiro, 64.
5. Whaley LF, Wong DL. *Essentials of Pediatric Nursing*. 5th edition. St. Louis, MO: Mosby; 1997:524-607.
6. Ziolko ME. Counseling parents of children with disabilities: a review of the literature and implications for practice. *J Rehab*. 1991;57(2): 29.
7. Shapiro, 191.
8. Shapiro, 252.

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Op-Ed

Gamete Donation, Identity, and the Offspring's Right to Know

Lucy Frith

One ethical dilemma that is still fiercely debated in assisted reproduction is whether children born by gamete (egg or sperm) donation should be allowed to have information about the gamete donor [1-3]. For the purposes of this article I shall concentrate on whether the donor offspring (whom I will refer to simply as "offspring") have or do not have a right to gain access to *identifying* information about their gamete donors. The debate over whether to allow offspring to have *nonidentifying* information has been less heated, with many commentators agreeing that it should be made available [4].

Discussion about a child's right to have identifying information about his or her gamete donor begins with the prior question of whether offspring should be told about the means of their conception. If children are not told, the right to have access to information about the donor is effectively useless to them [5]. In most jurisdictions there is no legal expectation of disclosure—means of conception is not stated on the birth certificate, and no professional body has any duties or obligations to inform individuals that they were conceived with donor gametes [6]. Thus, the argument that offspring have a right to be told, generally defends a moral right to know rather than a legal right [7].

Children's Right to Know

The case that offspring have a right to the truth about their conception and origins has developed over many years. John Triseliotis has argued that "truth is always better than deception. No one has the right to erase part of yourself, even if it is only a minor part" [8]. Family therapy practitioners claim that openness and honesty are preferable and that basing family life on deception and secrecy can cause stress and anxiety within the family [9, 10]. Mary Warnock insists that there is an ethical imperative to tell, even while saying,

> I cannot argue that children who are told of their origins, if they are AID [artificial insemination donor] children, are necessarily happier, or better off in any way that can be estimated. But I do believe that if they are not told they are being wrongly treated [11].

The main reason for telling the child how he or she was conceived is often so that he or she can then seek information about the donor. It should be noted that the volume

of disclosed information depends on the policies of the clinic and national legislation [4].

Many societies are now placing greater emphasis on children's rights than was common in the past. The United Nations' *Convention on the Rights of the Child* was, for example, the most rapidly signed international convention on human rights [12]. One of the rights the document views as fundamental is the right to know one's parents (Article Seven). This has been interpreted as a child's right to know the identity of his or her gamete donor [13], but the justification for such rights is clearly contentious—most significantly because the conventions on child and human rights were not written with gamete donation in mind. The Council of Europe has stated that, "It is not possible—at the present moment—to draw decisive arguments from the Convention for the Protection of Human Rights and Fundamental Freedoms either in favour or against the anonymity of donors" [14].

Nevertheless, such a rights-based argument has been used by various legislatures to justify policies of nonanonymous gamete donation [1, 15]. The most common reason given for why knowledge of one's genetic origins is thought to be a right is that it is deemed essential for a person's well-being. Alexina McWhinnie, for example, has argued that donor offspring can suffer from "genealogical bewilderment," meaning that they can be curious about the physical characteristics, family aptitudes, and medical history of their gamete donors [16].

Much of the evidence about harm caused by not knowing one's origins is drawn from the literature on adoption, and it can be questioned whether this is an accurate comparison [17]. The position of donor offspring within the family differs from that of adoptive children—they have not been abandoned by their genetic parents, and they are often biologically related to one member of the couple. As Susan Golombok says, "Genetic unrelatedness has a different meaning for children conceived by gamete donation than for children in adoptive families or in stepfamilies" [18]. Still, it can be assumed that donor offspring have just as much interest in knowing about their origins as adoptees have. The absence of information about their genetic parent(s), including the lack of knowledge of their identity, can represent a missing part of their lives [19]. While the analogy between donor offspring and adoptees is not a perfect fit, it appears that these two groups often have similar concerns about their genetic identity.

Parents' and Donors' Right to Privacy

A final question to consider is whether the offspring's right to identifying information negatively affects the privacy rights of the parents and the donor. If the duty to tell offspring how they were conceived is left exclusively to the parents, then it can be argued that it is the parent's right to privacy, rather than the child's right to know, that is considered paramount [6, 20]. Taking the decision to tell out of the parents' hands raises parental rights issues of its own [7, 21]. For instance, putting "by donation" on an offspring's birth certificate could be argued to be an infringement of the offspring's privacy. Similarly, the rights of the donor could be threatened by a policy

that enforced nonanonymous gamete donation. In a robust system of gamete donation, donors should give fully informed consent to the donation and be aware of the possibility that they could, in future, be identified by any offspring. If they do not wish to contribute nonanonymously, it is their prerogative to decline donation.

One major problem with a programme of nonanonymous gamete donation is that it could adversely affect the numbers of gamete donors, an argument frequently advanced against establishing such a policy [22]. There are two counterarguments, however, to this contention. In 2005, legislation in the UK required donors to agree to disclosure of their identity to offspring when offspring reach age 18. A subsequent study of prior UK donors' views on how the removal of anonymity would affect their future donation did not firmly establish that the new policy would cause a decline in gamete donation. And it is uncertain that the decline in donations in countries that have recently removed gamete donor anonymity (i.e., countries of the UK, New Zealand, and the Netherlands) is solely due to this policy change [23, 24]. Second, if nonanonymous donation is the morally right way of organising gamete donation, then the low donor numbers is the price that has to be paid for a morally sound system.

Conclusion

Whether offspring have a right to know the identity of their gamete donors is a hotly debated issue. Clearly, the notion of disclosing identifying information about gamete donors is based on an assumption of the importance of biological origins. Other arguments in favour of offspring having that information are grounded in concepts of parity and nondiscrimination. Donor offspring should not be the only group of people *legally* prevented from finding out identifying information about their biological parentage.

Notes and References

1. Frith L. Gamete donation and anonymity: the ethical and legal debate. *Hum Reprod*. 2001;16(5):818-824.
2. Hampton T. Anonymity of gamete donations debated. *JAMA*. 2005;294(21):2681-2683.
3. Daniels K. Donor gametes: anonymous or identified? *Best Pract Res Clin Obstet Gynaecol*. 2007;21(1):113-128.
4. Ethics Committee of the American Society of Reproductive Medicine. Informing offspring of their conception by gamete donation. *Fertil Steril*. 2004;82(2):527-531.
5. This information could be held by the clinic that carried out the treatment or by a national body such as the UK's Human Fertilisation and Embryology Authority.
6. van den Akker O. A review of family donor constructs: current research and future directions. *Hum Reprod Update*. 2006;12(2):91-101.
7. Frith L. Beneath the rhetoric: the role of rights in the practice of non-anonymous gamete donation. *Bioethics*. 2001;15(5-6):473-484.

8. Triseliotis J. Identity and genealogy. In: Bruce N, Mitchell A, Priestley K, eds. *Truth and the Child: A Contribution to the Debate on the Warnock Report*. Edinburgh, UK: Family Care; 1988:22.
9. Turner AJ, Coyle A. What does it mean to be a donor offspring? The identity experiences of adults conceived by donor insemination and the implications for counselling and therapy. *Hum Reprod*. 2000;15(9):2041-2051.
10. Snowden R. *The Gift of a Child: A Guide to Donor Insemination*. Exeter, England: University of Exeter Press; 1993.
11. Warnock M. The good of the child. *Bioethics.*1987;1(2):141-155.
12. Freeman M. The new birth right? Identity and the child of the reproduction revolution. *The International Journal of Children's Rights*. 1996;4:273-297.
13. Blyth E, Farrand A. Anonymity in donor-assisted conception and the UN Convention on the Rights of the Child. *International Journal of Children's Rights*. 2004;12(2):89-104.
14. Council of Europe. *Human Artificial Reproduction*. Strasbourg, Germany; 1989.
15. Blyth E. Information on genetic origins information in donor-assisted conception: is knowing who you are a human rights issue? *Human Fertil (Camb)*. 2002;5(4):185-192.
16. McWhinnie A. Gamete donation and anonymity. *Hum Reprod*. 2001;16(5):807-817.
17. Shenfield F. Filiation in assisted reproduction: potential conflicts and legal implications. *Hum Reprod*. 1994;9(7):1348-1354.
18. Golombok S. New families, old values: considering the welfare of the child. *Hum Reprod*. 1998;13(9):2342-2347.
19. See for example, Scheib J, Riordan M, Rubin S. Adolescents with open-identity sperm donors: reports from 12-17 year olds. *Hum Reprod.* 2005;20(1):239-252; Vanfraussen K, Ponjaert-Kristoffersen I, Brewaeys A. Why do children want to know more about the donor? The experience of youngsters raised in lesbian families. *J Psychosom Obstet Gynecol.* 2003;24(1):31-38; and Turner AJ, Coyle A, 2041-2051.
20. Walker I, Broderick P. The psychology of assisted reproduction, or psychology assisting its reproduction? *Aust Psychol.* 1999;34(1):38-44.
21. Baines JA. Gamete donors and mistaken identities: the importance of genetic awareness and proposals favoring donor identity disclosure for children born from gamete donations in the United States. *Family Court Review*. 2007;45(1):116-132.
22. Braude P, Johnson MH, Aitken RJ. Human fertilisation and embryology bill goes to report stage. *BMJ.* 1990;300(6737):1410-1412.
23. Frith L, Blyth E, Farrand A. UK gamete donors' reflections on the removal of anonymity: implications for recruitment. *Hum Reprod*. 2007;22(6):1675-1680.
24. Blyth E, Frith L. The UK gamete donor crisis—a critical analysis. Submitted for publication.

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Suggested Readings and Resources
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Affidavit in Support of Arrest Warrant D-038033 (Feb. 5, 1992), *State v Whitner*, No 92-GS-39-670 (SC Ct Gen Sess Pickens County 1992).

Alston PK, Kuller JA, McMahon MJ. Pregnancy in transplant patients. *Obstet Gynecol Surv*. 2001;56(5):289-295.

American Academy of Pediatrics Committee on Bioethics. Sterilization of minors with developmental disabilities. *Pediatrics*. 1999;104(2 Pt 1):337-340.

American College of Obstetricians and Gynecologists. Informed consent. In: American College of Obstetricians and Gynecologists. *Ethics in Obstetrics and Gynecology*. 2nd ed. Washington, DC: American College of Obstetricians and Gynecologists; 2004:9-17. www.acog.org/from_home/publications/ethics/ethics009.pdf. Accessed July 30, 2007.

American College of Obstetricians and Gynecologists. ACOG Committee Opinion Number 316. Smoking cessation during pregnancy. *Obstet Gynecol*. 2005;106(4):883-888.

American College of Obstetricians and Gynecologists. ACOG Committee Opinion Number 321. Maternal decision making, ethics, and the law. *Obstet Gynecol*. 2005;106(5 Pt 1):1127-1137.

American College of Obstetricians and Gynecologists. ACOG Committee Opinion. Sterilization of women, including those with mental disabilities. *Obstet Gynecol*. 2007;110(1):217-220.

American Medical Association Council on Science and Public Health. *Universal, Routine Screening of Pregnant Women for HIV Infection*. http://www.ama-assn.org/ama/pub/category/13548.html#universal_versus_mandatory. Accessed July 18, 2007.

Anderson JE, Koenig LJ, Lampe MA, Wright R, Leiss J, Saul J. Achieving universal HIV screening in prenatal care in the United States: provider persistence pays off. *AIDS Patient Care STDs*. 2005;19(4):247-253.

Armenti VT, Radomski JS, Moritz MJ, et al. Report from the National Transplantation Pregnancy Registry (NTPR): outcomes of pregnancy after transplantation. *Clin Transpl*. 2002:121-130. http://www.transplantliving.org/ContentDocuments/Pregnancy_Outcomes_Report.v2.pdf. Accessed July 31, 2007.

Bader AA, Petru E, Winter R. Long-term follow-up after neoadjuvant chemotherapy for high-risk cervical cancer during pregnancy. *Gynecol Oncol*. 2007;105(1):269-272.

Baines JA. Gamete donors and mistaken identities: the importance of genetic awareness and proposals favoring donor identity disclosure for children born from gamete donations in the United States. *Family Court Review*. 2007;45(1):116-132.

Beauchamp TL, Childress JF. *Principles of Biomedical Ethics*. 4th edition. New York, NY: Oxford University Press; 1994:120-188.

Beller GA. Edvard Munch's renditions of illness and dying: their message to contemporary physicians. *J Nucl Cardiol*. 2006;13:309-310.

Blyth E. Information on genetic origins information in donor-assisted conception: is knowing who you are a human rights issue? *Human Fertil (Camb)*. 2002;5(4):185-192.

Blyth E, Farrand A. Anonymity in donor-assisted conception and the UN Convention on the Rights of the Child. *International Journal of Children's Rights*. 2004;12(2):89-104.

Blyth E, Frith L. The UK gamete donor crisis—a critical analysis. Submitted for publication.

Braude P, Johnson MH, Aitken RJ. Human fertilisation and embryology bill goes to report stage. *BMJ*. 1990;300(6737):1410-1412.

Bruehl FJ. The development of pregnancy tests. *Am J Nurs*. 1952;52(5):591-593.

Callahan TL, Hall JE, Ettner SL, Christiansen CL, Greene MF, Crowley WF Jr. The economic impact of multiple-gestation pregnancies and the contribution of assisted-reproduction techniques to their incidence. *N Engl J Med*. 1994;331(4):244-249.

Carey v Population Serv Int'l. 431 US 678, 685.

Centers for Disease Control and Prevention. Achievements in public health. Reduction in perinatal transmission of HIV infection—United States, 1985-2005. *MMWR Morb Mortal Wkly Rep*. 2006;55(21):592-597.

Centers for Disease Control and Prevention. HIV testing among pregnant women—United States and Canada, 1998-2001. *MMWR Morb Mortal Wkly Rep*. 2002;51(45):1013-1016.

Centers for Disease Control and Prevention. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. *MMWR Morb Mortal Wkly Rep*. 2006;55(RR14):1-17.

Centers for Disease Control and Prevention. *Sexually Transmitted Disease Surveillance 2005 Supplement, Syphilis Surveillance Report*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention; 2006. cdc.gov/std/syphilis2005/syphsupp2005.short.pdf. Accessed July 30, 2007.

Chester R. Double trouble: Legal solutions to the medical problems of unconsented sperm harvesting and drug-induced multiple pregnancies. *St Louis U Law J*. 2000;44:451-485.

Chou R, Smits AK, Huffman LH, Fu R, Korthuis PT; US Preventive Services Task Force. Prenatal screening for HIV: A review of the evidence for the US Preventive Services Task Force. *Ann Intern Med*. 2005;143(1):38-54.

Christen AG, Christen JA. The female smoker: from addiction to recovery. *Am J Med Sci*. 2003;326(4):231-234.

Colley Gilbert BJ. Johnson CH, Morrow B, Gaffield ME, Ahluwalia I. Prevalence of selected maternal and infant characteristics, Pregnancy Risk Assessment Monitoring System (PRAMS), 1997. *MMWR CDC Surveill Summ.* 1999;48(5):1-37.

Connor EM, Sperling RS, Gelber R, et al. Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment. Pediatric AIDS Clinical Trials Group Protocol 076 Study Group. *N Engl J Med*. 1994;331(18):1173-1180.

Cooper ER, Charurat M, Mofenson L; Women and Infants' Transmission Study Group. Combination antiretroviral strategies for the treatment of pregnant HIV-1-infected women and prevention of perinatal HIV-1 transmission. *J Acquir Immune Defic Syndr*. 2002;29(5):484-494.

Council of Europe. Human Artificial Reproduction. Strasbourg, Germany; 1989.

Cunningham FG, Gant NF, Leveno KJ, Gilstrap LC 3rd, Hauth JC, Wenstrom KD. *Williams Obstetrics*. 22nd ed. New York, NY: McGraw Hill; 2005:209.

Daniels K. Donor gametes: anonymous or identified? *Best Pract Res Clin Obstet Gynaecol*. 2007;21(1):113-128.

David HP. Incentives, reproductive behavior, and integrated community development in Asia. *Stud Fam Plann*. 1982;13(5):159-173.

Davis D. A short discussion of harm. In: *Genetic Dilemmas: Reproductive Technology, Parental Choices and Children's Futures*. New York, NY: Routledge; 2001:35-48.

Duggan B, Muderspach LI, Roman LD, Curtin JP, d'Ablaing G 3rd, Morrow CP. Cervical cancer in pregnancy: reporting on planned delay in therapy. *Obstet Gynecol*. 1993;82(4 Pt 1):598-602.

Duley L. Maternal mortality associated with hypertensive disorders of pregnancy in Africa, Asia, Latin America and the Caribbean. [See comment in *Br J Obstet Gynaecol.* 1992;99(11):937-938.] *Br J Obstet Gynaecol.* 1992;99(7):547-553.

Ethics Committee of the American Society of Reproductive Medicine. Informing offspring of their conception by gamete donation. *Fertil Steril*. 2004;82(2):527-531.

Evans MI, Johnson MP, Quintero RA, Fletcher JC. Ethical issues surrounding multifetal pregnancy reduction and selective termination. *Clin Perinatol*. 1996;23(3):437-451.

Feinberg J. The nature and value of rights. *J Value Inq*. 1970;4:243-257.

Freeman M. The new birth right? Identity and the child of the reproduction revolution. *The International Journal of Children's Rights*. 1996;4:273-297.

Frith L. Gamete donation and anonymity: the ethical and legal debate. *Hum Reprod*. 2001;16(5):818-824.

Frith L. Beneath the rhetoric: the role of rights in the practice of non-anonymous gamete donation. *Bioethics*. 2001;15(5-6):473-484.

Frith L, Blyth E, Farrand A. UK gamete donors' reflections on the removal of anonymity: implications for recruitment. *Hum Reprod*. 2007;22(6):1675-1680.

Funai EF, Friedlander Y, Paltiel O, et al. Long-term mortality after preeclampsia. *Epidemiol.* 2005;16(2):206-215.

Funai EF, Paltiel OB, Malaspina D, Friedlander Y, Deutsch L, Harlap S. Risk factors for pre-eclampsia in nulliparous and parous women: the Jerusalem perinatal study. *Paediatr Perinat Epidemiol.* 2005;19(1):59-68.

Gifford RW, August PA, Cunningham FG, et al. Report of the National High Blood Pressure Working Group on Research on Hypertension in Pregnancy. *Am J Obstet Gynecol.* 2000;183(1):S1-S22.

Glazebrook C, Sheard C, Cox S, Oates M, Ndukwe G. Parenting stress in first-time mothers of twins and triplets conceived after in vitro fertilization. *Fertil Steril*. 2004;81(3):505-511.

Goldenberg RL, Rouse DJ. Prevention of premature birth. [See comments in *N Engl J Med.* 1998;339(25) 1858-1860.] *N Engl J Med.* 1998;339(5):313-320.

Golombok S. New families, old values: considering the welfare of the child. *Hum Reprod*. 1998;13(9):2342-2347.

Haig D. Genetic conflicts in human pregnancy. *Q Rev Biol.* 1993;68(4):495-532.

Hampton T. Anonymity of gamete donations debated. *JAMA*. 2005;294(21):2681-2683.

Harris J. Rights and reproductive choice. In: Harris J, Holm S, eds. *The Future of Human Reproduction: Ethics, Choice, and Regulation*. Oxford: Clarendon Press; 1998:5-37.

Hiby SE, Walker JJ, O'Shaughnessy KM, et al. Combinations of maternal KIR and fetal HLA-C genes influence the risk of preeclampsia and reproductive success. *J Exp Med.* 2004;200(8):957-965.

Hollier LM, Hill J, Sheffield JS, Wendel GD. State laws regarding prenatal syphilis screening in the United States. *Am J Obstet Gynecol*. 2003;189(4):1178-1183.

Horton WA, Hall JG, Hecht JT. Achondroplasia. *Lancet*. 2007;370(9582):162-169.

Indiana Code sec 16-41-6-4. Testing newborn infants; confidentiality; notice; information on treatment options; objecting; rules. http://www.in.gov/legislative/ic/code/title16/ar41/ch6.html. Accessed July 30, 2007.

Irgens HU, Reisaeter L, Irgens LM, et al. Long term mortality of mothers and fathers after pre-eclampsia: population based cohort study. *BMJ.* 2001;323(7323):1213-1217.

Johannesen KF. *Edvard Grieg*. Miller D, trans. http://nettbiblioteket.no/grieg-samlingen/utskrifter/bio2_eng.html. Accessed August 3, 2007.

Jones RK, Brayfield A. Life's greatest joy? European attitudes toward the centrality of children. *Soc Forces*. 1997;75(4):1239-1270.

Karam A, Feldman N, Holschneider CH. Neoadjuvant cisplatin and radical cesarean hysterectomy for cervical cancer in pregnancy. *Nat Clin Pract Oncol*. 2007;4(6):375-380.

Levine RJ, Lam C, Qian C, et al. Soluble endoglin and other circulating antiangiogenic factors in preeclampsia.[See comment in *N Engl J Med.* 2006;355(10):1056-1058.] [Erratum appears in *N Engl J Med.* 2006;355(17):1840]. *N Engl J Med.* 2006;355(10):992-1005.

Levine RJ, Maynard SE, Qian C, et al. Circulating angiogenic factors and the risk of preeclampsia. [See comments in *N Engl J Med.* 2004;350(7):641-642; and *N Engl J Med.* 2004;350(19):2003-2004.] *N Engl J Med.* 2004;350(7):672-683.

Lindegren ML, Byers RH, Thomas P, et al. Trends in perinatal transmission of HIV/AIDS in the United States. *JAMA*. 1999;282(6):531-538.

Lindheimer MD, Roberts JM, Cunningham FG. *Chesley's Hypertensive Disorders in Pregnancy.* 2nd ed. Stamford, CT: Appleton and Lange; 1999.

Ludwig M. Ethics in medicine: maternal-fetal conflict. http://depts.washington.edu/bioethx/topics/matern.html. Accessed August 3, 2007.

Maynard SE, Min JY, Merchan J, et al. Excess placental soluble fms-like tyrosine kinase 1 (sFlt1) may contribute to endothelial dysfunction, hypertension, and proteinuria in preeclampsia. [See comment in *J Clin Invest.* 2003;111(5):600-602.] *J Clin Invest.* 2003;111(5):649-658.

McKay DB, Josephson MA. Pregnancy in recipients of solid organs—effects on mother and child. *N Engl J Med*. 2006;354(12):1281-1293.

McWhinnie A. Gamete donation and anonymity. *Hum Reprod*. 2001;16(5):807-817.

Minkoff H, Paltrow LM. Melissa Rowland and the rights of pregnant women. *Obstet Gynecol*. 2004;104(6):1234-1236.

Minkoff H, Santoro N. Ethical considerations in the treatment of infertility in women with human immunodeficiency virus infection. *N Engl J Med*. 2000;342(23):1748-1750.

Nagy S, Bush M, Berkowitz R, et al. Pregnancy outcome in liver transplant patients. *Obstet Gynecol.* 2003;102(1):121-128.

National HIV/AIDS Clinicians' Consultation Center. State HIV testing laws. Updated March 2, 2007. http://www.ucsf.edu/hivcntr/PDFs/WEB2007State%20Laws.pdf. Accessed July 18, 2007.

New York Public Health Law sec 2500f. Human immunodeficiency virus; testing of newborns. www.wadsworth.org/newborn/law.htm. Accessed July 30, 2007.

Office of the High Commissioner for Human Rights. General Comment No. 19: Protection of the family, the right to marriage and equality of the spouses (Art. 23). 39th session (1990).

Parker M. The best possible child. *J Med Ethics*. 2007;33(5):279-283.

Perinatal HIV Guidelines Working Group. *Public Health Service Task Force Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1 Infected Women for Maternal Health and Interventions to Reduce Perinatal HIV-1 Transmission in the United States*. Rockville, MD: AIDSinfo. http://aidsinfo.nih.gov/ContentFiles/PerinatalGL.pdf. Accessed July 18, 2007.

Petersen TS. The claim from adoption. *Bioethics*. 2002;16(4):353-375.

Planned Parenthood v Casey, 505 US 833 (1992).

Roberts JM, Gammill HS. Preeclampsia: recent insights. *Hypertens.* 2005;46(6):1243-1249.

Roe v Wade, 410 US 113 (1973).

Ross LF. Ethical considerations related to pregnancy in transplant patients. *N Engl J Med*. 2006;354(12):1313-1316.

Savulescu J. Procreative beneficence: Why we should select the best children. *Bioethics*. 2001;15(5-6):413-426.

Scheib J, Riordan M, Rubin S. Adolescents with open-identity sperm donors: reports from 12-17 year olds. *Hum Reprod*. 2005;20(1):239-252.

Schieve LA, Reynolds MA. What is the most relevant standard of success in assisted reproduction? Challenges in measuring and reporting success rates for assisted reproductive technology treatments: What is optimal? *Hum Reprod*. 2004;19(4):778-782.

Scholz T, Bartholomaus S, Grimmer I, Kentenich H, Obladen M. Problems of multiple births after ART: medical, psychological, social and financial aspects. *Hum Reprod*. 1999;14(12):2932-2937.

Shapiro DE. *Delivering Doctor Amelia*. New York, NY: Harmony Books; 2003.

Shenfield F. Filiation in assisted reproduction: potential conflicts and legal implications. *Hum Reprod*. 1994;9(7):1348-1354.

Sibai BM, Barton JR. Expectant management of severe preeclampsia remote from term: patient selection, treatment, and delivery indications. *Am J Obstet Gynecol.* 2007;196(6):514.e1-9.

Snowden R. *The Gift of a Child: A Guide to Donor Insemination*. Exeter, England: University of Exeter Press; 1993.

Stanley v Illinois, 405 US 645, 651; 92 SCt 1208, 1212 (1972).

Stenchever MA, Droegemueller W, Herbst AL, Mishell DR Jr. *Comprehensive Gynecology*. 4th edition. St. Louis, MO: Mosby; 2006:901-910.

Takushi M, Moromizato H, Sakumoto K, Kanazawa K. Management of invasive carcinoma of the uterine cervix associated with pregnancy: outcome of intentional delay in treatment. *Gynecol Oncol*. 2002;87(2):185-189.

Triseliotis J. Identity and genealogy. In: Bruce N, Mitchell A, Priestley K, eds. *Truth and the Child: A Contribution to the Debate on the Warnock Report.* Edinburgh, UK: Family Care; 1988:22.

Turner AJ, Coyle A. What does it mean to be a donor offspring? The identity experiences of adults conceived by donor insemination and the implications for counselling and therapy. *Hum Reprod*. 2000;15(9):2041-2051.

United Nations General Assembly. Universal Declaration of Human Rights, adopted under Resolution 217 A (III), UN Doc A/810 at 71 (1948). December 10, 1948. http://www.un.org/Overview/rights.html. Accessed August 7, 2007.

United States General Accounting Office. *Newborn Screening: Characteristics of State Programs*. GAO-03-449. Washington, DC: General Accounting Office; 2003. http://www.gao.gov/new.items/d03449.pdf. Accessed July 18, 2007.

van den Akker O. A review of family donor constructs: current research and future directions. *Hum Reprod Update*. 2006;12(2):91-101.

Van der Vange N, Weverling GJ, Ketting BW, Ankum WM, Samlal R, Lammes FB. The prognosis of cervical cancer associated with pregnancy: a matched cohort study. *Obstet Gynecol*. 1995;85(6):1022-1026.

Vanfraussen K, Ponjaert-Kristoffersen I, Brewaeys A. Why do children want to know more about the donor? The experience of youngsters raised in lesbian families. *J Psychosom Obstet Gynecol*. 2003;24(1):31-38.

Veatch R. *Transplantation Ethics*. Washington, DC: Georgetown University Press; 2000:277-413.

Verhovek SH. A radical treatment to stunt a 9-year-old disabled girl's growth stirs a deep ethical debate; What about Ashley's dignity? *Houston Chronicle*. January 5, 2007:A4.

Walker I, Broderick P. The psychology of assisted reproduction, or psychology assisting its reproduction? *Aust Psychol*. 1999;34(1):38-44.

Warnock M. The good of the child. *Bioethics*.1987;1(2):141-155.

Warren MA. Does distributive justice require universal access to assisted reproduction? In: Rhodes R, Battin BP, Silvers A, eds. *Medicine and Social Justice: Essays on the Distribution of Health Care*. New York, NY: Oxford University Press; 2002:426-437.

Wilson EE. Assisted reproductive technologies and multiple gestations. *Clin Perinatol*. 2005;32(2):315-328.

Wu L. family planning through human cloning: Is there a fundamental right? *Colum L Rev*. 1998:1410.

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