

The Ethics of Assisted Reproduction

Medicine can do a lot to help people become parents. Sometimes, maybe too much

by Tim Beardsley, *staff writer*

When Louise Brown, the first baby conceived through in vitro fertilization (IVF), was born in England 20 years ago, commentators fretted that the technique would allow humans to “play God.” Tens of thousands of healthy babies later, society has accepted IVF as a treatment for infertility, at least for heterosexual couples. The extensions of IVF that are now being developed, however, give rise to ethical and legal quandaries that are far more challenging than those that surrounded Baby Brown.

Unlike the U.K. and some other countries, which have regulated assisted reproduction, the U.S. has left the field to develop as it will. That development is proceeding at an eye-popping rate: hundreds of millions of dollars are now spent every year on in vitro fertilization. Technological possibilities seem to have run ahead of society’s willingness to grapple with the issues they present.

Fertility clinics could, for example, now legally produce babies from biological parents who are both dead, by buying and thawing frozen sperm and eggs that donors banked while still alive. The clinics would combine the components and then implant the resulting embryo in a surrogate mother. There is “no clear technical or legal obstacle to prevent it,” says Eric T. Juengst, a bioethicist at Case Western Reserve University. Twins were born last year in Atlanta from frozen eggs that were fertilized after thawing, the first such births in the U.S.

The breakthrough means that “now you can begin to use cadavers” as sources of eggs, says ethicist Arthur Caplan of the University of Pennsylvania. It could happen: “Americans hate people telling them how to make babies,” Caplan observes. Last year physicians in California established a pregnancy with an embryo frozen and banked by a woman who had died of cancer. The surrogate mother miscarried.

Already, thousands of babies have been born from frozen embryos. And because scientists can split early-stage animal embryos to create identical twins, they might soon be able to create identical human twin embryos. One could then be implanted and the other stored for implantation years later.

Commerce in genetic materials prompts its own tricky questions, such as whether reproduction is becoming, like plastic surgery, a privilege of wealth. Eggs and sperm are routinely bought and sold through fertility clinics: would-be parents select the gametes on the basis of the physical or mental characteristics of the originators. Thus, embryos themselves “are

nearly sold,” Juengst says. In a notorious case at the University of California at Irvine’s now defunct fertility clinic, scores of embryos were effectively stolen—implanted by clinic staff into would-be mothers without the permission of the donors.

Piecemeal Regulation

Individual states have passed laws to ensure that commercial reproductive services meet quality-control requirements and have put limits on surrogate-motherhood contracts, says Lori B. Andrews of Chicago-Kent College of Law. But the regulation is patchy and does not cover experimental techniques. The U.S. Congress has largely ignored the field because of the political risks of getting near the abortion debate. Controversy swirls even now around the practice of “selective abortion”: implanting multiple embryos into a woman’s uterus and then surgically eliminating some should too many start to grow.

Americans’ strong belief in the right of individuals to reproduce suggests that legal controls on the new techniques “are not going to happen,” states Lawrence O. Gostin, legal editor of the *Journal of the American Medical Association*. And some legal theorists believe that that is as it should be. John A. Robertson of the University of Texas, notably, has argued that people who want to be parents have a constitutionally protected right to do so. Robertson points out that few legal constraints limit fertile heterosexual couples who want a baby. So people who need medical help should be subject to no additional legal tests, according to this libertarian view.

Bernard M. Dickens of the University of Toronto says that attitudes toward reproductive technology depend on the opening premise. Some people believe that it should be regulated essentially because it is unnatural. But those who don’t agree “must show some harm if they want to restrict reproductive freedom,” Dickens asserts. He observes that common attitudes toward reproduction, strongly influenced by traditional religious teachings, are far from gender-neutral. When former Canadian prime minister Pierre Trudeau fathered a child at 71, people applauded this evidence of his vigor. But if a 71-year-old woman bore a child, “many would think that was abhorrent,” Dickens says.

Some fear, though, that the anything-goes approach could in fact lead to harm. One possibility is physical harm to the child. Pierre Roubertoux of the National Center for Scientific Research (CNRS) in Orléans, France, has recently repeated his earlier finding that elderly mice that originated as frozen embryos show subtle differences in weight, jaw structure and behavior. Sung-Eun Park and his colleagues at the CHA General Hospital in Seoul have published a report indicating that frozen and thawed human eggs have elevated numbers of chromosomal and other cellular abnormalities.

In principle, such changes could cause problems that might appear only during later life. Joe B. Massey, director of Reproductive Biology Associates, which produced the twins born in Atlanta from frozen eggs, says Park’s finding has prompted him to reconsider the technique.

One new procedure for treating male-factor infertility—intracytoplasmic sperm injection (ICSI)—brings with it the possibility of transmitting to offspring a genetic condition that would otherwise not propagate itself. Zev Rosenwaks of New York Hospital–Cornell Medical Center and his colleagues recently used the technique to give men who have the extreme, “nonmosaic” form of Klinefelter’s syndrome their own children. Males with this condition have an extra X chromosome in all their cells. They produce very few sperm, but by intro-

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ducing individual sperm directly into eggs using ICSI, Rosenwaks has produced healthy babies. Yet male offspring produced this way could be at significant risk of Klinefelter's.

Some doubters of Robertson's libertarian approach suggest governments should enact laws dictating who might be suitable parents, perhaps modeled on the rules governing adoptive parents. Such regulations might avoid tragedies like one that happened in Pennsylvania, in which a 26-year-old bank analyst paid a clinic \$30,000 to create an embryo from his sperm and have it carried to term by a surrogate mother. Then, a month after bringing the baby home, he beat the infant to death and pled guilty to murder in 1995. On the other hand, "Would the public sit still for requiring women who wanted IVF to meet adoption criteria?" asks Kenneth Ryan, chair of the ethics committee of the American Society for Reproductive Medicine.

Then there is possible harm to the prospective parents. "My concern is to avoid fraudulent contracts," Juengst states. People who approach a fertility clinic may be especially vulnerable, he believes. A number of the techniques being offered are still experimental, partly because federal funds cannot be used to support research on human embryos. Although professional guidelines attempt to control how clinics advertise their success rates, statistics are irrelevant to a new procedure. So an unscrupulous operator could bilk a fortune out of a would-be parent by offering endless approaches.

Not the least of the possible ill effects from reproductive technology flows from the abstract idea that children have a right to an "open future." If one of two identical twins were to be born many years after the other, the parents who reared the second child would know what kind of talents he or she might develop and so might not allow her to acquire her own wide range of experiences. And when genetic manipulation of human embryos becomes feasible—probably some years from now—parents may want to engineer their offspring so that they can become great dancers or great thinkers.

Fear of Cloning

The question of restricting a child's future could become a pressing issue if researchers ever clone a human. "A cloned child will be a child who is likely to be exposed to limited experiences and limited opportunities," Andrews charges, because the person who produces one will most likely encourage specific characteristics in the child.

In cloning, which made headlines in 1997 with the creation of Dolly the sheep, a nucleus would be taken from a cell donated by the individual to be cloned. The nucleus, containing a complete set of chromosomes, would then be transferred into an egg cell whose own nucleus had been removed. The resulting artificial embryo, implanted into a surrogate mother, would develop into a clone of the original cell donor.

Three bills have been proposed in Congress to ban human cloning, and two are still in play—although no responsible scientist will attempt the procedure anytime soon. Evidence from research on animals suggests that it could give rise to birth defects: during the experiments that produced Dolly, several cloned embryos that miscarried were found to have abnormalities.

Regulation of cloning could be problematic, however. Dickens believes the two bills now in Congress are unconstitutional, and scientists are fighting them because they would prevent important health research. Some emerging techniques related to cloning might, for example, one day be used to grow replacement nerve or skin tissue for transplants.

Another promising technique closely related to cloning has been proposed to allow a woman to have healthy offspring even if she suffers from a heritable disease transmitted in her mitochondria. These are subcellular structures outside the cell nucleus that, like chromosomes, contain genetic material.

Andrea L. Bonnicksen of Northern Illinois University notes that in the as yet untested procedure known as in vitro ovum nuclear transplantation, a cell nucleus from a would-be parent with mitochondrially transmitted disease would be transferred into a donated healthy egg cell whose own nucleus had been removed. The hybrid egg would lack the disease-causing mitochondria of the parent.

The regulatory mess might be clarified soon. The American Bar Association has formed a committee to draft a "model act" that states could use as a basis for

their own legislation. According to H. Joseph Gitlin, its chair, the act should protect the rights of children conceived through IVF and establish the legal status of genetic materials. It should also provide consumer protection for prospective parents.

The Food and Drug Administration and the Centers for Disease Control and Prevention are now considering regulating the fertility business. But the proliferating ways of bringing children into the world will continue to challenge society's tenuous ethical consensus. The conundrums are profound.

While desperate prospective parents undergo risky procedures to have a shot at acquiring children genetically related to themselves, thousands of unwanted youngsters wait in vain to be adopted. Yet "it seems that all that we prize about the parent-child relationship is present with adopted children," Dickens notes.

And while ethicists debate new reproductive technologies, 600,000 women worldwide die each year from complications linked to pregnancies initiated in the traditional manner, says Rebecca J. Cook of the University of Toronto. The overwhelming majority could be saved with properly trained birth attendants and inexpensive medicines. But most of these deaths are in developing countries, and the developed world applies quite different ethical standards to faraway lands.



A human egg is held and injected with a sperm (through needle, left) in intracytoplasmic sperm injection (ICSI).