The Fate of Surplus Cryopreserved Embryos: What is the Superior Alternative for their Disposition?

[T]ens of thousands of embryos are now frozen in fertility clinics, often because couples don’t know what to do with them. Their options are limited. They can throw them away. They can leave them in the freezer. They can donate them for research . . . . They can also give them to another woman hoping to get pregnant.

I. INTRODUCTION

As a result of recent advancements in reproductive technology, many infertile couples have turned to in vitro fertilization (IVF) as an alternative means of conception. Following the birth of the first “test-tube baby” in the United States in 1981, IVF has enabled the birth of more than 114,000 babies. Many couples who are struggling to conceive children view IVF as a “last chance” and a “last hurrah” for biological parenthood.

During the IVF process, a clinician extracts eggs from a woman’s ovaries and fertilizes them in a laboratory. Subsequently, several of the resulting embryos are transferred into the woman’s uterus. In recent years, many couples have opted to “cryopreserve” the remaining embryos, thereby retaining multiple future opportunities to conceive without the necessity of further egg

3. Am. Soc’y for Reprod. Med., Fact Sheet: In Vitro Fertilization (IVF) (providing brief overview of IVF history and statistics), at http://www.asrm.org/Patients/FactSheets/invitro.html (last visited Jan. 28, 2004). Statistics reveal that 82% of pregnancies from IVF result in a live birth. Id. Furthermore, IVF success rates are comparable to the 20% chance that a reproductively normal couple has of bearing a live child. Id.
4. ANDREA L. BONNICKSEN, IN VITRO FERTILIZATION: BUILDING POLICY FROM LABORATORIES TO LEGISLATURES 24 (1989) (describing desperation of infertile women and their willingness “to try anything” to conceive). Many women fear that they will be unable to conceive children and cling to IVF as a last hope. Id. The desperation of IVF patients is illustrated by the following statement: “[i]f you put 100 women over 40 in a room and tell them only one percent will get pregnant, they will beg to be part of that one percent.” Id.
5. See BONNICKSEN, supra note 4, at 147-51 (delineating IVF technique).
6. See BONNICKSEN, supra note 4, at 147-51 (delineating IVF technique).
retrieval attempts.\textsuperscript{7}

Despite its popularity, cryopreservation technology, which allows for an indeterminable lapse between conception and implantation, has sparked a variety of controversies.\textsuperscript{8} Disputes include those involving post-divorce ownership rights to cryopreserved embryos, orphaned embryos, and even posthumously conceived children.\textsuperscript{9} Ironically, the desirability and widespread use of this technique has created yet another cryopreservation controversy: what should be done with the growing number of surplus embryos?\textsuperscript{10}

Currently, fertility clinics across the nation are storing greater than 100,000 embryos.\textsuperscript{11} In the absence of any consistent, generalized plan, the embryos will continue to stockpile at the current rate of 18.8% annually.\textsuperscript{12} The three most prominent alternatives for the disposition of these surplus embryos are: destruction; donation for stem cell research; and adoption by other infertile couples.\textsuperscript{13} Because each of these alternatives is fraught with its own unique issues and controversies, determining the fate of surplus embryos is a difficult decision.\textsuperscript{14}


\textsuperscript{8} See infra note 9 and accompanying text (providing various instances when cryopreservation resulted in conflict or controversy).


\textsuperscript{11} Moore, supra note 10, at KS1 (providing numerical estimate of frozen embryos being stored in fertility clinics); see Lori B. Andrews & Nanette Elster, Regulating Reproductive Technologies, 21 J. Legal Med. 35, 59 (2000) (estimating 100,000 embryos currently being stored, increasing annually by 18.8%); Jackie Jadrnak, Legal Chill Surrounds Frozen Embryos, ALBUQUERQUE J., Apr. 1, 2001, at A1 (indicating “100,000 to 200,000 frozen embryos exist in this country”), available at 2001 WL 17938689.

\textsuperscript{12} See supra note 11 and accompanying text (setting forth current statistics for numbers of embryos in storage and expected rates of increase). To date, the fertility industry “remains largely unregulated” and only a limited number of states have addressed issues relating to the disposition of unused embryos. See Jennifer M. Stolier, Comment, Disputing Frozen Embryos: Using International Perspectives to Formulate Uniform U.S. Policy, 9 Tul. Int’l & Comp. L. 459, 470-71 (2001) (emphasizing lack of regulation in fertility industry and suggesting deficiency related to abortion controversy).


\textsuperscript{14} See Redman & Redman, supra note 13, at 586-87 (referencing legal and ethical issues surrounding
This Note will begin with an overview of infertility and a description of the IVF and cryopreservation techniques. Part II will describe the three legal classifications employed by courts in resolving disputes regarding cryopreserved embryos. It will then outline and explore the three main alternatives for surplus cryopreserved embryos: destruction; donation for research; and adoption. Part III will analyze the advantages and disadvantages of each of the alternatives and conclude that, absent specific guidance from the individual genetic providers, stem cell research is the superior alternative for the disposition of surplus embryos.

II. HISTORY

A. Reproductive Technology

Infertility is a reproductive condition that impairs the ability of approximately ten percent of Americans to have children. The causes of infertility are varied and can result from problems in the man, the woman, or both. Despite the success of drug therapy and surgical intervention treating certain infertility disorders, an increasing number of infertile couples are turning to assisted reproductive technology.

15. See infra Part II.A.1-2 (presenting general background information on reproductive technology).
16. See infra Part II.B (analyzing three prominent legal classifications for embryos).
17. See infra Part II.C (describing advantages and disadvantages of destruction, research and donation for adoption).
18. See infra Part III (analyzing alternatives and selecting embryo donation for research as superior option).
20. Robert Blank & Janna C. Merrick, Human Reproduction, Emerging Technologies, and Conflicting Rights 85 (1995) (stating infertility can be caused by “environmental, heritable, pathological, and sociobehavioral factors”); see Hwang, supra note 19, at 1888 (outlining causes of infertility). Typically, male infertility is caused by either low sperm count or abnormal sperm function. Hwang, supra note 19, at 1888. In females, fallopian tube blockage is the most common cause of infertility. Bonnicksen, supra note 4, at 23. Such blockages can arise from “scarring from abdominal surgery, ectopic pregnancies . . . , appendicitis, endometriosis, scarring from abortions, venereal diseases, and pelvic inflammatory disease (PID).” Id. Female infertility can also arise from adverse hormonal conditions, diminished numbers or defective quality of eggs, or as a result of other biological disorders. Hwang, supra note 19, at 1888.
21. See Hwang, supra note 19, at 1888 (outlining prevalent types of advanced fertility treatments); see also Blank & Merrick, supra note 20, at 86 (noting popularity of reproductive technology). One alternative is superovulation and intrauterine insemination, a process in which a clinician places sperm in a woman’s uterus after she has used hormones to stimulate egg production. Hwang, supra note 19, at 1888. Another alternative is the widely used IVF technique, which involves the formation of embryos outside the body and transfer into the woman’s cervix. Id. As technology has progressed, several variations of IVF have also been developed. Id. Zygote intrafallopian transfer (ZIFT), is a variation of IVF in which a physician transfers fertilized eggs into a woman’s fallopian tubes through a laproscope. Id. Another technique, Gamete intrafallopian transfer (GIFT), involves the transfer of eggs and sperms into the fallopian tubes through small incisions in the woman’s abdomen. Id.
1. In Vitro Fertilization

The success of IVF became clear in July of 1978 when Louise Brown, the first baby conceived by this reproductive technique, was born in England.22 Following substantial ethical and political debate, IVF became available in the United States in January of 1980.23 Elizabeth Carr, the first IVF baby in the United States was born on December 28, 1981.24 Although success rates for IVF vary and are dependent on case-specific factors, the births of these “test-tube” babies has sparked great hope among desperate couples.25

IVF minimizes many of the individualized factors that hamper a couple’s ability to conceive because fertilization occurs outside the woman’s body.26 Typically, the IVF procedure takes place over the course of two weeks.27 The process begins with the use of hormones to stimulate egg ovulation and results in the production of multiple eggs, which an IVF clinician later removes and fertilizes in a petri dish.28 A physician ultimately transfers some or all of the

22. See BLANK & MERRICK, supra note 20, at 89 (tracing history of IVF); see also BONNICKSEN, supra note 4, at 18 (noting birth of Louise Brown responsible for calling public attention to IVF). According to one poll taken after the birth of Louise Brown, an astounding percentage of Americans had heard of Louise’s birth and could at least partially explain the IVF procedure. BONNICKSEN, supra note 4, at 18. “People magazine named her one of the ten most important people of the decade by virtue of her mere presence.” Id.

23. BLANK & MERRICK, supra note 20, at 89 (noting introduction of IVF in United States); see Lori B. Andrews & Nanette Elster, Regulating Reproductive Technologies, 21 J. LEGAL MED. 35, 35-41 (2000) (summarizing conflicts and debates surrounding in vitro fertilization). With the birth of the first IVF baby, many arguments against IVF were also born. Andrews & Elster, supra, at 36-37. IVF has been attacked as being an attempt to “play God,” unethical, unnatural, and for purportedly shifting the focus of medicine away from “more pressing” problems. Id. at 37-38.

24. BLANK & MERRICK, supra note 20, at 89 (noting first IVF birth in United States).

25. See supra note 3 and accompanying text (providing general statistics for IVF success rates); supra note 4 and accompanying text (describing desperation of IVF patients); see also BLANK & MERRICK, supra note 20, at 89 (noting variable success rates “between patients with specific indications”). IVF success is largely dependent on the unique characteristics of the individuals and donated gametes. BLANK & MERRICK, supra note 20, at 89-90. Success rates, for example, are dramatically reduced for couples in which the male is infertile, for women with a single ovary, and for women over the age of 40. Id. at 89.

26. See BONNICKSEN, supra note 4, at 23 (acknowledging tubal abnormality as common cause of female infertility). With the advent of IVF, a condition such as blocked or damaged fallopian tubes will not automatically preclude a woman from bearing a child. Id. Because the embryo is placed directly in the uterus, a woman who has previously undergone a tubal ligation for birth control purposes still has the potential to carry a child. Id.; see also SUSAN LEWIS COOPER & ELLEN SARASOHN GLAZER, CHOOSING ASSISTED REPRODUCTION: SOCIAL, EMOTIONAL AND ETHICAL CONSIDERATIONS 56 (1998) (articulating benefits of close proximity between sperm and egg during IVF). When sperm are placed directly with an egg in a petri dish, fewer sperm are needed for successful fertilization than would be required during regular intercourse. COOPER & GLAZER, supra, at 56.

27. See, e.g., BONNICKSEN, supra note 4, at 147-51 (detailing specific medical steps of IVF procedure); Redman & Redman, supra note 13, at 584-85 (outlining IVF technique); Diane K. Yang, Note, What’s Mine Is Mine, But What’s Yours Should Also Be Mine: An Analysis of State Statutes That Mandate The Implantation of Frozen Preembryos, 10 J.L. & Pol’y 587, 591 (2002) (providing general overview of IVF process); see also supra notes 5-6 and accompanying text (describing basic principles of IVF process).

28. See Gunsburg, supra note 7, at 2210-11 (explaining both process and rationale for ovarian stimulation). Hormone stimulation of the ovaries is initially utilized in order to increase the number of eggs produced. Id.
resulting embryos into the woman’s uterus through the cervix. This controlled and external fertilization mimics the natural fertilization process and hormonally-stimulated ovulation increases the chance of a successful conception.

2. Cryopreservation

The very nature of the ovarian stimulation phase of the IVF procedure creates the potential for multiple embryos. When a physician mixes a woman’s eggs with normal quality sperm in a petri dish, approximately 70% of the eggs will fertilize in a given cycle. It is possible, however, that all or most of the eggs will be fertilized, resulting in multiple embryos. Due to the health risks associated with multiple pregnancies, a physician will only implant a limited number of embryos into a patient at a given time.

The recent development of embryo cryopreservation has both provided a solution for these excess embryos and further brightened the hopes of many infertile couples. Cryopreservation is a process that involves freezing an embryo at the two-to-eight cell stage, so that it may be preserved for implantation at a future date. After being carefully packed with cryoprotectants, technicians place embryos in containers and store them at approximately minus 196 degrees Celsius. When a woman is ready for implantation, the process is reversed and the embryo is thawed and implanted via the normal IVF process.

In addition to allowing a woman multiple future opportunities for conception, cryopreservation offers couples several other significant advantages. Cryopreservation of embryos is less costly than IVF when subsequent implantation is desired because the hormone and fertilization stages can be bypassed. Another advantage is that the woman is spared the

29. See supra note 27 and accompanying text (providing general overview of IVF protocol).
30. See Gunsburg, supra note 7, at 2210-11 (describing rationale for using IVF).
31. See supra note 28 and accompanying text (describing hormonal stimulation of ovaries and its effects).
32. COOPER & GLAZER, supra note 26, at 52 (acknowledging difficulty in predicting number of successful fertilizations in single IVF cycle).
33. COOPER & GLAZER, supra note 26, at 52 (recognizing potential for fertilization of all eggs).
34. Redman & Redman, supra note 13, at 586 (mentioning potential increase in maternal and fetal complications arising from multiple pregnancies).
35. See COOPER & GLAZER, supra note 26, at 51 (articulating advantages of cryopreservation for infertile couples).
37. See supra note 36 and accompanying text (delineating cryopreservation protocol).
38. See supra note 36 and accompanying text.
39. Puskar, supra note 36, at 763 (summarizing advantages of cryopreservation).
40. Puskar, supra note 36, at 763 (noting cost benefits of cryopreservation).
emotional and physical exhaustion of undergoing another complete IVF procedure.  
Furthermore, cryopreservation allows a woman more control over the timing of her pregnancy and also allows for implantation “after the deleterious effects of the ovarian-stimulating hormone have abated.”

B. Moral and Legal Status of the Embryo

What is an embryo?

There is much discussion in the literature on the status of the embryo. To members of ethics commissions here and abroad, it is a potential human being worthy of special respect. To physicians, it is a collection of cells with specific properties depending on the embryo’s developmental stage. To couples, it is a powerful symbol of hope and potential parenthood.

In light of the conflicting personal, societal, scientific, and moral perspectives that exist, it is nearly impossible to develop a satisfactory working definition of an embryo. In unraveling the legal dilemmas surrounding embryos, courts have adopted three basic views in order to determine the rights of genetic providers and the embryo. Embryos have been classified as “persons,” “property,” and in a special “interim category between life and property.”

1. Embryos as “Persons”

Proponents of the theory that embryos are human beings believe that fertilization marks the beginning of human life. This position, adopted by right-to-life groups and the Roman Catholic Church, advocates that embryos be “afforded all the rights and dignities due a human person . . . [including] the right to life.” Consequently, proponents of this theory forbid any action that

41. BONNICKSEN, supra note 4, at 31 (recognizing emotional benefits of cryopreservation). According to nurse coordinators: “[i]t dissipates anxiety if freezing is done. Patients know they have something in the tank. They are happy about that. They will get extra mileage for their money with freezing.” Id.

42. See Perry & Schneider, supra note 36, at 468 (noting benefits of cryopreservation).

43. BONNICKSEN, supra note 4, at 40 (illustrating various meanings of “embryo”).

44. See BONNICKSEN, supra note 4, at 40 (discussing working definition of embryo).

45. Davis v. Davis, 842 S.W.2d 588, 596 (Tenn. 1992) (delineating three perspectives from which to view embryos); see, e.g., COOPER & GLAZER, supra note 26, at 27-28 (providing brief overview of three perspectives on embryos); Arado, supra note 7, at 252-57 (outlining three basic legal categories applied to embryos); Jennifer P. Brown, Comment, “Unwanted, Anonymous, Biological Descendants”: Mandatory Donation Laws and Laws Prohibiting Premenstrual Discard Violate the Constitutional Right to Privacy, 28 U.S.F. L. REV. 183, 193-99 (1993) (setting forth three major legal positions regarding embryos).

46. See supra note 45 and accompanying text (identifying three views regarding embryo status).


48. COOPER & GLAZER, supra note 26, at 27-28 (acknowledging position of Roman Catholic Church on embryo’s moral status); see Robertson, supra note 47, at 971 (listing groups in support of human-based embryo theory). The Roman Catholic Church’s position is that “life exists on a continuum, beginning with fertilization.” COOPER & GLAZER, supra note 26, at 28.
might harm the embryo or is not primarily therapeutic in nature, such as cryopreservation or research. Similarly, there is a corresponding implied obligation to provide opportunities for implantation of any surplus embryos.

Critics of this human-based view of embryos, however, have challenged it on both legal and medical grounds. In *Roe v. Wade*, the United States Supreme Court held that viability, rather than conception, was the point at which a state has a legitimate and compelling interest in the preservation of life and regulation of abortion. Scientific data corroborates this holding and indicates that pregnancy does not begin with fertilization, but instead begins when the embryo implants in the uterus. Only upon implantation does an embryo become individualized and develop a brain and differentiated organs.

2. Embryos as “Property”

At the opposite end of the spectrum is the characterization of embryos as personal property of the genetic providers. According to this view, ownership is vested in the “parents” of the embryo and, absent specific consent, no restrictions should be placed on their decisions to use or discard the embryo.

The property approach gives the owner the “right to possess, use, or dispose of...
something according to [his] own pleasure.”

The property-based view of embryos was employed in *York v. Jones*, a Virginia case between genetic providers and an IVF clinic.58 After signing a “Cryopreservation Agreement,” Steven York and Risa Adler-York underwent IVF and left one remaining embryo with a clinic in Virginia to be stored.59 Following a move to California one year later, the Virginia clinic denied the couple’s request to transfer their embryo from Virginia to a clinic in Los Angeles.60 The *York* court utilized basic property principles in holding that a bailor-bailee relationship arose from the “Cryopreservation Agreement.”61 Pursuant to the agreement, the clinic fully acknowledged the couple’s “property rights” in the embryo and had “limited their rights as bailee to exercise dominion and control over” the embryo.62 The result: the court awarded the couple sole power to decide their embryo’s fate.63

Despite the use of property-based principles in the specific contractual scenario presented in *York*, this view has been the subject of great criticism based on its perceived tendency to diminish the value of human life.64 In *Davis v. Davis*, the Supreme Court was unwilling to accept Mary Sue Davis’ argument that she was entitled to a greater interest in the “property” because she had undergone more mental anguish and physical and emotional pain during the IVF process.65 Similarly, two renowned ethics committees, the

57. See Martin & Lagod, supra note 55, at 268 (noting genetic providers have superior and ultimate control over embryo, according to property theory).
59. Id. at 424.
60. Id. (explaining couple wished to have their doctor in Los Angeles implant the embryo).
61. Id. at 425.
62. *York*, 717 F. Supp. at 425-27 (holding clinic obliged to return embryo). According to the specific terms and language used in the cryopreservation contract, the court inferred that the couple had not relinquished their rights to the embryo and that the clinic was merely holding the embryo as a bailee. *Id.* at 426-27. “The Agreement repeatedly refers to ‘our pre-zygote,’ and explicitly provides that in the event of a divorce, the legal ownership of the pre-zygote ‘must be determined in a property settlement’ by a court of competent jurisdiction.” *Id.* at 426.
63. *Id.* at 427. Because the clinic was merely a bailee, the couple succeeded in their action to obtain possession of their cryopreserved embryo. *Id.* at 425-27. In granting the couple the desired relief, the court relied on the basic principles of a bailor-bailee property relationship: “[t]he essential nature of a bailment relationship imposes on the bailee, when the purpose of the bailment has terminated, an absolute obligation to return the subject matter of the bailment to the bailor.” *Id.* at 425.
64. See Martin & Lagod, supra note 55, at 267-70 (suggesting application of property principles to embryo is “wrong”); Alise R. Panitch, Note, *The Davis Dilemma: How to Prevent Battles Over Frozen Preembryos*, 41 CASE W. RES. L. REV. 543, 554-55 (1991) (condemning property-based characterization and warning decision-making control should not be equated with ownership). Arguments against the property-based approach stem from the fear that the embryo’s value will be diminished and its potential for human life will be overlooked. *Id.* at 555.
Warnock Committee in England and the Waller Committee in Victoria, Australia, staunchly rejected the notion that embryos should be treated as personal property.66

3. Special Interim Status

The final characterization of embryos is the one employed by the Davis court: “preembryos are not, strictly speaking, either ‘persons’ or ‘property,’ but occupy an interim category that entitles them to special respect because of their potential for human life.”67 According to this rationale, embryos are afforded a certain level of dignity and respect because of the unique promise they hold for life.68 Biologically, the embryo is able to divide, metabolize, exchange respiratory gases, and has the potential to develop into a human being.69 Without further development and implantation, however, the embryo consists only of a small cluster of cells, unable to survive on its own.70 The special interim category takes into account the unique nature of the embryo and creates a compromise between the extreme property and person-based views.71 Critics of the special interim status find the classification meaningless because it does not definitively decide whether the embryo is to be afforded any rights.72

C. Alternatives for Surplus Embryos

Although the IVF process creates many embryos it is likely that only one will become a baby.73 What then becomes of the “spare” or “surplus” cryopreserved embryos that are no longer needed by the genetic providers?74 It is estimated that 100,000 to 200,000 embryos are frozen in clinics throughout the country; this stockpile will grow even larger with time.75 Typically, IVF

Davis sought to retain control of and implant the embryos she had created with her ex-husband, Junior Davis. Davis, 842 S.W.2d at 589. Although the trial court awarded Mary Sue temporary custody of the embryos for implantation, it did so based on the notion that it was in the “best interest of the children.” Id. at 594. On appeal, the court refused to characterize the embryos as either property or human beings, holding that embryos should be treated with “special respect” in an interim category. Id. at 597.

66 See Panitch, supra note 64, at 555 (noting worldwide prevalence of criticism of property-based view).
67 Davis, 842 S.W.2d at 597 (discarding extreme property and person-based views in favor of middle ground, special interim category).
68 See COOPER & GLAZER, supra note 26, at 28 (identifying embryo treatment under third view).
69 See Martin & Lagod, supra note 55, at 277 (summarizing basic principles of embryologic function).
70 Martin & Lagod, supra note 55, at 227 (distinguishing embryo from newborn).
71 See COOPER & GLAZER, supra note 26, at 28 (describing categorization as blending property and human-based principles).
72 See Brown, supra note 45, at 199 (noting critics deem “special respect” most vague of three viewpoints).
73 See supra note 28 and accompanying text (discussing rationale and consequences of using fertility drugs during IVF).
74 See Jadmak, supra note 11, at A1 (describing dilemma created by couples who abandon or fail to provide for disposition of embryos); Moore, supra note 10, at KS1 (commenting on controversy created by surplus embryos).
75 See supra notes 10-11 and accompanying text (detailing numerical estimates of frozen embryos stored
Clinics require couples to sign consent forms specifying how they wish to dispose of any unused embryos. Clinics can legally make any use of the embryos authorized by the genetic providers, including discard, research, or transfer to others. Which alternative is the superior fate for “spare” embryos? The question is not easily answered because each alternative is distinct, and support for each varies according to personal, moral, and political considerations.

1. Discarding Embryos

Ethicists and health officials agree there is no legitimate reason for keeping embryos frozen indefinitely and the disposition of frozen embryos needs to be addressed. One option is simply to throw them away. Discarding surplus

76. See, e.g., Cooper & Glazer, supra note 26, at 53 (commenting on commonality of consent forms between genetic providers and clinics); Michael T. Morley et al., Developments in Law and Policy: Emerging Issues in Family Law, 21 Yale L. & Pol’y Rev. 169, 170 (2003) (calling attention to Florida’s policy regarding disposition of frozen embryos); John A. Robertson, Precommitment Strategies for Disposition of Frozen Embryos, 50 Emory L.J. 989, 990 (2001) (indicating precommitment strategies employed to alleviate future uncertainties); Shana Kaplan, Note, From A to Z: Analysis of Massachusetts’ Approach to the Enforceability of Cryopreserved Pre-Embryo Dispositional Agreements, 81 B.U. L. Rev. 1093, 1096 (2001) (noting formal agreements are commonplace to account for unforeseen future complications). As of today, Florida is the only state that requires couples to sign dispositional agreements before they begin the IVF process. Morley, supra, at 170. The Florida statute provides that “[a] commissioning couple and the treating physician shall enter into a written agreement that provides for the disposition of the commissioning couple’s eggs, sperm, and pre-embryos in the event of a divorce, the death of a spouse, or any other unforeseen circumstance.” Fla. Stat. Ann. § 742.17 (West 2002) (mandating dispositional agreements prior to IVF commencement). See generally Susan L. Crockin et al., Embryo Law, in Adoption and Reproductive Technology Law in Massachusetts § 11.1.2 (2000) (providing a brief and general overview of IVF consent forms).

77. Robertson, supra note 76, at 992 (delineating options available to clinics); see Nat’l Bioethics Advisory Comm’n, Ethical Issues in Human Stem Cell Research: Executive Summary 6 (1999) [hereinafter EXECUTIVE SUMMARY] (delineating recommendations for excess embryos), available at http://www.georgetown.edu/research/nrbcl/nbac/execsumm.pdf. According to the National Bioethics Advisory Commission, IVF clinics should assist prospective donors in making voluntary and informed choices about their unused embryos. EXECUTIVE SUMMARY, supra, at 6. The policy provides that “[p]rospective donors of embryos remaining after infertility treatments should receive timely, relevant, and appropriate information to make informed and voluntary choices regarding disposition of the embryos.” Id.

78. See Jadrank, supra note 11, at A1 (describing dilemma created by couples who abandon or fail to provide for disposition of embryos); Moore, supra note 10, at KS1 (commenting on controversy created by surplus embryos).

79. See Jadrank, supra note 11, at A1 (describing dilemma created by couples who abandon or fail to provide for disposition of embryos); Moore, supra note 10, at KS1 (commenting on controversy created by surplus embryos).

80. See Heidi Forster, The Legal and Ethical Debate Surrounding the Storage and Destruction of Frozen Human Embryos: A Reaction to the Mass Disposal in Britain and the Lack of Law in the United States, 76 Wash. U. L.Q. 759, 766 (1998) (addressing need for resolution of embryo surplus). In addition to concerns regarding the availability of and expense of storage for the growing population of embryos, there is also a concern about the biological repercussions of prolonged freezing. Id. at 768. While there is no evidence that freezing has any adverse affects on the embryo, the technique is still relatively new, making it difficult to accurately predict any potential long-term complications. See id.; see also Michael D. Lemonick, Sorry, Your

81. Discarding surplus
embryos is ideal in situations where genetic providers no longer desire more children, but would be uneasy knowing their genetic material was alive somewhere else in the world.\textsuperscript{82} Furthermore, the practice of discarding extra embryos is harmonious with the beliefs of those who advocate that an embryo is not yet a human being.\textsuperscript{85} British law incorporates this approach, mandating the thawing and disposal of unclaimed embryos after a period of five years.\textsuperscript{84}

When British officials first enforced the mandatory disposal of unclaimed embryos, protestors ignited a major controversy.\textsuperscript{85} Those who believe life begins at the moment of conception are vehemently opposed to the practice and describe the process as the callous, heartless murder of unborn children.\textsuperscript{86}

At one Bay area clinic, [embryos] are flushed down the drain in a metal sink. At another, a technician drops them into a medical waste bin, to be picked up and incinerated by hospital staff. At still another, a “quiet area” is set aside in the lab, where frozen embryos are thawed and allowed to live out their last days—usually no more than three or four at most.\textsuperscript{87}

2. Donation of Embryos for Research

Another option for surplus embryos is donation for scientific studies, such as stem cell research.\textsuperscript{88} Contractual agreements typically give IVF patients the option to donate excess embryos for private research.\textsuperscript{89} Federal guidelines permit the use of federal funds for research on surplus embryos created for

\textit{Time is Up}, \textit{TIME}, Aug. 12, 1996, at 41 (pointing to general consensus on futility of freezing embryos forever).

\textsuperscript{81} See Redman & Redman, supra note 13, at 586-87 (discussing various alternatives for disposition of unused embryos); see also Smith, supra note 9, at 30-31 (noting several options exist for disposition of surplus embryos).


\textsuperscript{83} See Forster, supra note 80, at 767-68 (arguing disposal appropriate because embryonic cells undifferentiated and unable to develop without implantation).

\textsuperscript{84} See Lemonick, supra note 80, at 41 (describing public reaction to controversial British law). Other countries have dealt with the issue of surplus embryos in different ways. \textit{Id}. While Germany avoided the issue with a straight ban on the cryopreservation of embryos, the United States has altogether failed to provide for the disposition of abandoned embryos. \textit{Id}.

\textsuperscript{85} Lemonick, supra note 80, at 41 (indicating protestors and couples “bitterly lamented” Britain’s order to destroy embryos abandoned after five years).

\textsuperscript{86} See Forster, supra note 80, at 764-66 (stating “many believe disposal is tantamount to murder”).

\textsuperscript{87} Hall, supra note 82, at A1 (depicting various methods for embryo destruction in manner suggesting embryos are living beings).

\textsuperscript{88} See supra note 13 and accompanying text (mentioning three options for addressing issue of surplus embryos).

\textsuperscript{89} Crockin, et al., supra note 76, § 11.5.2 (discussing issues raised by donation of embryos for research purposes). Patients who choose to donate their unused embryos for research should be entitled to specific information regarding the types of research to be performed. \textit{Id}. The importance of informed consent was illuminated by a case in which an infertility patient was shocked to discover that her eggs were not being used to study human infertility, but were instead used for zoological research. \textit{Id}.
procreative purposes only. Funds from the National Institutes of Health (NIH) may be used to conduct research on stem cells derived from “embryos that were created for the purposes of fertility treatment and were in excess of the clinical need of the individuals seeking such treatment.” These guidelines also mandate that there be no reward or inducement offered in exchange for the embryos.

Although embryo experimentation has many potential scientific applications, the focus of research has recently shifted towards the enormous therapeutic potential of stem cells. Embryonic stem cells, also known as pluripotent stem cells, are unspecialized and undifferentiated cells that have the extraordinary ability to convert into any kind of human tissue. The regenerative nature of these unique cells and the ability to transform them into specialized cells have given scientists great hope that these cells may play an instrumental role in the future treatment of injuries and diseases, such as Parkinson’s disease, diabetes, and heart disease. Although stem cells have been identified in many adult tissues and organs, they are more difficult to grow in culture, more limited in number, and limited in their ability to differentiate.


91. See NIH Guidelines, supra note 90, at 51,979 (setting forth conditions for source and use of embryonic stem cells).

92. NIH Guidelines, supra note 90, at 51,979 (ensuring voluntary donation).

93. See James J. McCartney, Embryonic Stem Cell Research and Respect for Human Life: Philosophical and Legal Reflections, 65 ALB. L. REV. 597, 598-99 (2002) (calling stem cell research “timely” controversy); see also BLANK & MERRICK, supra note 20, at 180 (outlining various uses for embryos in scientific research). In addition to genetic studies, embryos can be used to study cell growth, analyze chromosomal aberrations, test and develop oral contraceptives, explore implantation mechanisms and study cancers and diseases. BLANK & MERRICK, supra note 20, at 180; see ANTHONY DYSON & JOHN HARRIS, EXPERIMENTS ON EMBRYOS 6-26 (1990) (discussing potential role of embryonic research in prenatal diagnosis, gene manipulation, and fetal therapy); Alan Trounson, Why Do Research on Human Pre-Embryos?, in EMBRYO EXPERIMENTATION 16 (Peter Singer et al. eds., 1990) (noting limits of animal experimentation and discussing rationale for embryonic research).

94. See Nat’l Insts. of Health, Stem Cell Basics *1 [hereinafter Stem Cells Primer] (summarizing unique properties of stem cells), at http://stemcells.nih.gov/infoCenter/StemCellBasics.pdf (last modified Sept. 2002). When stem cells are placed under certain physiological or experimental conditions, it is possible to manipulate them so that they become specialized cells, such as “beating cells of the heart muscle or the insulin-producing cells of the pancreas.” Id. at *1. Scientists have even developed the ability to control the type of resulting cells by altering conditions and the basic “recipes” for differentiation. Id. at *3.

95. See Stem Cells Primer, supra note 94, at *1 (summarizing potential uses for stem cells). Scientists hypothesize that stem cells will be used in screening new drugs and generating cells and tissues for new therapies. Id. Additionally, stem cells may be used in the renewal of “cells and tissues to treat diseases including Parkinsons and Alzheimer’s diseases, spinal cord injury, stroke, burns, heart disease, diabetes, osteoarthritis, and rheumatoid arthritis.” Id. at *6.

96. See Stem Cells Primer, supra note 94, at *5 (comparing and contrasting embryonic and adult stem cells); Carly Goldstein, Note, Dipping into Uncle Sam’s Pockets: Federal Funding of Stem Cell Research: Is
From a scientific perspective, embryonic cells are particularly attractive for their potential therapeutic value.\textsuperscript{97} For those who consider the embryo a human life from the moment of fertilization, however, the idea of manipulating embryos and utilizing them as a source of stem cells is appalling.\textsuperscript{98} “Opponents in the controversy over stem cell research agree that life is sacred and should be protected. They differ over whether eight cells in a test tube or an 8-year old in a cancer ward deserves the greater protection.”\textsuperscript{99}

3. Embryo “Adoption” or “Donation”

The third means to resolve the embryo surplus is to allow a woman who desires a child to implant and assume custody of someone else’s embryo.\textsuperscript{100} Because the embryo already exists, the need for the IVF procedure is bypassed and medical fees associated with embryo donation are far less than IVF fees.\textsuperscript{101} Embryo donation is advantageous as a last resort for infertile couples, as well as an opportunity for single women to become pregnant.\textsuperscript{102}

States such as Louisiana and New Mexico espouse the view that embryos are human beings and have taken the idea of embryo donation to the extreme.\textsuperscript{103} Both states have adopted statutes that mandate implantation of unused embryos by either the genetic providers or a surrogate couple.\textsuperscript{104} While
the Louisiana statute defines an embryo as a person with individual rights, the New Mexico statute defines a fetus as a product of conception. Regardless of the technical definitions attached to an embryo, both statutes mandating donation invoke constitutional issues of procreation and privacy. In contrast to the strict statutes of Louisiana and New Mexico, which are aimed at protecting the potential of the embryo, few other states have addressed the issue and no federal guidelines currently exist on point.

In July 2002, the Bush administration authorized the expenditure of one million dollars in federal funds to promote awareness of embryo adoption. In accordance with this decision, the Department of Health and Human Services published guidelines for organizations interested in raising public awareness about embryo adoption. In the wake of this announcement, many feminist groups and advocates of abortion protested that the “adoption” terminology used by the Bush administration will undermine Roe v. Wade. They argue that the word “adoption,” rather than “donation,” implies that embryos are live beings rather than cells with a mere potential for life. Aside from controversial terminology and mandatory implantation laws, the public has received the concept of embryo donation fairly well.

when the embryo is in a state of cryopreservation, is considered non-viable and is not considered a juridical person.


106. See Brown, supra note 45, at 186 (concluding regulation requiring implantation infringes on individual’s constitutional rights). But see Jill Madden Melchoir, Comment, Cryogenically Preserved Embryos in Dispositional Disputes and the Supreme Court: Breaking Impossible Ties, 68 U. Cin. L. Rev. 921, 963 (2000) (arguing constitutionality of mandatory implantation). Some commentators feel that the surplus could be avoided if IVF patients would only create those embryos that they wish to implant. Id. The genetic providers can either refrain from the IVF process, only create those embryos that they can implant, or donate the embryos. Id.

107. See generally Yang, supra note 27, at 612-17 (analyzing statutes mandating implantation and referring to absence of federal guidance).

108. See Meckler, supra note 1, at 1 (declaring public awareness campaign most recent phase of controversial debate over status of embryo); see also Carolyn Hubert, Questionable Criticism, Salt Lake Trib., Sept. 3, 2002, at A1 (criticizing embryo research and advocating adoption as superior choice for disposition of unused embryos); Aaron Zitner, A Cold War on Embryo Adoptions, L.A. Times, Mar. 22, 2002, at A1 (suggesting concept of embryo “adoption” may undermine current legal status of abortion), available at 2002 WL 2462911.


111. Id.

III. DONATION FOR RESEARCH: THE SUPERIOR ALTERNATIVE

Ideally, individual genetic providers should retain control of any and all decisions pertaining to the disposition of their unused embryos. Alternatively, in the event that a couple relinquishes their rights to unused embryos or in situations of abandoned or orphaned embryos, it is imperative that the embryo surplus is dealt with in a uniform and consistent manner. The surplus needs to be addressed, yet the alternatives remain numerous and controversial. Although the use of excess embryos for research has sparked an intense debate, it is the most advantageous alternative and carries with it enormous therapeutic potential.

None of the proposed solutions are perfect. It is necessary to weigh the pros and cons of each to determine which alternative is the most advantageous and will confer the most benefit on humanity. On its face, embryo destruction offers a straightforward solution by simply eliminating the surplus. Destruction, however, eliminates a valuable resource that could potentially save or improve the life of another human being. The very nature of the IVF procedure is conducive to the creation of surplus embryos. Rather than flushing potential scientific advances down the drain, this surplus should be utilized to improve human life and further the interests of humanity.

113. See supra note 76 and accompanying text (discussing IVF consent forms and their role in alleviating unforeseen problems).
114. See supra notes 10-11 and accompanying text (referring to inevitable embryo “stockpile” in absence of plan for surplus embryos).
115. See supra notes 10, 13 and accompanying text (referring mixed perceptions surrounding increasing number of frozen embryos).
116. See supra notes 93-95 and accompanying text (noting potential uses for embryonic research).
117. See Redman & Redman, supra note 13, at 586-87 (pointing to controversial nature of each alternative).
118. See supra note 10 and accompanying text (noting conflicting perceptions deterrent to resolution of embryo surplus).
119. See supra notes 80-87 (discussing pros and cons of discarding excess embryos).
120. See Trounson, supra note 93, at 14-15 (stating application of animal research to human conditions inherently limited). Although experiments in animal models are informative and valuable as preliminary tools, such results may be insufficient or inappropriate when applied to humans. Id. at 15. It is possible that the conditions being researched are unique to humans and thus experiments in animal models, which can be influenced by species-specific traits, would ultimately have no benefit to human medicine. Id. Non-human research does have a place in medicine, but “animal and tissue culture models can only be a guide for the likely situation in the human.” Id.
121. See supra note 28 and accompanying text (detailing hormonal stimulation used during IVF and likelihood of creating multiple embryos).
122. See Brodsky, supra note 99, at 241 (balancing interests of person debilitated by disease or injury against those of embryo). While many agree that the interests of humanity should be at the forefront of the surplus debate, there is great disagreement over whether the interest of the embryo or the live human being should prevail. Id. at 241-42. From the perspective of ailing individuals who might possibly be cured by the fruits of embryonic research, “it seems absurd to imbue cellular matter the size of a pinhead with human interests.” Id. at 251. Regardless of whether excess embryos are donated and given a chance for life or used to enhance current medicine, simply destroying this potential offers no human benefit. See id. at 239-40.
light of the time, energy, and money expended during the creation of embryos through IVF, embryo destruction offers no affirmative benefit and is a waste of valuable resources.\textsuperscript{123}

Alternatively, embryo donation is a reasonable and practical solution that offers life to both embryos and infertile couples.\textsuperscript{124} Unlike embryo discard, which simply ends the discussion, embryo donation offers the possibility of turning the burdensome surplus into something positive and desirable.\textsuperscript{125} Conceptually, donation is an ideal solution: an unused embryo is spared destruction and instead fulfills the dreams of an individual who lacks the biological capacity to conceive and the finances needed to undergo the costly IVF procedure.\textsuperscript{126}

Realistically, donation raises many practical issues.\textsuperscript{127} Many couples may not want to implant their unused embryos for either personal or financial reasons.\textsuperscript{128} Nor would they be willing to simply pass their “children” on to strangers.\textsuperscript{129} The idea of having unknown biological offspring, living somewhere in the world, is understandably unsettling to many couples.\textsuperscript{130}

Although voluntary embryo donation is within the discretion of the donating couple and has obvious advantages, mandating donation or implantation is impermissible because it eliminates the rights of genetic providers in favor of

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\item \textsuperscript{123} See Brodsky, supra note 99, at 239-40 (recognizing need to turn embryo surplus into positive life-affirming results); Puskar, supra note 36, at 763 (alluding to emotional and financial costs of IVF). “[T]he preservation of an embryo . . . that may be discarded entirely—is an empty sacrifice that not only devalues the embryo, but . . . minimizes the enormous pain of those living with potentially treatable ailments.” Brodsky, supra note 99, at 239-40.
\item \textsuperscript{124} Redman & Redman, supra note 13, at 587-90 (considering embryo adoption as alternative to disposal).
\item \textsuperscript{125} Redman & Redman, supra note 13, at 589 (suggesting embryo adoption is preferable to destruction).
\item \textsuperscript{126} Redman & Redman, supra note 13, at 587-88 (summarizing benefits of embryo donation).
\item \textsuperscript{127} See Brown, supra note 45, at 236 (discussing negative aspects of mandatory implantation laws). In addition to impinging on a couple’s constitutional right to privacy, mandatory implantation can be psychologically traumatizing for the biological parents. \textit{Id.} at 225.
\item \textsuperscript{128} See Andrews & Elster, supra note 11, at 59 (estimating number of unused embryos currently being stored). Because implantation and raising multiple children is a costly venture, many couples will be left with unused embryos after a successful IVF pregnancy has taken place. Arado, supra note 7, at 244 (stating excess embryos can be cryopreserved). In the event of a divorce, one party may wish to implant a cryopreserved embryo against the other party’s wishes. \textit{Id.} at 245 (introducing examples when unforeseen circumstances caused one party’s desire to have children to change). In such cases, the wishes of the party no longer desirous of procreation should prevail. \textit{Id.} at 249-50.
\item \textsuperscript{129} See Brown, supra note 45, at 225 (noting psychological trauma likely to result when couple is forced to donate embryos); Yang, supra note 27, at 621 (asserting emotional burden placed on gamete providers when donation mandated). Mandatory donation burdens the biological parents with the knowledge that “their genetic children will exist without any personal connection to them.” Brown, supra note 45, at 225. Biological parents reasonably may fear that their genetic offspring will be abused or neglected by their adoptive parents. Yang, supra note 27, at 624-25 (citing example in which surrogate mother carried child who was killed by father after birth). Forcing a couple to donate their unused embryos to complete and potentially unscreened strangers, “strikes at the very notion of individual rights and procreative freedom.” \textit{Id.} at 621.
\item \textsuperscript{130} See supra note 127 and accompanying text (describing emotional complications arising when donation mandated against will of gamete providers).
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the rights of an embryo.\textsuperscript{131} Mandatory implantation infringes on the gametic provider’s constitutional rights and is contrary to the United States Supreme Court’s decision in \textit{Roe v. Wade}.\textsuperscript{132} While voluntary donation may be in the best interest of certain individuals, it cannot be universally prescribed as a solution to the embryo surplus.\textsuperscript{133}

It is evident that embryo discard and donation are flawed and fraught with weaknesses.\textsuperscript{134} Embryo discard eliminates the embryo surplus, but it also eliminates a valuable resource without any affirmative benefit.\textsuperscript{135} Embryo donation uses the surplus to create valuable lives, but does so at the expense of the genetic providers’ fundamental rights.\textsuperscript{136} Is there a way to use these existing embryos for the benefit of society, without trampling on the right of a person to forego parenthood?\textsuperscript{137} The solution lies within the availability of unused embryos for scientific and medical research.\textsuperscript{138} Donation of excess embryos for scientific research resourcefully utilizes the by-products of IVF to promote the interests of humanity.\textsuperscript{139}

Opponents of embryonic research believe that life begins at fertilization.\textsuperscript{140} Those who espouse this perception consider embryo experimentation, which
destroys or harms the embryo, unethical.\textsuperscript{141} This theory persists, despite contrary scientific evidence that an embryo is unable to survive on its own and achieves viability only after prolonged gestation in the mother’s womb.\textsuperscript{142} Proponents of the life-at-conception theory advocate implantation as the solution to the embryo surplus because discard and experimentation adversely affect the embryo.\textsuperscript{143} The question becomes whether fundamental procreative decisions should be outweighed in favor of an eight-celled being that may never come into existence.\textsuperscript{144} The rights of an embryo that may never develop into a human life cannot supercede the constitutional rights of a living human being.\textsuperscript{145}

The concept of embryo donation for scientific research is premised on the notion that life is valuable.\textsuperscript{146} Previous embryonic research has led to substantial improvements in modern medicine.\textsuperscript{147} Current stem cell research from embryos indicates that these cells offer enormous potential for repairing injuries and curing debilitating diseases.\textsuperscript{148} These extra embryos, remnants of the IVF process, are an unexpected gift for science and humanity in general.\textsuperscript{149} Based on the successes of past embryonic research and the promising results of recent embryonic stem cell research, it is clear that the use of spare embryos for research purposes is a valuable and valid alternative.\textsuperscript{150}

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\item \textsuperscript{141} Supra note 49 and accompanying text (indicating any activity not primarily therapeutic in nature conflicts with embryo-as-person theory).
\item \textsuperscript{142} See supra notes 53-54 and accompanying text (setting forth scientific evidence indicating embryo development begins only upon implantation in uterus).
\item \textsuperscript{143} Supra note 49 and accompanying text (noting theory suggests implantation only moral alternative for surplus embryos).
\item \textsuperscript{144} See supra note 99 and accompanying text (highlighting conflict between human potential of embryo and development of medical therapies).
\item \textsuperscript{145} See Brown, supra note 45, at 236 (stating potential of cryopreserved embryo is not considered compelling interest); see also supra note 122 and accompanying text (considering idea of attributing superior interest to embryo, from perspective of ailing individual). “The fact, nonetheless, remains that these embryos do exist. Rather than allowing them to die by thawing, they should be used for developing new stem cell lines that will potentially have significant therapeutic value.” McCartney, supra note 93, at 615 (indicating embryonic research is respectful of human life).
\item \textsuperscript{146} See Brodsky, supra note 99, at 225-32 (citing examples of human injuries and diseases which may be cured by embryonic research). Through embryonic stem cell research, scientists have the ability to turn theories into “potentially curative reality.” Id. at 231. Advocates of embryo research and those who believe embryos are human beings agree that life is valuable; they differ in their notions of what constitutes a “life.” Wurmbrand, supra note 7, at 1089-91 (discussing conflicting concepts of when life begins and effect on resolving frozen embryo controversies).
\item \textsuperscript{147} See Trounson, supra note 93, at 17-20 (providing specific examples of past successful research involving human embryos).
\item \textsuperscript{148} See supra notes 93-95 and accompanying text (outlining potential benefits of stem cell research).
\item \textsuperscript{149} See supra notes 122, 145 and accompanying text (advising scientific research to take advantage of embryos in existence).
\item \textsuperscript{150} See supra notes 93-95 and accompanying text (suggesting advantages of embryonic research are plentiful and worth pursuing).
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IV. CONCLUSION

The various alternatives for resolving the embryo surplus are each uniquely controversial. Nevertheless, infinite storage of these embryos is costly and offers no affirmative benefit. Given the popularity of IVF and cryopreservation, the surplus will continue to grow indefinitely in the absence of a uniform plan. While the proposed solutions may be controversial, it is imperative to curtail the problem, rather than perpetuate it with indefinite storage.

Unlike those embryos scientists manipulate and create for research purposes, the embryos created during the IVF process are intended for procreative purposes. Financial and personal constraints, however, may prevent a couple from implanting all of their embryos. Ideally, genetic providers should make any and all decisions regarding the disposition of their unused embryos. Practical realities and unforeseen circumstances may make this an impossibility.

In the absence of guidance from the couple, the ideal solution will convert these already-existing embryos into something positive and beneficial to humanity. Destroying excess embryos is a waste of valuable resources and scientific potential. Mandating donation is an equally unacceptable alternative because it impinges on the genetic providers’ constitutional right to choose not to have a child. Use of these surplus embryos in scientific studies, designed to improve the health and welfare of society, will ensure that something good can come from these inherently valuable embryos. On their own, these embryos are unable to sustain life. In the hands of scientists they have infinite potential to improve the lives of those afflicted with disease or injury.

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