

2. Particular Reproductive Technologies

2.3 In Vitro Fertilization (IVF)

The Procedure

The assisted reproductive technology of in vitro fertilization (IVF) involves a number of steps.

1) *Ovulation Induction*

Hormones are given to the woman to make her ovaries produce multiple eggs instead of the single egg that normally develops each month. Several different medications may be needed, including medications that stimulate more than one egg to develop at a time, that help the eggs mature, that prevent premature ovulation, and that prepare the lining of the uterus for implantation of an embryo. (1)

Determination of when the eggs are ready to be collected will be made by vaginal ultrasound (an imaging exam of ovaries to monitor the development of follicles, the fluid-filled sacs where eggs mature) and blood tests (to measure response to ovarian stimulation medications). (2)

Sometimes IVF cycles must be canceled before egg retrieval because of an inadequate number of follicles developing, premature ovulation, too many follicles developing and creating a risk of ovarian hyperstimulation syndrome, or other medical issues (3)

2) *Egg Retrieval*

The usual method of retrieving eggs is *transvaginal ultrasound aspiration*. In this procedure, an ultrasound probe is inserted into the vagina to identify follicles, and then a thin needle is inserted into an ultrasound guide to go through the vagina and into the follicles. An alternative procedure is *laparoscopy* in which a tiny incision is made in the abdomen and a slender viewing instrument is inserted (laparoscope) to guide the needle into the follicles. (4)

The eggs are removed from the follicles through the needle, which is connected to a suction device. The eggs are then placed in a nutritive liquid (culture medium) and incubated. (5)

3) *Sperm Retrieval*

Sperm are obtained through masturbation or sometimes through testicular aspiration (use of a needle or surgical procedure to extract sperm from the testicle). (6)

4) *Fertilization*

Two methods are commonly used to fertilize the eggs which have been retrieved: *insemination*, where sperm and eggs are mixed in the lab and incubated overnight; and *intracytoplasmic sperm injection (ICSI)*, where a single sperm is injected directly into an egg. (7)

When the fertilized egg begins to divide, it is known as an *embryo*. (8) Embryos are allowed some development in the lab before they are transferred to a woman's body. Before transfer, a fertility clinic may "grade" embryos based on "how the embryos are dividing, their shape and overall quality" with "the best embryos...used for embryo transfer." (9)

5) *Embryo Transfer*

This procedure usually takes place 2 – 6 days after egg retrieval. (10) A catheter (a long, thin, flexible tube) is inserted into the woman's vagina, through her cervix and into her uterus. A

syringe containing one or more embryos in a small amount of liquid is attached to the end of the catheter and used to place the embryo(s) into the uterus with the intent that an embryo will implant to achieve a pregnancy (11) Embryos which are not transferred immediately may be frozen for later use. (12)

When IVF is performed using the sperm and eggs of a married couple, it is known as *homologous* in vitro fertilization. (13) But IVF may also be performed on behalf of a couple using donor sperm and/or eggs. In this case, it is called *heterologous* in vitro fertilization. (14)

In vitro fertilization may be coupled with *Preimplantation Genetic Diagnosis* (15); see section 5.1. IVF may also be coupled with use of a *gestational surrogate* who will carry the pregnancy to term (16); see section 2.6

Uses of In Vitro Fertilization to Address Fertility Problems

According to the Mayo Clinic, IVF may be “offered as a primary treatment for infertility in women over age 40.” (17) IVF is also utilized in the case of certain health conditions:

- Damaged or blocked fallopian tubes.
- Ovulation disorders causing ovulation to be infrequent or absent.
- Premature ovarian failure, that is, the loss of normal ovarian function before age 40.
- Endometriosis, where the uterine tissue implants and grows outside of the uterus.
- Uterine fibroids, that is, benign tumors in the wall of the uterus.
- A previous tubal ligation.
- Impaired sperm production or function.
- Unexplained infertility, where no cause of infertility has been found. (18)

For discussion of the use of IVF to preserve the fertility of a woman undergoing cancer treatment, see section 3.2.

Moral Assessment of In Vitro Fertilization

According to the teaching of the Catholic Church, in vitro fertilization is not morally permissible. This holds true whether donor sperm or ova are used, or whether the procedure is undertaken between a husband and wife. (19)

The use of donor eggs in IVF may be considered because of age-related diminished ovarian reserve (i.e., decreasing egg quality related to the woman’s age), premature ovarian failure, or natural or surgical menopause. (20) Donor sperm may be utilized if the male partner has a medical condition that prevents him from making sperm and thus providing a sperm sample for use in IVF. (21) Donor eggs or sperm may also be utilized to prevent transmission of a genetic disease. (22)

The Vatican *Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation (Donum Vitae)* points out that the use of eggs or sperm from a donor other than the two spouses joined in marriage is *contrary to the unity of marriage* (23); (see also section 1.2).

Having recourse to the eggs or sperm of a third person constitutes a violation of the reciprocal commitment of the spouses (24). It is not in accord with their exclusive right to become father and mother through each other. (25)

The *Instruction* further notes that the use of donor sperm or ova violates the rights of the child in “depriv[ing] him of his filial relationship with his parental origins and can hinder the maturing of his personal identity.” (26) Such a practice can bring about a rupture between genetic parenthood, gestational parenthood and responsibility for upbringing. (27) As noted by ethicists:

The techniques utilized in standard in vitro fertilization allow for a startling number of permutations and combinations with respect to the donors of sperm and eggs, the choice of a recipient to receive the embryos that result, and the choice of individuals to parent the children who are born as a result of these techniques. Donors of sperm or eggs may or may not be persons who are married. Women who cannot produce viable eggs or who for some reason are unwilling or unable to undergo the procedures necessary to perform laparoscopy may ask another woman to supply eggs for in vitro fertilization.

It is also possible to utilize women other than the biologic donor to serve as the “gestational mother” for a fertilized egg. These women may carry an embryo to term and then either keep the resulting child or turn it over to another party—either the biologic donor or yet another person or persons. Because it is possible to freeze embryos, it is also possible to utilize in vitro fertilization techniques to produce a child after the death of the biologic donors or without the knowledge and consent of the biologic donors.

Nonstandard in vitro fertilization techniques allow for a division of the roles of mother and parent that was, quite simply, impossible before the appearance of these techniques. It is now possible to produce a child who has one set of biologic parents who may be either alive or dead and who provide eggs and sperm, another person or persons who are involved in pregnancy and gestation, and still a third person or persons who serve as the actual or social parent(s) of the child. (28)

The in vitro fertilization procedure may involve only the husband and wife, and some have been tempted to place this case of IVF in a different moral category. (29) However, there are several reasons why even this practice is morally impermissible.

One principle guiding the moral assessment of reproductive technologies is that the life of the new human being must be safeguarded from the time of conception, so that methods of reproduction may not be used which involve the deliberate destruction or the wastage of embryos (see section 1.2). As noted in the Vatican documents *Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation* and the *Instruction Dignitas Personae On Certain Bioethics Questions*, the technology of in vitro fertilization involves significant loss of embryos (30):

- Not all embryos which have been created survive until the time of transfer to the woman. (31)

- As they develop, embryos are “graded” and selected for immediate transfer to a woman, for freezing, or *to be discarded*. (32)
- Not all embryos transferred to a woman will implant in the uterus to achieve a pregnancy. (33) For example, one fertility clinic in the Chicago area gives an average implantation rate of 24.4% for fresh embryos from non-donor eggs, with a range from 47.5% for women under age 35 to 4.6% for women over age 42. (34) Indeed, multiple embryos may be transferred to a woman at a given time in order to increase the probability that at least one embryo will implant in the uterus, with the expectation that some of the embryos will be lost. (35)
- Not all embryos which have been frozen for subsequent use will survive the thawing process. The Embryo Adoption Awareness Center reports that “the success rate for thawing frozen embryos will vary by clinic – from 50 – 75%.” (36) Otherwise stated, 25% - 50% of frozen embryos do not survive the thawing process and are lost.

Regarding the embryonic loss involved in IVF, the *Instruction Dignitas Personae* observes:

These losses are accepted by the practitioners of *in vitro* fertilization as the price to be paid for positive results. In reality, it is deeply disturbing that research in this area aims principally at obtaining better results in terms of the percentage of babies born to women who begin the process, but does not manifest a concrete interest *in the right to life of each individual embryo*. (37; italics added)

...the practice of multiple embryo transfer implies *a purely utilitarian treatment of embryos*. One is struck by the fact that, in any other area of medicine, ordinary professional ethics and the healthcare authorities themselves would never allow a medical procedure which involved such a high number of failures and fatalities. In fact, techniques of *in vitro* fertilization are accepted based on the presupposition that the individual embryo is not deserving of full respect in the presence of the competing desire for offspring which must be satisfied. (38)

Pastoral counselors should remind couples contemplating the use of *in vitro* fertilization that the embryos lost in the IVF procedure are *human beings*, and indeed, are *their own children*. If they were to use IVF, they could be sacrificing some human lives, indeed, sacrificing the lives of some of their own children, in order to satisfy their parental desires. (39)

Given the inseparability of the unitive and procreative meanings of the conjugal act, another principle guiding the moral assessment of reproductive technologies is that *the conception of a child should not occur as the direct result of a technological process which replaces the interpersonal act of sexual intercourse* (see section 1.2). But this is precisely what happens with *in vitro* fertilization, where the creation of a child is purely a laboratory procedure. As the Vatican *Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation (Donum Vitae)* points out:

...homologous IVF and ET [embryo transfer] dissociates from the conjugal act the actions which are directed to human fertilization.

...Homologous IVF and ET is brought about outside the bodies of the couple through the actions of third parties whose competence and technical activity determine the success of the procedure.

...Conception *in vitro* is the result of the technical action which presides over fertilization. Such fertilization is neither in fact achieved nor positively will as the expression and fruit of a specific act of the conjugal union. In homologous IVF and ET, therefore, even if it is considered in the context of 'de facto' existing sexual relations, the generation of the human person is objectively deprived of its proper perfection: namely, that of being the result and fruit of a conjugal act in which the spouses can become "cooperators with God for giving life to a new person."

These reasons enable us to understand why the act of conjugal love is considered in the teaching of the Church as the only setting worthy of human procreation. For the same reasons the so-called "simple case", i.e., a homologous IVF procedure that is free of any compromise with the abortive practice of destroying embryos and with masturbation, remains a technique which is morally illicit because it deprives human procreation of the dignity which is proper and connatural to it. (40)

Thus this document makes clear that, even if IVF could be practiced without the aforementioned loss of embryos, its separation of the creation of a child from the conjugal act is sufficient reason to disqualify it.

In order to avoid the hardships and risks of repeatedly retrieving eggs from a woman's body, IVF typically involves a single procedure in which multiple eggs are retrieved and fertilized. The embryos which are not immediately transferred to the woman may be frozen for subsequent use should the initial attempt at achieving pregnancy not succeed. Or, the frozen embryos may be used at a later date should the couple wish to have additional children. (41) In some cases, even the embryos used in the first transfer to a woman have been previously frozen "because the hormonal ovarian stimulation used to obtain the oocytes [eggs] has certain effects which lead physicians to wait until the woman's physiological conditions have returned to normal before attempting to transfer an embryo into her womb." (42)

However, freezing embryos "exposes them to the serious risk of death or physical harm" since, as previously pointed out, "a high percentage does not survive the process of freezing and thawing." (43) Further, freezing embryos deprives them, "at least temporarily, of maternal shelter and gestation, thus placing them in a situation in which further offenses and manipulation are possible." (44) For these reasons, the Church judges the practice of freezing embryos to be "an offense against the respect due to human beings." (45)

Moreover, frozen embryos can become "spare" or "extra" if a couple achieves the number of children they wish without all their frozen embryos being thawed and transferred to the woman. Or again, a couple may become frustrated with a lack of success in achieving a pregnancy through the IVF procedure and simply give up trying, although frozen embryos remain. What to do with these extra frozen embryos is a major problem and deserves extended consideration in its own right; see section 2.4. In discussing IVF, pastoral counselors should be sure to address this issue with couples.

Practical Issues about the IVF Procedure

Pastoral counselors can also point out to couples considering IVF that there are practical downsides to this procedure.

There are some health risks involved with IVF. For the woman undergoing the procedure, there can be complications with the egg retrieval process. Specifically, “use of an aspirating needle to collect eggs could possibly cause bleeding, infection or damage to the bowel, bladder or a blood vessel.” (46) Further, the use of injectable fertility drugs to induce ovulation can cause ovarian hyperstimulation syndrome (OHSS). (47) Symptoms of OHSS can range from mild to severe. (48) The symptoms of mild to moderate OHSS may include mild to moderate abdominal pain, abdominal bloating or increased waist size, nausea, vomiting, diarrhea, tenderness in the area of the ovaries, and sudden weight increase of more than 6.6 pounds. (49) About 1% to 2% of women undergoing ovarian stimulation develop a severe form of OHSS which may involve rapid weight gain (e.g., 33 – 44 pounds) in five to ten days, severe abdominal pain, severe and persistent nausea and vomiting, blood clots in the legs, decreased urination, shortness of breath, and a tight or enlarged abdomen. (50) Severe OHSS can be life-threatening. (51)

Women who use IVF incur a 2% - 5% risk of the procedure resulting in an ectopic pregnancy. (52) Further, research indicates that IVF slightly increases the risk of premature delivery and of a baby being born with a low birth weight. (53) The risk of miscarriage may be slightly increased when previously frozen embryos are used. (54) When more than one embryo is transferred to a woman at a given time, there is a possibility of a multifetal pregnancy occurring, which carries a higher risk of early labor and low birth weight babies. (55)

According to the Society for Assisted Reproductive Technology (SART), “patients have rated the stress of undergoing IVF as more stressful than or almost as stressful as any other major life event, such as the death of a family member or separation or divorce.” (56) There are stresses in terms of time, “both in the time commitment to an intense treatment which leads to disruption in family, work, and social activities, and for some, in long waiting periods for treatment services.” (57) The marital relationship may also be negatively impacted by a reduction in sexual intimacy. (58) Women will have to deal with side effects of the medical treatments, such as hot flashes, mood swings, headaches, bloating, and nausea. (59) Financial strains may be experienced because the IVF procedure is expensive. The American Pregnancy Association reports that “the cost for a single IVF cycle can range from at least \$12,000 - \$17,000” (60), and “many insurance companies do not cover the cost of fertility treatments.” (61) And there is the stress associated with waiting to hear the outcome of embryo transfer in terms of achieving a pregnancy (62) and the fear that the procedure will fail. (63) Indeed, “many patients describe IVF as an emotional roller-coaster.” (64)

According to the American Pregnancy Association, in the United States the live birth rate for each IVF cycle started is approximately 41% - 43% for women under the age of 35, 33% - 36% for women aged 35 to 37, 23% - 27% for women aged 38 to 40, and 13% - 18% for women over 40. (65) The bottom line is that the IVF procedure does not guarantee that a couple will get their much wanted child.

Notes

1. Mayo Clinic, *In vitro fertilization (IVF)*. <https://www.mayoclinic.org/tests-procedures/in-vitro-fertilization/about/pac-20384716>. Accessed 2018.
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3. *Ibid.*
4. *Ibid.*
5. *Ibid.*
6. *Ibid.*
7. *Ibid.*
8. UW Health, *In Vitro Fertilization (IVF)*. https://www.uwhealth.org/infertility/in-vitro-fertilization-ivf/14510?gclid=EAlalQobChM147fbque12QIVCLjACh3iug49 EAAYASAAEgKy2fD_BwE. Accessed 2018.
9. *Ibid.*
10. Mayo Clinic, *In vitro fertilization (IVF)*.
11. *Ibid.*
12. *Ibid.*
13. Congregation for the Doctrine of the Faith, *Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation (Donum Vitae)*, II (1987). Available at <http://w2.vatican.va> > English > Roman Curia > Congregations > Doctrine of the Faith > Documents. Accessed 2018.
14. *Ibid.*
15. Mayo Clinic, *In vitro fertilization (IVF)*.
16. *Ibid.*
17. *Ibid.*
18. *Ibid.*
19. Congregation for the Doctrine of the Faith, *Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation (Donum Vitae)*, II.A.2, II.B.4-5. Also Congregation for the Doctrine of the Faith, *Instruction Dignitas Personae On Certain Bioethical Questions*, nos. 14-17 (2008). Available at <http://w2.vatican.va> > English > Roman Curia > Congregations > Doctrine of the Faith > Documents. Accessed 2018.
20. Genetics & IVF Institute, *Donor Egg IVF*. <https://www.givf.com/donoreggivf/whoisacandidate.shtml>. Accessed July 2018.
21. Washington University Physicians, *Donor Sperm Insemination*. <https://fertility.wustl.edu/treatments-services/donor-sperm-insemination>. Accessed July 2018.

22. Genetics & IVF Institute, *Donor Egg IVF*; Washington University Physicians, *Donor Sperm Insemination*.
23. Congregation for the Doctrine of the Faith, *Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation (Donum Vitae)*, II.A.2.
24. *Ibid.*
25. *Ibid.*
26. *Ibid.*
27. *Ibid.*
28. Arthur L. Caplan, "The Ethics of In Vitro Fertilization" in Richard T. Hull, *Ethical Issues in the New Reproductive Technologies* (Belmont, CA: Wadsworth Publishing, 1990), p. 101.
29. See, for example, Richard A. McCormick, S.J., "Document is Unpersuasive," *Health Progress* (July-August 1987): 53-55.
30. Congregation for the Doctrine of the Faith, *Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation (Donum Vitae)*, II.B.5; Congregation for the Doctrine of the Faith, *Instruction Dignitas Personae On Certain Bioethical Questions*, nos. 14-15.
31. Genetics & IVF Institute, *IVF Cycle*. <https://www.givf.com/fertility/ivfcycleindetail.shtml>. Accessed July 2018. Also IVFMD, *Fertility Success Rates FAQ*. <https://www.ivfmd.com/fertility-success-rates-faq>. Accessed July 2018.
32. Sher Fertility, *Doctors Blog Embryo & Blastocyst Grading: Which to Transfer, Which to Discard*. <https://haveababy.com/fertility-information/ivf-authority/embryo-blastocyst-grading-which-to-transfer-which-to-discard>. Accessed July 2018. Also Sebastiaan Mastenbroek, Fulco van der Veen, Abbas Aflatoonian, Bruce Shapiro, Patrick Bossuyt, and Sjoerd Repping, "Embryo Selection in IVF," *Human Reproduction* 26/5 (2011): 964-66.
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34. Fertility Centers of Illinois, *Success Rates*. <https://fcionline.com/our-center/success-rates>. Accessed July 2018.
35. Medcover Fertility, *How Many Embryos to Transfer for IVF?* <https://www.medcoverfertility.com/blog/how-many-embryos-to-transfer-forIVF?> Accessed July 2018. Also Congregation for the Doctrine of the Faith, *Instruction Dignitas Personae On Certain Bioethical Questions*, no. 15.

36. Embryo Adoption Awareness Center, *What is the success rate for thawing embryos?* <https://www.embryoadooption.org/faqs/what-is-the-success-rate-for-thawing-embryos>. Accessed July 2018.

37. Congregation for the Doctrine of the Faith, *Instruction Dignitas Personae On Certain Bioethical Questions*, no. 14.

38. *Ibid.*, no. 15.

39. “It is often objected that the loss of embryos is, in the majority of cases, unintentional or that it happens truly against the will of the parents and physicians. They say that it is a question of risks which are not all that different from those in natural procreation; to seek to generate new life without running any risks would in practice mean doing nothing to transmit it. It is true that not all the losses of embryos in the process of *in vitro* fertilization have the same relationship to the will of those involved in the procedure. But it is also true that in many cases the abandonment, destruction and loss of embryos are foreseen and willed.” Congregation for the Doctrine of the Faith, *Instruction Dignitas Personae On Certain Bioethical Questions*, no. 15.

40. Congregation for the Doctrine of the Faith, *Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation (Donum Vitae)*, II.B.5

41. Congregation for the Doctrine of the Faith, *Instruction Dignitas Personae On Certain Bioethical Questions*, no. 18.

42. *Ibid.*

43. *Ibid.*; see also Congregation for the Doctrine of the Faith, *Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation (Donum Vitae)*, I.6.

44. Congregation for the Doctrine of the Faith, *Instruction on Respect for Human Life in its Origin and On the Dignity of Procreation (Donum Vitae)*, I.6. See also Congregation for the Doctrine of the Faith, *Instruction Dignitas Personae On Certain Bioethical Questions*, no. 18.

45. *Ibid.*

46. Mayo Clinic, *In vitro fertilization (IVF)*.

47. *Ibid.*

48. Mayo Clinic, *Ovarian hyperstimulation syndrome*. <https://www.mayoclinic.org/diseases-conditions/ovarian-hyperstimulation-syndrome-ohss/syndromes-causes/syc-20354697>. Accessed January 2018.

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51. *Ibid.*

52. Mayo Clinic, *In vitro fertilization (IVF)*.

53. *Ibid.*

54. *Ibid.*

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56. Society for Assisted Reproductive Technology (SART), *Preparing for IVF: Emotional Considerations*. <https://www.sart.org/patients/a-patients-guide-to-assisted-reproductive-technology/general-information/preparing-for-ivf-emotional-considerations>. Accessed July 2018.

57. *Ibid.*

58. *Ibid.*

59. *Ibid.* See also WINFertility, *The Physical and Emotional Toll of Infertility Treatment*. <http://www.winfertility.com/stress-of-infertility-treatment-ivf>. Accessed July 2018.

60. American Pregnancy Association, *In Vitro Fertilization: IVF*. <http://americanpregnancy.org/infertility/in-vitro-fertilization>. Accessed July 2018.

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62. Society for Assisted Reproductive Technology (SART), *Preparing for IVF: Emotional Considerations*.

63. Southern California Reproductive Center, *How to Cope with the Emotional Stress of IVF*. <https://blog.scrxivf.com/how-to-cope-with-emotional-stress-of-ivf>. Accessed July 2018.

64. WINFertility, *The Physical and Emotional Toll of Infertility Treatment*.

65. American Pregnancy Association, *In Vitro Fertilization: IVF*.