Contents

PART I: Laying the Foundation

1. The Experience of Infertility . . . 11
    - Definitions of terms . . . 23
    - Overview of the book . . . 33
2. Theology of Family and Procreation . . . 37
3. Catholic Natural Law and Procreation . . . 55
4. The Moral Status of Fetuses and Embryos . . . 77

PART II: Evaluating Procedures

5. Intrauterine Insemination and Egg Donation . . . 107
6. GIFT, ZIFT, and IVF . . . 131
7. Surrogate Motherhood . . . 163
8. Prenatal Genetic Testing . . . 197

Afterword . . . 225
Notes . . . 229
Acknowledgments . . . 245

CHAPTER ONE

The Experience of Infertility

The faces of infertility are many and varied. Sometimes the most surprising one is seen in your own mirror. At first, getting pregnant is just something you're waiting to have happen. After all, a couple doesn't always become pregnant with the first several attempts. A few weeks pass. Then it is a niggling little reminder at the back of your thoughts. Could this be a problem? Months pass.

Friends are having children, and conversations in which you once felt included now only isolate you. For some reason, you cannot bring yourself to *ooh* and *aah* over the latest positive pregnancy test, labor and delivery story, or nursing or diapering ecstasy. Holidays when families gather have become difficult, and Mother's and Father's Day are actually painful.

By the time one year of having unprotected sexual intercourse without pregnancy passes, a couple has met the criteria for infertility.

Infertility statistics are just that—statistics—until those numbers include the person in the mirror. In addition to the difficulties of the holidays with family members and their children and the ever-shrinking list of friends in similar circumstances, there are problems in unexpected places.

Jake and Mandy

Jake and Mandy Anderson's story is a case in point. In their early thirties, they had been trying for a year and a half to have a baby, without success. They had seen their doctors. Mandy's tubes were clear of blockage and Jake's sperm count was satisfactory. Mandy was checking her temperature for a rise denoting ovulation. She called Jake whenever that happened. More than once, he had had to interrupt his workday for what initially seemed a romantic rendezvous. Over time, the pleasurable and gratifying sex life they had anticipated became something they never imagined. It seemed at times a chore, and was always a reminder of the fact that they were unable to conceive. Mandy would typically be in tears when her period began each month. They even wondered out loud if having a child was worth going through all of this, and contemplated a life without children. Together, they started looking into adoption as an alternative, but found they were still not quite ready to give up trying to have a child of their own.

Another unanticipated experience, which made their infertility even more difficult, was the way it affected each of their self-images. For Mandy, so much of being a fulfilled woman was bound up with having a child. Not that she would lose her identity in her child's, but she had a deep longing to conceive and experience childbirth and the bonding with her newborn that her friends talked about with such intimacy. She felt somehow less of a woman because she was failing to achieve one of her most significant callings in life.

Jake felt his manhood and virility were threatened; what kind of man was he if he couldn't impregnate his wife? Whatever they had expected, it certainly was not this level of soul-searching brought on by the clinical-sounding word—infertility.

After two years of frustration, Jake and Mandy reached a turning point. They consulted an infertility specialist one of their friends recommended. It was not without fear and trepidation. They had heard about the expense of fertility treatment. They had also heard some cautionary advice from Marc, their pastor. He seemed concerned that infertile couples were not trusting God to give them a child, but Mandy and Jake were confident that they had trusted God through the process so far, and they had prayed consistently as they tried to get pregnant. Marc thought that many infertility treatments were "unnatural." This bothered Jake and Mandy, too, but then, taking one's temperature in order to know when to have intercourse was a bit odd. Marc was hesitant about using any procedure that would involve another person to help a couple conceive and bear a child. These thoughts and more were in the backs of the Andersons' minds as they consulted Dr. Walters.

Dr. Walters was empathetic with their situation. He expressed more care for them than had many of their well-meaning Christian friends, whose advice had been basically to trust God or accept childlessness as His calling for them. The infertility specialist explained that there were a variety of reproductive technologies available, with the only constraining factor being their ability to pay.

He told them about a dizzying alphabet soup of techniques. There was IUI, DI, GIFT, ZIFT, IVF, and ICSI to name a few. Some were very expensive, and they did not know how they could pay for them. But others involved less money, so that was encouraging.

The doctor explained that some of these techniques would involve genetic materials from only the two of them. But others included a third person contributing either genetic material (the egg or the sperm) or the womb in which the child would be gestated. In some

cases, a woman might even provide both egg and womb.

They left the meeting with the doctor, encouraged that their situation was far from hopeless, but also very confused about which treatment or treatments to try.

Another Couple

Jake and Mandy are only one of several fictitious, but typical couples you will meet in this book. No couple represents any real persons, but Jake and Mandy could have been named Scott and Sally Rae. We struggled with infertility for several years. Although we did eventually conceive and bear three children, our journey through infertility touched

TECHNOLOGY AND INFERTILITY

In the past thirty years more than one million babies have been conceived by means of in vitro fertilization. While assisted reproductive technologies are advancing, there is an ongoing battle to overcome the problem of maternal age and infertility. One technology that offers a ray of hope for combating the problems of maternal age is known as vitrification. Vitrification allows doctors to flash-freeze unfertilized eggs so that the woman can postpone pregnancy to a later age. A study in Spain revealed that the rates of success with in vitro fertilization do not differ between using a frozen and a fresh egg. This procedure is helpful for young women who want to preserve eggs for later in life, but there is not much that can be done for women who have diminished fertility, generally women past the age of thirty-five. However, frozen eggs are more sensitive to temperature and hence less reliable than frozen embryos and sperm, and as a consequence vitrification is not a widely used process; doctors generally only recommend this procedure for cancer patients who undergo treatments that will leave them sterile. In the end of the day, assisted reproductive technologies may be progressing, but scientists can't do much to alter the fact that women's fertility diminishes with age.

Source: Leslie Berger, "Racing to Beat the Maternal Clock," *The New York Times*, Dec. 12, 2007, NYTimes.com.

us deeply and changed us in ways we could not have imagined.

We have had other struggles as well. Recently, I asked Sally to compare the pain of infertility to what she experienced in her successful battle with breast cancer (radical surgery, reconstruction, chemotherapy, and so on). She replied *without any hesitation* that the pain of infertility was much more difficult to endure. She and I both remember vividly the pain we experienced, and believe that we can offer genuine empathy and sound advice to infertile couples, as well as those who advise them.

Bearing Advice

Long before a couple considers the technologies that are primarily the focus of this book, they talk to close friends, family members, or a professional, such as their pastor or a counselor. These confidants can offer a listening ear and a compassionate shoulder on which to cry, both of which are quite valuable. But frequently well-meaning individuals can actually increase the pain by the advice they give. Suggestions such as "just relax, you're trying too hard," or "it's just not the right time," often do more harm than good because they inadvertently communicate to the couple that their struggle is not that significant.

What may be worse are the spiritualized words of "encouragement" that tell a couple to trust in God, or that a couple may be childless because God has some other purpose for them. Both of the above may be true, but when offered as advice, it often seems callous and unfeeling, and a denial of the pain that the couple feels.

Is This Book for You?

If you are a couple struggling with infertility, we've written this book for you to help you navigate the confusing world of reproductive technology. This book is also written for those who know a couple like Jake and Mandy, and want to help. If you are a professional or layperson who is involved with infertile couples and has at some time

found yourself wondering, as a Christian, what to say to a couple contemplating some of these technologies, this book is for you.

Reproductive technologies often make headlines; not so, the ramifications of using them. Deeper consideration is needed. If you are teaching a class in your church, or in a college or graduate school on social issues, medical ethics, or reproductive ethics, then this book is for you and the people in your class. We have tried to make a very complicated subject understandable to people who may be thinking seriously about this for the first time, while at the same time helping the professional grapple with the complexity of the issues involved.

We have tried to analyze reproductive technologies from the perspective of a Christian worldview to help you draw some conclusions about which are morally allowed and consistent with biblical ethics. First are some basic issues that need to be addressed for the infertile couple.

Spiritual and Emotional Aspects of Infertility

Infertility Produces Real and Deep Pain

For couples who strongly desire a child, the inability to have one produces a strange mixture of emotions—anger, frustration, and disappointment, which may reach the point of despair after a prolonged struggle with infertility. Being around families, especially those with babies or young children, may make this more acute. The Christmas season can be particularly difficult for infertile couples, who may prefer to spend time by themselves or get away. Public or church celebrations of Mother's and Father's Day are painful reminders of desires unfulfilled.

One of the main reasons that infertility causes so much pain is that the ability to produce a child is at the heart of many people's gender identity. Whether it is a man's inability to father a child or a woman's inability to become pregnant, both men and women struggling with infertility feel like failures. The sense of inadequacy can be overwhelming at times. It can produce anger and resentment at the partner who is the "problem." To the infertile couple, we would say,

"Do not minimize the pain you are suffering. Resist those who would subtly encourage denial of the anguish you feel. Spend your time with those people who can empathize with you and encourage you."

For others, there are several platitudes as well as questions to be avoided. These include, but are not limited to, the following.

"Have you considered that God might not want you to have children?"

"If you adopt, then you'll get pregnant."

"All you need to do is relax; then you'll get pregnant. That's what happened to 'X.'"

"Whose fault is it?"

"What kind of undershorts do you wear?"

It Helps to Share Your Thoughts and Feelings about Your Struggle

During this time, both of you will be bubbling cauldrons of emotion. It is not helpful to keep these emotions bottled up inside of you. Men frequently have a difficult time talking about infertility and sharing how they feel about it. The more you can encourage this kind of discussion, allowing for breaks from it from time to time, the better.

It is certainly appropriate and helpful to talk with another person of the same gender, and to get together with other couples who are in the same position as you. There are many support networks available for infertile couples, either through your church (you may even encourage your pastor to start one if your church does not have one already) or through a counselor or therapist in your community. RESOLVE is a national support network for infertile couples, and Christian groups such as Stepping Stones[1] and Focus on the Family can provide additional resources.

It is important to be honest with God with your feelings about infertility. Many couples are angry at God and doubt His sovereignty over them and His loving care for them. The psalmists in the Old Testament were extremely honest with God with their feelings, and there

is never any indication that God thought any less of them for being so honest. To question God and to express anger at Him is not unusual for infertile couples who believe that God has a family in His plan for them. Many couples feel let down that God has not kept His promises to them. Many infertile couples would make wonderful parents, and it is not clear sometimes what God is doing in their lives.

INFERTILITY SUPPORT SERVICES

There are groups available to many couples to provide support and encouragement in the journey of infertility. RESOLVE is the national infertility support network that provides information on all infertility treatments and advocates for public policy that supports these treatments. They also have local chapters around the country that serve as support networks for infertile couples. They support infertility awareness week in the spring of each year and provide resources for newer options such as embryo adoption. See their website at www.resolve.org for more resources they have available. A Christian version of RESOLVE, Stepping Stones, provides distinctly Christian-based support and information on infertility, helping couples stay in touch with their faith through the journey of infertility. They provide similar resources for support and information (www.bethany.org/step). A further resource is found on the American Society for Reproductive Medicine website (asrm.org).

Resist the Urge to Focus on "Why?"

Whenever a couple or an individual experiences a trauma or difficult time in life, the natural and obvious question is "Why is this happening to me?" For a Christian, there is a bit of a twist to the question when they ask, "What is God trying to teach me through this time?"

For the infertile couple, as for anyone enduring hard times, this question may be unanswerable this side of eternity. Although some infertility may be the result of a sexually transmitted disease, often infertility does not fit into a category that readily answers the why question. Even if the root cause of a couple's infertility can be medically pinpointed, the medical cause does not normally answer the

deeper question of "why?"

Though it is true that infertility—as well as all illnesses or difficulties—is a result of the entrance of sin into the world, it is not normally the case that infertility is the result of some specific sin of a particular couple. Ecclesiastes 3:11 helps put the why question into perspective. Solomon writes, "He has made everything beautiful in its time. He has also set eternity in the hearts of men; yet they cannot fathom what God has done from beginning to end."

Similarly in Ecclesiastes 11:5, with a figure of speech particularly appropriate for infertility, he writes, "As you do not know the path of the wind, or how the body is formed in a mother's womb, so you cannot understand the work of God, the Maker of all things."

These verses indicate that there are significant limits to what human beings this side of eternity can know about the plan of God for their lives, especially how things fit together into a coherent whole. It is much like viewing an Oriental rug, but from the underside. When we look at the rug in that way, we will see knots and loose ends and can only faintly make out the pattern. But when we see the rug from on top, we can see the intricate design in all its fullness and beauty.

Until Christ returns, we see life, and especially infertility, from the underside of the Oriental rug of God's plan. That view, and our inability to answer why will not change until we meet Christ face-to-face. Thus it is not a fruitful way to expend emotional energy, and it can be presumptuous to suggest such an answer to a struggling infertile couple. The more fruitful questions are "How can we cope with this?" and "Where can we get support in this?" rather than spending a good deal of emotional energy trying to unscrew the inscrutable and answer the unanswerable question: "Why?"

Don't Let Desperation Cloud Your Judgment

There is little doubt that by the time many couples seriously consider some of the more expensive reproductive options, they have become desperate to have a child. Getting pregnant can become practically

an obsession for them. To be sure, this springs out of a natural inclination to procreate, and the sense of desperation is understandable because of the way that infertility strikes at a person's sense of gender identity.

But it is also true that this desperation can lead couples to do things that they would not otherwise do. For example, it is not uncommon for people to go deeply into debt in a pursuit of the latest round of reproductive technology. It is also not uncommon for couples to be totally engrossed in this process, some to the point of not being able to take care of other important aspects of life. Though I would want to be very careful in talking to an infertile couple about this sense of desperation, it may be an appropriate concern.

The desperation to conceive a child needs to be evaluated in light of some important biblical virtues. Trust in God's care for and sovereignty over a couple is an important aspect of developing Christlike maturity. Patience, long-suffering, courage, and endurance are other significant Christian virtues that are sometimes compromised in the process of countering infertility.

This sense of desperation for a child and the feeling that a couple is not complete without one should not be taken as a given, but rather be brought to the light of Scripture. This is not to add further to the guilt and frustration that many infertile couples feel. Indeed, anyone who counsels an infertile couple and mentions their desperation should have earned the right to say things like these through their commitment to the couple and their consistent support of them in the process.

These are not questions to be brought up prior to the couple understanding your commitment to them and unconditional love for them. But support and love for a couple sometimes involves pointing out things about which they may not be aware. The virtue of the couple in the process of infertility does matter, and these questions should be faced, though never used as a club to bludgeon the couple into further guilt.

COMING TO TERMS WITH INFERTILITY

In contrast to the technological message of society and the infertility industry to always keep going, some couples opt out of the infertility race and come to terms with their infertility. Pamela Tsigdinos, who with her husband tried various infertility treatments for roughly eleven years, wrote a book about the experience, entitled, *Silent Sorority: A (Barren) Woman Gets Busy, Angry, Lost and Found*. She has moved on without success at infertility treatments, and has accepted that additional attempts at procreating a child would bring potential for more heartbreak with a small chance at success. Diane Allen, director of the Toronto-based Infertility Network, said, "Many fertility clinics treat couples long after their financial and emotional bank accounts are overdrawn. It isn't often that I've heard of clinics trying to help patients gain acceptance that their fertility may be at an end."

Source: Adriana Barton, "When Couples Come to Terms with Infertility," *Vancouver Globe and Mail*, May 23, 2010, theglobeandmail.com.

Set a Limit on How Far You'll Go

In light of the fact that couples normally become more desperate the further into the process they go, it is helpful to decide at the outset how far you will go. Moral parameters should help you set these boundaries, as well as financial and emotional considerations. To be sure, you should not make any final decisions until all the medical facts are ascertained.

Because of your strong desire for a child, you are in a vulnerable position when it comes to making decisions about how far to take the process. Many couples can be persuaded to give it one more try, when the chances may not be any better than on the previous tries. Certainly the one more try may produce a child, but statistically, the chances of conception after repeated failures are not high. But the frustration rate and the total expense increase with every try that does not result in a pregnancy. So while you are at the beginning of the process and therefore more objective, try to set some limits on how far you will go

in pursuing different reproductive options.

One of the hardest decisions you may make in your life is the decision to stop employing assisted reproductive technology after you have been at it for some time, thus accepting childlessness or pursuing adoption as alternatives. But it may also be one of the wisest.

Walking Together

Undoubtedly, as we have said, infertility is one of the most painful things a person and a couple can experience. Those who have not experienced it personally have a difficult time identifying with those who cannot conceive the child of their dreams. If you are currently infertile, our hearts go out to you. We hope the encouragement of this chapter and the general guidelines of this book are helpful to you.

If you are in the position of walking with friends of yours through infertility, we hope this helps direct you into ways that can be both helpful and encouraging to them. Please appreciate how intense is their struggle and how deep is their pain. Allow them to share their feelings with you without being judgmental of them, and especially without offering pious platitudes that will likely alienate you from them. Pray consistently for them, for ultimately it is God who opens the womb. In spite of all our sophisticated technology that enables us to peer into the womb, it is still the “secret place” over which God alone has ultimate control.

In the definitions and discussions that follow in this book, it should not be construed that medical advice is being given. I, Dr. Riley, am an internist by training, with a graduate degree in bioethics. I am not, nor have I ever been, an expert in infertility. My husband and I have experienced sorrow in miscarriages, and have walked with a number of friends through deeper waters of prolonged infertility. My hope in helping write this book is to make some of the terminology more understandable, and to help frame the discussion of the ethics involved in considering reproductive technologies.

Definition of Terms

Louise Joy Brown, the world's first test-tube baby, was born on July 25, 1978. Research into reproductive technologies was suddenly in the public eye, and has since seeped into our consciousness, as further technological advances have been made. When used successfully, these technologies represent the miracle of life for couples who have often spent years trying to have a child and have exhausted all other avenues for conceiving a child of their own. But many of these techniques raise major moral questions and can create thorny legal dilemmas that are presented to our courts for resolution.

Reproductive technologies is a very broad term that refers to medications given women to stimulate egg production with no intention of egg retrieval; the handling of sperm, such as for insemination; and "assisted reproductive technologies" (ART). Here are a few definitions to begin this process; these are listed in alphabetical order

U.S. PIONEER REFLECTS ON FUTURE OF ART
(Assisted Reproductive Technology)

Dr. Howard W. Jones Jr. and his wife, Dr. Georgeanna Seegar Jones, helped create the first test tube baby born in the United States. The Joneses are also known for having opened the first in vitro fertilization clinic in America. With the combination of much experience in the field of assisted reproductive technology and good foresight, Dr. Howard Jones recognized a need for an ethics committee early in his career. In 1984 an ethics committee began under the American Fertility Society, known today as the American Society for Reproductive Medicine. Despite the creation of an ethics committee, Dr. Howard Jones recognizes the spirit of commercialization prevalent among doctors today. He adds that while commercialization isn't unique to this field of medicine, it is a disappointment; in the "early days" doctors helped one another.

Source: Randi Hutter Epstein, "Pioneer Reflects on Future of Reproductive Medicine," *The New York Times*, March 22, 2010, NYTimes.com.

for the sake of convenience. The ethical ramifications of each will be discussed in the following chapters.

ART**—**In this book, ART will be restricted as per the Centers for Disease Control and Prevention (CDC) definition.[2] ART refers to fertility treatments that involve the handling of both eggs and sperm. Usually, this entails drug-induced stimulation of egg maturation and release, followed by the surgical removal of a woman's eggs from her ovaries. The eggs are combined with sperm in a petri dish in the laboratory for fertilization to take place, and the resulting embryos are implanted in the woman's uterus. There are several variations of this procedure, and these will be explained further in this and succeeding chapters.

ART Cycle**—**(or simply, **cycle**) refers to the hormonal preparation of the woman with fertility drugs, harvesting or retrieval of the mature eggs, fertilization, and transfer of the embryos into the woman's uterus. The cycle may result in a pregnancy, or something may interrupt it in any of these steps along the way. In this book, "cycle" refers to the ART cycle only, unless otherwise specified.

Days**—**In terms of the embryos created through in vitro fertilization: Day 0 is the day the egg is fertilized with the sperm in the laboratory. Day 1 is the first day AFTER the egg is fertilized. These fertilized eggs, or zygotes, can be frozen on Day 1, Day 3, or Day 5.

Donor Insemination (DI)**—**Sperm is procured, usually by masturbation, from a man who is not the legal father of the child. There are differences, in terms of maternal health-related risk, between fresh and frozen sperm samples. The sperm is used to inseminate the woman through placing it in her uterus (IUI) or fallopian tube (GIFT), or to fertilize eggs in a petri dish in the laboratory.

Egg Donation—Eggs are procured from reproductive-age females who have received drugs to stimulate egg production. These eggs are fertilized with sperm in the laboratory, or (more rarely) placed into the woman's fallopian tube through a laparoscope.

Embryo—This term denotes a human being from conception (when a human egg is fertilized by human sperm) until eight weeks gestation. There are some other terms for certain stages of the embryo that may be familiar: when sperm fertilizes an egg, a fertilized egg or **zygote** is produced. At five–seven days post-fertilization, the name given to the microscopic human is **blastocyst**.

Embryo Adoption—A couple who are not the genetic parents of the embryo are given the embryo of and by another couple: this is not a legal adoption, per se. It requires hormonal preparation of the recipient mother, and an embryo transfer.

Embryo Transfer—The movement of an embryo from a petri dish or other container in the lab through the woman's cervix into her uterus. This can be a previously frozen or a so-called fresh embryo; hormonal preparation of the recipient is required.

Fertility Drugs—refers to any of several medications that promote egg maturation and release from the ovaries; while some are oral medications, most of these are injectable. They are used in all the assisted reproductive technologies, and result in some level of ovarian hyperstimulation.

Fetus—This is the name of the developing human, from the end of the eighth week following conception until birth.

Gamete—refers to either the sperm or egg (ovum).

Gamete Intrafallopian Transfer (GIFT)—The woman's eggs are surgically removed (after stimulation by fertility drugs) and, with the sperm, are inserted into the fallopian tubes, where fertilization normally occurs. This is a laparoscopic procedure.

Intracytoplasmic Sperm Injection (ICSI)—usually a procedure for male infertility, a single sperm is injected into an egg in this laboratory procedure. An egg, harvested from a woman, is placed under the microscope and held in place. A small hole is made in the egg's membrane. A single sperm, prepared by having a portion of its tail removed, is placed into the egg using specialized equipment. If the egg is successfully fertilized, the resulting embryo is placed into the woman's womb (uterus), which has been hormonally prepared to receive it.

Intrauterine Insemination (IUI)—Sperm, from a husband or donor, is placed in a woman's uterus via a catheter in this procedure.

In Vitro Fertilization (IVF)—A procedure in which eggs, matured through use of fertility medications, are laparoscopically removed from a woman and mixed with sperm from a man, and the resulting embryo(s) is/are placed into the woman's uterus through the cervix.

Laparoscopic; laparoscopically—A surgical procedure in which one or more small incisions are made in the abdomen to allow the insertion of instruments, including a camera, which is part of the viewing apparatus (a laparoscope). The laparoscope is attached to a video monitor, so the surgeon can see the inside of the abdomen and pelvis, and perform procedures without "opening" the abdomen.

Preimplantation Genetic Diagnosis (PGD)—This testing of IVF embryos uses one or more cells from an early embryo to check for inherited conditions/diseases/abnormal chromosomes. Following the outcome of the testing, usually only unaffected embryos are implanted in the woman's uterus.

***Prenatal Genetic Testing*—**testing of the blood of a pregnant woman or the amniotic fluid or placental tissue of the developing child for inherited and/or chromosomal abnormalities.

***Surrogacy*—**the gestating (carrying in the womb) of a child by a woman who will not act as the mother who rears the child.

Altruistic Surrogacy—a woman who gestates a child for another without payment.

Commercial Surrogacy—a woman who is paid to gestate a child for someone else.

Genetic Surrogacy—The woman who gestates the child also contributes the egg, so she is the genetic mother of the child.

Gestational Surrogacy—a woman who carries to term a child for another; she does not provide the egg. Genetic and gestational surrogacy may be either commercial or altruistic.

Zygote—a newly fertilized egg.

BIRTH RATES IN WOMEN OVER FORTY

Marilyn Nolen used assisted reproductive therapy (ART) to give birth to twins at the age of fifty-five. Nolen is just one of many women who are using ARTs to have children past the age of forty. The number of pregnant women ages 40–44 increased 4 percent in 2008. Also, pregnant women past the age of forty were more likely to be first-time mothers than not. However, doctors warn that women should not be misled into thinking postponing pregnancy is always a good option. There is only a 10 percent chance that a woman after the age of forty can conceive naturally, and having children later in life has an increased risk of medical complications for the mother, including gestational diabetes and hypertension during pregnancy.

Source: Courtney Hutchison, "Birth Rates Rise Among Women Over 40, CDC Finds," ABC News Medical Unit, April 7, 2010, abcnews.go.com.

Zygote Intrafallopian Transfer (ZIFT)—An IVF embryo is placed into a woman's fallopian tube through a laparoscope.

Of the entities listed above, these involve primarily medical intervention into natural reproductive processes: fertility drugs, IUI, GIFT, ZIFT, IVF, and ICSI. A second group of these technologies goes further and requires participation of another person in order to achieve conception and/or birth: donor insemination (DI), egg donation, and surrogate motherhood.[3] In some cases, the genetic material of the third party is required, and in others, such as gestational surrogacy, it is not.

From a theological perspective, reproductive technologies—the ones that do not involve third party contributors and those that do—raise ethical issues. These issues are associated with one's understanding of the theology of the family related to reproduction that is outlined in Scripture and Christian tradition. For example, Roman Catholic tradition, based on natural law, has taught that most interventions in the reproductive process are immoral because they interfere with the natural order of creation (and procreation) that God has ordained.[4] Others allow for technological intervention but do not allow any third parties into the process. We will evaluate both groups of reproductive technologies from the perspective of the biblical teaching on the family.

Is Infertility on the Rise?

Infertility statistics are not easily accessed. The Centers for Disease Control and Prevention (CDC) found that, by 2002, the number of women ages 15–44 who had ever utilized infertility services was 7.3 million in the United States alone.[5] The American Society for Reproductive Medicine stated in 2003 that one in seven couples has difficulty conceiving. About 35 percent of infertility stems from tubal difficulties of the female: open and functioning fallopian tubes are necessary for conception to occur. Males contribute or are the source of infertility in approximately 40 percent of the cases. Between 5–10 percent of infertility has no obvious cause.[6]

One of the causes of infertility is a woman's blocked or scarred fallopian tubes. This afflicts 18 percent of infertile couples seeking reproductive technologies. There are various reasons for such scarring; the primary one is sexually transmitted diseases, especially chlamydia. Annually, over one million cases of chlamydia infection are reported to the CDC. Early diagnosis and treatment are very important.[7] Note, however, this accounts at least partially for only 18 percent of cases of infertility. That means that 82 percent—the vast majority—have other causes.

BIG SISTER WITH HER SIBLINGS

At the Care Fertility clinic in Nottingham, Shane and Helen Baxter successfully underwent in vitro fertilization. Helen had two fertilized embryos implanted; one took hold and the couple bore daughter Alice Baxter in 2007. Several years later the couple implanted the remaining three embryos from the in vitro fertilization process. All three embryos took hold and the Baxters now have four children from in vitro fertilization: three infants and one three year old.

Source: Lucy Laing, "Pictured: The Toddler Sister and Her Baby Siblings . . .Who Are Actually Quadruplets," *Mail Online*, March 4, 2010, Dailymail.co.uk.

Many techniques have been added to the armamentarium of infertility specialists since the world's first test-tube baby was born in 1978. The numbers of IVF cycles have steadily increased. Analysis of worldwide data lags substantially behind the reporting thereof: the data from 2002 were not published until 2009. In 2002, worldwide there were estimated 601,243 IVF cycles, with a total of 148,208 babies born. This represented a 25 percent increase in the number of IVF cycles over the year 2000.[8]

Data for assisted reproductive technologies in the United States are reported to the Centers for Disease Control and Prevention (http://www.cdc.gov/ART/index.htm). The various procedures and their success rates are published by the Society for Assisted Reproductive

Technology, SART (www.sart.org/). The first IVF baby in the United States was born in 1982, and the most recent available data are from the year 2008. In that year, in the United States, 140,795 cycles were reported. Greater than 99 percent of those were IVF cycles; less than 1 percent of the cycles were either GIFT or ZIFT. Almost all of the cycles included ovarian hyperstimulation, and 64 percent of the cycles included intracytoplasmic sperm injection (ICSI).[9]

When ARTs May Be Sought

These new technologies make a wide variety of reproductive arrangements possible for couples and single persons today. Some of them have become almost routine treatments for infertility while others really present novel ways of having a child. Here is a sample of the ways procreation can occur through these new medical technologies:

- A couple has had three pregnancy losses, and two children who have died before the age of nine months from congenital disorders. They yearn to have a child of their own, but are reluctant to try again. Recently they heard about embryo adoption, and wonder if that may be an option.

- A woman is able to produce eggs but is unable to carry a child to term. She and her husband want to "rent the womb" of another woman to gestate the embryo that will be formed by laboratory fertilization of the wife's egg by the husband's sperm. Is this reasonable? What considerations should be made regarding surrogacy?

- A married couple desires to have a child but the woman wants to avoid any interruption in her career for pregnancy, so her sister offers to carry the child for her. The wife accepts, and the child is born successfully. How does the sister feel about this niece or nephew? What/when do the parents tell the child about their desire for him/her?

- A lesbian couple wants to have a child. One of the women provides the egg, and after it is fertilized by donor sperm, the embryo is implanted in the uterus of her partner. Five years later, they go their separate ways. What happens to the child?

- A couple desiring to have children cannot produce any of the sperm or eggs necessary for conception. So the woman's sister will donate the egg and the man's brother will donate the sperm. Fertilization will occur in vitro, that is, outside the womb, and the embryo will be transferred to the wife of the couple, who will carry the child. Whose names go on the birth certificate? How will the child learn of his/her genetic origins? Is this adultery?

- Two homosexual males want to rear a child. To do so, one man's female friend donates the egg and the other man donates the sperm (or it could even be a mixture of both of their sperm). Another woman is hired to carry the child. What happens if the gestational surrogate refuses to hand over the child?

- A postmenopausal woman in her early sixties with grown children wants to have another child. She is given a donated egg, has it fertilized by donor sperm, and the embryo is implanted in her body for her to carry and give birth to the child. Should this be disallowed by law? How old is too old to have a child? Who pays for the procedure?

- A young man dies tragically, leaving only his mother to mourn his death. She has his sperm posthumously harvested, and recruits a surrogate to supply both the egg and the womb, planning to rear her own grandchild. Who controls the gametes of the dead? Should we allow posthumous gamete retrieval?

- A couple had twins through IVF, and froze five embryos from that cycle. These were implanted two years later, and three of them were

THE LGBT BABY BOOM

Of all the new ways to procreate children available to married couples, it is actually gay/lesbian couples who are some of the primary customers of the infertility industry today. UC Berkeley Professor Charis Thompson calls this the "LGBT baby boom" and estimates that in the San Francisco-based Pacific Reproductive Services, that 85–90 percent of the clients are gay/lesbian. Gay men use surrogates and lesbian women utilize donor insemination to have children.

Source: C. W. Nevius, "More Lesbian Women Becoming Moms," *San Francisco Chronicle*, May 8, 2010: C1, sfgate.com.

born. Technically, these three are the rest of a set of quintuplets. What do the parents tell these children?

- A fertility clinic has four thousand embryos left in frozen storage. The staff has tried without success to contact the persons whose embryos these are. What should they do with them?

The Infertility Industry

Debora L. Spar, a business administration professor at Harvard, wrote an excellent tome, *The Baby Business*. In it, she describes the markets that surround the procuring of babies—through reproductive technologies as well as adoption. She calculated the U.S. market for fertility treatment:

- In 2002, revenue in U.S. dollars for IVF was $1,038,528,000.
- In 2004, fertility drugs alone totaled $1,331,860,000.
- Money spent for gametes in 2004: sperm, $74,380,000; donor eggs, $37,773,000.[10]

Prices of cycles (see page 24) vary, based on maternal age and the procedures done. An average cycle costs more than $12,000 currently.[11]

Spar explains the infertility industry in these words: "There are very few restrictions on fertility treatments and little regulation of

providers. . . . The market for fertility in the United States is vibrant, competitive, and expanding in the absence of any kind of formal controls."[12]

Overview of the Book

In assessing the morality of each of these reproductive technologies, we must first lay some foundational groundwork. We will examine a theology of the family related to reproduction that will set some of the main parameters for the Christian couple (chapter 2). We will use this to evaluate the Roman Catholic prohibition of most reproductive technologies based on the notion of natural law (chapter 3). We will discuss the question of the personhood of the fetus and embryo (chapter 4). If embryos and fetuses are persons from the moment of conception, then that affects the morality of some of these reproductive technologies.

In part II, we will look at the specific reproductive technologies that are being used today. We will take up both artificial insemination and egg donation in chapter 5. IVF, GIFT, and ZIFT are addressed together since they have a number of features in common (chapter 6). Surrogate motherhood is more controversial both in Christian and

THE BUSINESS OF BABY MAKING

An ad by the Destination Health Exhibition in London advertised the high demands of IVF fertility treatment. The exhibition provided IVF clinics with the opportunity to advertise their services to potential patients from local and abroad locations. The advertisement emphasized the notion that patients attend the exhibition "with money to spend" and they are "eager and willing to spend money on their needs." Overall the ad sounded more like an exhibition for businesses looking to get ahead of the competition than a medical practice looking to treat patients in need.

Source: Michael Cook, "The Lucrative Business of Baby-Making," *BioEdge*, March 30, 2010, Bioedge.org.

secular circles and we will explore its complex issues in chapter 7. We will address prenatal genetic testing and preimplantation genetic diagnosis in chapter 8.

Though we have tried to make the book accessible to someone with little background in this arena, the issues that we will address together are very complex; it would be a disservice to deal with them simplistically. We have attempted to make the medical terminology understandable. Although the moral discussion of these technologies presumes no formal background in ethics, our intent is to do justice to the moral complexity of these issues. This is likely the level that the professional and the more advanced student in this area desire. A few of the chapters (chapters 2–4, particularly) are aimed specifically at the person who has considered these issues before, yet a careful reading of these should prove beneficial to all readers.