



Infertility Treatments: *In Vitro* Fertilization



In vitro fertilization — literally, fertilization in glass — is, perhaps, the best known of all infertility treatments. It captivates the imagination, as it is a dramatic use of advanced technology by skilled practitioners and technicians to treat difficult cases of infertility after other approaches have failed; and, when it is successful, it results in the “miracle babies” so familiar in media images and stories. Among the various treatments for infertility, *in vitro* fertilization has received the most attention, both from researchers and from those critical of infertility treatments in general. More focus is given to IVF than to either fertility drugs or assisted insemination. This is despite the fact that both of these are much more commonly used treatments for infertility and result in the birth of many more children than IVF — from which, in 1991, fewer than 400 infants were born. The most advanced technology, excellent diagnosticians, and skilled practitioners have been devoted to treating the most difficult cases of infertility, the people for whom IVF may be their last chance of conceiving.

For their part, some critics contend that this technology is unproven and dangerous, and that its provision runs counter to women's best interests. They maintain that practitioners and scientists are seeking medical breakthroughs at the expense of women and ignoring the adverse consequences of IVF use, such as multiple pregnancy with its attendant emotional and financial costs, and the short- and long-term health risks of the fertility drugs used to stimulate the production of eggs for IVF. Others are critical of how IVF is offered, saying that IVF is inaccessible to any but urban heterosexual couples with high incomes.

For many people working in the field of new reproductive technologies and for many people observing and commenting on the field, what happens with IVF helps set the context for viewing other infertility treatments. Thus, the Commission was very aware that the implications of its study of and recommendations on IVF would have an impact beyond this treatment itself.

IVF was developed originally to treat fallopian tube blockage resulting from disease. Over the past 15 years, however, it has come to be used and applied in a wider and wider variety of indications. Our research showed that, in the mid- to late 1980s, IVF was being used for indications ranging from unexplained infertility (the “diagnosis” when no apparent fertility problem can be found in either the male or the female partner), ovulation defects, and endometriosis, in addition to tubal blockage (see research volume, *Treatment of Infertility: Current Practices and Psychosocial Implications*). Our survey of fertility programs found that IVF is also used as a diagnostic test of male infertility after assisted insemination has been unsuccessful, to ensure there is no chance the male partner’s sperm can fertilize the egg, before the couple stops treatment or turns to donor insemination.

In addition, the technology has been applied in situations not directly related to infertility treatment as commonly understood. For instance, IVF of eggs donated by younger women and then transferred into women past the age of menopause has been used. The technology has also been applied in so-called gestational preconception arrangements (which are discussed in Chapter 23). In this latter use, a zygote* created *in vitro* from the eggs and sperm of a contracting couple is implanted in a woman who gestates and gives birth to a child to surrender to the contracting couple. All these wider applications of the use of IVF raise ethical issues that society has yet to deal with; many of them are alluded to in the section discussing the social context of IVF.

Following a brief explanation of the origins and development of IVF and how the IVF procedure works, the first part of this chapter describes the Commission’s work in determining the effectiveness of IVF for various indications and in examining the risks associated with its use. The second half of this chapter examines issues surrounding how IVF is currently being offered in Canada — who is providing it, who has access to it, what kinds of practices are followed in clinics, the counselling and information couples receive, and how success rates are defined and records kept.

To appreciate the Commission’s recommendations in this chapter, it is important to understand our two basic findings related to the use of IVF as an infertility treatment:

- First, despite the proliferation of its use for other diagnoses, we found that IVF has been demonstrated to be effective only for the indication it was originally developed to treat — fallopian tube blockage.
- Second, we found marked variations in how treatment facilities are delivering IVF services, and that these variations are not serving the best interests of patients.

* See Chapter 22, “Embryo Research,” for a discussion of the use of the terms “zygote” and “embryo.”

Commissioners believe that the current way IVF is being offered is unacceptable; it is unethical and unsafe to permit IVF to be used as a treatment for indications for which it has not been found effective. Allowing to persist the wide differences in how services are offered gives rise to risk, uncertainty, misinformation, and unfairness. The proliferation of indications for IVF, without demonstration of effectiveness for many of these indications, means that many Canadians, including responsible physicians, share the Commission's concern about the situation.

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Such a situation is not unique to IVF, however. Studies of how health care technologies have developed and been disseminated have noted that new technologies that show some promise of effectiveness often become widely disseminated before being rigorously evaluated. Often it is only after a technology has been diffused — if then — that it is evaluated and that some measure of consistency is developed for determining what should be provided and how. Ideally, only those aspects of treatment shown to be effective continue. Unfortunately, once a technology has been widely diffused, it can be very difficult for practitioners to act on findings suggesting the treatment is not of benefit.

Some uses of IVF are unethical when viewed through the prism of our ethical principles, and our approach is to prohibit these (such as IVF in support of preconception arrangements or for post-menopausal women). With regard to the use of IVF to treat infertility, the Commission believes that the time has come to consolidate what we know about IVF and to use that as the basis for shaping the future direction of IVF practice in Canada. In our view, medical procedures should move from the realm of research to that of treatment only if they can be demonstrated to be effective and beneficial and if information on their risks and effects is available. A predominant theme of our entire discussion of IVF is that there is a pressing need for long-term, well-designed research to find out when and for what indications IVF is effective, and what the long-term health effects of its use are, for women and for the children they may have as a result of the procedure. Further, ensuring that IVF services are delivered in a manner that respects the autonomy of patients, enhances their ability to make informed choices, and provides clear information and appropriate support is a necessary component of an ethical approach to infertility treatment. This chapter provides details of the Commission's recommendations on how controls can be put in place to ensure that IVF is used in an ethically acceptable, effective, and safe way.

In reaching our conclusions and recommendations, we based our approach on the precepts of evidence-based medicine set out in Part One of this report, as well as on our ethic of care. We believe that IVF use

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presents an ideal opportunity to implement a model system of evidence-based medicine. The practitioner community is relatively small and concentrated, and our publicly funded single-payer health care system provides the means to exercise the control necessary to ensure that services are offered only in ethically acceptable ways. To allow the current situation to continue would be costly for Canadian society — not only in terms of dollars, but also in terms of the potential for harm to individuals and to collective values and goals. Boundaries must be established and, within those boundaries, a regulatory system put in place to guide practice, with compulsory licensing and standards established and enforced by the National Reproductive Technologies Commission. The Commission therefore recommends that

104. The provision of assisted conception services in Canada be subject to compulsory licensing by the National Reproductive Technologies Commission.

and that

105. The National Reproductive Technologies Commission establish an Assisted Conception Sub-Committee, with responsibility for setting the standards and guidelines to be adopted as conditions of licence and for monitoring developments in this field.

We recommend strongly that clinics and the professions begin right away to take the necessary steps to stop inappropriate treatments, pending the establishment of the National Reproductive Technologies Commission and the Assisted Conception Sub-Committee. We recognize that our recommendations will limit the provision of IVF services in Canada, possibly for some time to come. From 1987 to 1991, just under 45 percent of the IVF services provided were for indications other than tubal blockage. Limits on unproven services may cause concern for some people who are infertile, but, as the Commission was told repeatedly, they want safe, effective treatments. Our proposals provide the only means to ensure this goal can be reached. We do not want to reduce the number of successful IVF treatments; rather, we want to prevent unethical uses of technology

and to limit the resources devoted to ineffective treatment. It is misleading to patients and costly to the health care system to offer unproven treatments, except in the context of research studies designed to assess their safety and effectiveness, in which participants are fully informed about its experimental nature before consenting to treatment and have the other protections inherent in medical research involving human subjects.

We are not opposed to the further development and application of IVF for diagnoses other than tubal blockage provided those applications are effective and safe. In the section on priorities for IVF research, we have recommended a system that will allow IVF to be used for other diagnoses within the framework of

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research trials to evaluate whether its use in these situations is both effective and safe. Proven treatments would continue to be offered. Indeed, in light of the importance of children in the lives of individuals, couples, and society generally, Commissioners believe that if ethical, safe, and effective medical procedures are available to assist people to have children, a caring society should provide them through the health care system. Our discussion of how IVF should fit into the health care system follows the section on research priorities. The Commission is recommending that proven treatments be covered by provincial health insurance plans.

We conclude the chapter with our recommendations for a regulatory system to ensure that IVF technology is used only in an ethical and accountable way. How we reached our conclusions and recommendations is the subject of the remainder of this chapter, beginning with the social context for our inquiry into how IVF is practised in Canada today.

The Views of Canadians

IVF was among the most widely debated technologies in the Commission's mandate and a strong focus of attention in our national surveys, our survey of IVF patients, public hearings, private sessions, roundtables, and letters and submissions. These information-gathering activities produced a large body of material about the views and attitudes of Canadians toward IVF and the issues it raises. Those who took the time and made the effort to present their views helped create a national dialogue on IVF and gave Commissioners a rich and multifaceted basis from which to consider the issues. This multidimensional perspective was necessary, because no single vantage point can provide a comprehensive picture of the

personal, medical, social, ethical, economic, and legal dimensions of the issues surrounding the use of IVF.

Any attempt to summarize or categorize the spectrum of views about IVF cannot do justice to all perspectives. It is possible, however, to group the main issues raised into several broad categories. Many of the points made by Canadians with respect to IVF echo the broader discussion of the social context of infertility treatments set out at the beginning of this section.

The Proliferation of IVF

The proliferation of IVF from its original use for blocked fallopian tubes to unproven, and potentially unethical application is of concern to many groups and individuals, some of whom already had reservations about the use of medical technology and the medicalization of women's reproductive health. Many people were concerned that the expanded uses of IVF amount to experimentation on women's bodies without their informed consent.

On the other hand, a national survey of values and attitudes carried out by the Commission found that three-quarters of respondents would be very or somewhat likely to use IVF if they themselves were unable to conceive (see research volume, *Social Values and Attitudes Surrounding New Reproductive Technologies*).

"Some clinics which offer the procedure *in vitro* fertilization have never succeeded in producing a live birth, yet they claim success rates of up to 25 per cent, basing their statistics on the number of pregnancies achieved rather than the number of births."

Cited by L. Jones, quoting from CBC Radio "Ideas" 1986 program entitled "Drawing the Line: Reproductive Technologies." Dalkon Shield Survivors Group, Public Hearings Transcripts, Vancouver, British Columbia, November 27, 1990.

How IVF Services Are Provided

Many people raised concerns about whether consent to IVF treatment is truly informed, whether sufficient information is provided to patients, whether there is enough appropriate counselling, whether women's autonomy is respected, and whether services are provided in accordance with Canadians' values and priorities.

The Commission heard from patients and practitioners alike that information and counselling are vital for patients to make informed choices about their care. Many patients would like information about all the options open to them — not just treatment, but also adoption or coming to terms with not having children.

Risks Associated with IVF

We heard concerns that very little is known about the long-term health outcomes of IVF, both for the women who undergo treatment and for their children. Risks can accrue from the use of fertility drugs (these are outlined in the chapter on fertility drugs), from the surgical and other procedures associated with egg retrieval and transfer of zygotes to the uterus, and from the pregnancy and birth outcomes of treatment.

Any discussion of concerns regarding risk must be understood in the context that no medical treatment is absolutely "safe": patients and practitioners must always weigh the risks against the probable benefits and determine whether the level of risk is acceptable, given the anticipated benefits. We heard that in addition to accurate information about IVF effectiveness, patients, practitioners, and policy makers need accurate information about the risks of IVF as a basis for individual and public policy decisions. Many of the witnesses appearing before the Commission expressed concerns about the safety of the procedures and said that the drugs used in IVF have not been adequately tested or evaluated for their immediate effects on women or their longer-term implications for women or for the children that result from IVF. Intervenors also pointed to the risks involved in the multiple pregnancies often associated with IVF, and many were concerned that the short- and long-term health implications for women and children have not been tracked to date.

IVF should be classed as experimental [funded through research budgets] and subjected to the high standards of informed choice and consent outlined in the Nuremberg code and the Helsinki Declaration.

Brief to the Commission from the Canadian Advisory Council on the Status of Women, March 28, 1991.

In vitro fertilization usually results in the death of a high percentage of embryos; and in many procedures, the deliberate destruction of embryos that are believed to be less healthy ...

We are strongly opposed to the destruction of "unwanted" embryos *in utero* in cases where multiple implantations have resulted from IVF. Therefore, we recommend that IVF programs should be discontinued, except in cases where the woman's own ovum and her husband's sperm are used in the IVF process and where there is no intentional discarding or destruction of embryos.

H. Hilsden, Pentecostal Assemblies of Canada, Public Hearings Transcripts, Toronto, Ontario, November 20, 1990.

How IVF Is Paid For

The issue of public funding for IVF has been more controversial than that of funding for other infertility treatments, because it is very expensive, and because of questions about its effectiveness and safety. Even if these were known, however, many people opposed its public funding on the grounds that the health care system cannot afford the "luxury" of expensive, high-technology treatments for infertility, or because they felt it would divert attention and resources from other reproductive services or health priorities, including infertility prevention and basic prenatal care.

To those affected by it, however, infertility is not a trivial concern but a condition with potentially deep and lasting consequences for their well-being throughout their adult lives. We heard testimony that safe and effective procedures that could help those who are infertile should be included in the health care system, on the grounds that infertility is just as important in the lives of those affected as are many other conditions now treated in the health care system.

In an effort to answer the question of how infertility treatment is viewed compared to other medical treatments, data from the Oregon Health Services Commission are often quoted.

Faced with large numbers of the state's population without any medical insurance, Oregon decided to extend public coverage for low-income individuals more widely, so that all citizens without private insurance would be covered. Given the fixed amount of funding they had available, this could be done only by limiting the number of services that would be covered. The state therefore drafted legislation that ranked a large number of health care services, with the highest ranked services being covered and the lowest ranked services being excluded from Medicaid coverage. The list included the use of IVF to treat infertility.

The value attached to each procedure was determined using research into effectiveness, a formula considering cost and benefit, public hearings, and survey data. Ranked first were acute fatal conditions for which

IVF programs have a responsibility to make sure the participants are left intact by the process, and that goes for anyone involved in the situation of infertility. These are real people with very real life situations you are dealing with.

N. Newman, IVF Program, University of British Columbia, Public Hearings Transcripts, Vancouver, British Columbia, November 27, 1990.

If the [health care] system is going to collapse, it is not going to collapse because IVF has been added as one of the services to which citizens of Canada have access.

J. Cameron, private citizen, Public Hearings Transcripts, Toronto, Ontario, October 29, 1990.

treatment provides full recovery, followed by maternity care, acute fatal conditions for which treatment prevents death but without full recovery, and preventive care for children. Ranked as being of low priority were infertility services. IVF in particular ranked 696th out of a total of 709 medical services. This finding is used frequently to suggest, therefore, that IVF should not be funded in our tax-supported system.

Precisely because this ranking is so often quoted, it is important to recognize that it is likely to be misleading, because of the methodology used. Respondents were asked to rank treatments for diseases that all of us are at risk of contracting. As long as the possibility exists that treatment may be needed, great importance is attached to its availability. While it was possible for any person responding to become ill with most of the conditions listed — a heart attack, or diabetes, or kidney disease, or a stroke — it was fairly obvious to respondents when they were not going to need IVF. If they already had children, it was unlikely that they would see the need for IVF services applying to themselves. The only way to get a true estimation of the relative value of infertility treatment would be to ask people who have not yet had children about the relative importance of this treatment. Only then would their responses be comparable to asking them about other treatments they may need. They are only “at risk” of needing this particular service if they do not have children.

The telephone survey that was carried out as part of the Oregon priority-setting exercise surveyed 1 000 households. Of these, 405 households had members under the age of 18, and 135 households had more than two members 18 years of age and over, most of whom were probably adult children still living at home. It is also likely that some of the other households with only two members 18 years of age and over were, in fact, a single parent and an adult child. One hundred and ninety-nine people, or about 20 percent, lived alone, in a household of one. This obviously could be young people who have not yet attempted to have children, but it could also include the elderly, divorced, or widowed, many of whom have had children or are past the age where it is a possibility.

What all these numbers, taken together, indicate is that the majority of respondents to the survey already had children. Thus, although they were a representative sample of Oregonians, they were not a representative sample of people who are as likely to require infertility treatment as treatment for some other condition. They were asked to place a value on treatment for disorders they are at risk for, in comparison to a treatment they knew they were not likely to need. This means the ranking of infertility treatment was not done on a comparable basis.

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We heard various views from Canadians on how IVF should be funded. A Commission survey found that about one-quarter of those interviewed

thought that people seeking treatment should pay the entire cost; just over half the respondents said that the cost of infertility treatment should be shared by the province and the individuals seeking treatment; and 10 percent said public health insurance should cover the entire procedure.

Access to IVF*

In contrast to access to donor insemination, access to IVF by single women or lesbians is not a major issue. This is because these women want access to safe sperm, but not usually to IVF, as their problem is not infertility, but the lack of a male partner. We heard concerns, however, that implicit or explicit program criteria could be used by clinics in a discriminatory way with respect to other groups — for example, women with disabilities.

Because of the highly technical nature of IVF, which makes it necessary to provide the procedure in specialized clinics, we heard that access is a critical issue for those who live outside southern Ontario (where most IVF clinics are concentrated) and the few other major urban centres.

We also heard that those with low incomes have problems with access to IVF. Ontario is the only province that provides health insurance coverage for IVF. As well as the procedure itself, there are drug costs and travel and accommodation costs that may put it out of reach for many.

Most IVF patients talk of the inconvenience of daily trips to the clinic and the hours off work. Most northern patients must book a vacation to get enough time for a treatment cycle.

J. Smart, private citizen, Public Hearings Transcripts, Ottawa, Ontario, September 19, 1990.

Decision Making About IVF

Individuals can make decisions about whether to undergo IVF only within the parameters of the decisions that society has already made about whether the treatment should be available, to whom, and under what conditions. Canadians told the Commission that they want more opportunities to influence decisions about the use of technologies and the allocation of public resources to them; they do not want to leave decisions about technologies like IVF solely in the hands of practitioners and researchers. Although we heard the view that society should look to the medical profession as both the repository of knowledge about reproductive technologies and the best source of decisions regarding their use, more often we heard the view that practitioners and researchers should not be

* See Annex for dissenting opinion.

the ones making moral and ethical judgements for the rest of society.

The Commission developed its social and ethical perspective on the provision of IVF in light of this social context. Taken in concert with current knowledge about effectiveness and risk, this enabled the Commission to recommend a public policy framework within which IVF could be offered to Canadians who are infertile in a safe and ethical manner — that is, in a way that protects and promotes the well-being of women, couples, and children and respects principles of equality, appropriate use of resources, non-commercialization of reproduction, and accountability. The remainder of this chapter is devoted to the conclusions

emerging from the Commissioners' review of the evidence on IVF technology and its use in Canada today and to our recommendations to address the concerns brought before us.

Right now, there is [an] arbitrary screening process. For example, in *in vitro* fertilization, the screening process is determined by the medical people in control of the clinic. And, therefore, they have set up what criteria they choose in order for people to access that technology ... Right now, you have to be a married couple. You have to have financial means to gain access to the clinic ... not all society can afford \$5 000 or \$10 000 per attempt at *in vitro* fertilization; not all society live in Calgary and can, therefore, gain immediate access to the technology; and not all society who want children are married, heterosexual couples.

P. Corbett, Social Issues Committee, YWCA, Calgary, Public Hearings Transcripts, Calgary, Alberta, September 14, 1990.

Origins and Development

If a woman's fallopian tubes are blocked, the egg cannot travel from the ovary, be fertilized in the tube, and continue on to implant in the uterus (see Chapter 7). IVF technology was developed originally to give women who had blocked fallopian tubes a chance at becoming pregnant by circumventing the tubal problem. Zygotes created outside the body, using the woman's eggs and her partner's sperm, are transferred to her uterus.

As described in greater detail in the Commission's research volumes,* the first steps in the development of human IVF (though this was not the immediate goal of the research) occurred in the United States in the 1930s and 1940s, using eggs from ovaries removed at hysterectomy. In February 1944, biologist Miriam Menken, who worked as an assistant to Harvard

* See, in particular, *Treatment of Infertility: Assisted Reproductive Technologies*.

gynaecologist and researcher John Rock, isolated a viable egg, mixed it with sperm collected from medical students, and observed by microscope the first human *in vitro* fertilization.

During the 1960s, the development of laparoscopy enabled researchers to see the uterus and fallopian tubes and allowed them to retrieve eggs directly from the ovaries. Ovulation induction drugs, which became generally available in 1967, were used soon after that to increase the number of eggs produced during a menstrual cycle. In the early 1970s the first successful retrieval, culture, and fertilization of human eggs was achieved, and researchers began their attempts to transfer the resulting zygotes to a woman's uterus, where it was hoped they would implant and develop.

During this period, researchers in Britain, Australia, and the United States were developing similar techniques and alternately reported procedural breakthroughs. Although much of the early work was pioneered in the United States, public concern about the ethical and social implications served to limit private and public funding for such research, and U.S. research progressed less quickly than that going on in Britain and Australia.

By the mid-1970s it was clear that although ovulation induction drugs permitted the retrieval of many eggs during a cycle, these hormones also made the lining of the uterus less suitable for zygote implantation. In 1977, British researchers Robert Edwards and Patrick Steptoe collected one naturally produced egg from Lesley Brown, fertilized it with her husband's sperm, and transferred it to her uterus. In July 1978, Louise Brown, the first IVF child, was born in England.

Over the next months and years, IVF technology was incorporated in medical practice throughout the Western world. Australian researchers and clinicians developed more effective egg retrieval methods and adjusted fertility drug doses and combinations to increase the number of eggs produced without sacrificing too much in uterine receptivity. They also initiated the practice of egg donation, where one woman's egg was retrieved, fertilized *in vitro*, and transferred to another woman's uterus. Canada, too, joined the countries involved in this field. In 1982, an Ontario woman gave birth to the first Canadian children born as a result of IVF, although the twin boys were conceived in England. The first IVF children conceived in Canada (also twin boys) were born in Vancouver in 1983. The mid-1980s also saw the first public funding of IVF in Canada, by Ontario's medicare program.

Another significant event of the 1980s was the development in Australia of zygote freezing (cryopreservation) and thawing techniques. Although successful cryopreservation of animal zygotes had been possible since 1972, the first pregnancy from a frozen then thawed human zygote was not achieved until 10 years later, and it was not until 1984 that the first live birth from a frozen zygote occurred.

IVF Procedures

Ovulation induction: Fertility drugs are usually prescribed to stimulate the production of several eggs in one menstrual cycle. Egg growth inside the ovary is monitored through blood or urine tests or ultrasound, and retrieval is timed just before ovulation occurs. Another drug may be given to lessen the chances of spontaneous ovulation before retrieval. Drug levels are monitored, and the woman is watched for signs of ovarian hyperstimulation syndrome. About 15 percent of IVF cycles are cancelled because eggs do not develop adequately, or because the woman ovulates before the retrieval.

Egg retrieval: When the eggs are ripe, but before they are released by the ovary, they are retrieved. The woman is given a light anaesthetic, and the physician uses an ultrasound probe to guide a needle to the location in her vagina closest to the ovary. The needle is passed through the vaginal wall to aspirate the fluid from each follicle (the ovary structures in which the eggs mature). The fluid is examined under a microscope to determine whether any mature eggs were retrieved. Any found are transferred to a prewarmed culture medium. (Immature eggs are transferred to an incubator to see whether they will mature further.) Eggs are found in about 80 percent of retrieval procedures.

Once the eggs have been removed from the woman's body, the following choices are available:

Disposal or research: If the egg is immature, abnormal, or surplus, it may be disposed of or used in research (for example, research into egg freezing).

Manipulation of gametes: Sperm and eggs can be treated to improve the chances of fertilization. The experimental techniques for eggs include *zona cutting* — the cells surrounding the egg are removed by passing it back and forth through a narrow pipette to shear off the adhering cells; then the egg is punctured with a needle to make a hole in the zona pellucida, the "shell" of the egg, so that sperm can penetrate more easily; *zona drilling* — surrounding cells are removed as with *zona cutting*, followed by an application of an acid solution to create a "drill hole" in the zona pellucida; *partial zona drilling* — after the cells are removed, instruments are used to create a series of gaps in the zona pellucida; and *microinjection* — sperm cells are injected directly into the egg.

Gamete intrafallopian transfer (GIFT): If the woman has a functioning fallopian tube, the egg may be transferred back into her body before being fertilized. In GIFT, the egg is transferred to the fallopian tube, and sperm is also put there in the hope that fertilization will occur in the tube.

Direct oocyte sperm transfer (DOST): A variation of GIFT in which eggs are collected from the ovary and placed immediately in the uterus. Sperm is then added, and, if fertilization occurs, this is in the uterus instead of in the fallopian tube.

(continued in next box)

IVF Procedures (continued)

Donation: Eggs can be donated to a recipient, to be fertilized with the sperm of the recipient's partner, with the intention of implanting the embryo in the recipient's uterus for gestation.

Egg fertilization and embryo culture: A semen specimen is collected from the woman's partner (or donor sperm is thawed), and the sample is concentrated by sperm wash. Four to 12 hours after the egg retrieval, a drop of sperm is added to medium with the eggs, which are returned to the incubator. Within 20 hours of insemination, each egg is examined to determine whether fertilization has occurred. With normal sperm, an estimated 70 to 80 percent of the eggs will be fertilized. On the third day, each zygote is assessed and the following choices are available as well as embryo transfer to the uterus:

Cryopreservation: Zygotes can be frozen in liquid nitrogen for later use.

Disposal or research: If a zygote does not develop properly, is abnormal in appearance, or is surplus, it can be disposed of or used in research. From various studies, an estimated 20 to 50 percent of IVF zygotes have chromosomal abnormalities. They may also have abnormalities in shape. Those with identifiable abnormalities are rejected for transfer.

Preimplantation diagnosis: Zygotes can be analyzed to identify single-gene or chromosomal conditions. Preimplantation diagnosis is still at an experimental stage, it is invasive and expensive, and it reduces their survival rate (see Chapter 27).

Donation: Zygotes can be donated to another woman or couple who are infertile.

Embryo transfer: When the zygote reaches the two- to eight-cell stage, it can be transferred to the uterus using a fine catheter inserted through the cervix, or to the fallopian tube using laparoscopy (a more invasive option requiring general anaesthesia). About 20 percent of embryo transfers result in implantation measurable by elevated hormone levels in the woman's blood, called a "chemical pregnancy." The live birth rate per zygote transferred, however, is about 17.5 percent.*

Zygote intrafallopian transfer (ZIFT): This procedure was developed to try to improve implantation rates by transferring zygotes to the fallopian tube earlier in their development. Only two Canadian programs offer ZIFT.

Implantation and beyond: Ideally, implantation takes place and the pregnancy proceeds to birth normally.

* Society for Assisted Reproductive Technology, The American Fertility Society. "Assisted Reproductive Technology in the United States and Canada: 1991 Results from the Society for Assisted Reproductive Technology Generated from the American Fertility Society Registry." *Fertility and Sterility* 59 (5)(May 1993): 956-62.

From the mid-1980s on, IVF practice expanded quickly throughout Europe, Australia, and North America. Because of the technical demands of the procedures, infertility clinics were developed where expertise and equipment could be centralized. In Britain and the United States, these clinics emerged as private, often free-standing, commercial enterprises; in other European countries, as in Canada, IVF programs were most often added to the existing services of teaching hospitals.

As IVF developed in the laboratory and in medical practice, many women's groups, as well as organizations representing the medical, legal, religious, and other communities, began to examine the ethical, social, and legal issues surrounding IVF. An extensive literature on the implications of IVF for Western cultures and social systems has emerged, identifying a range of issues that using the technology raises.

IVF Procedures

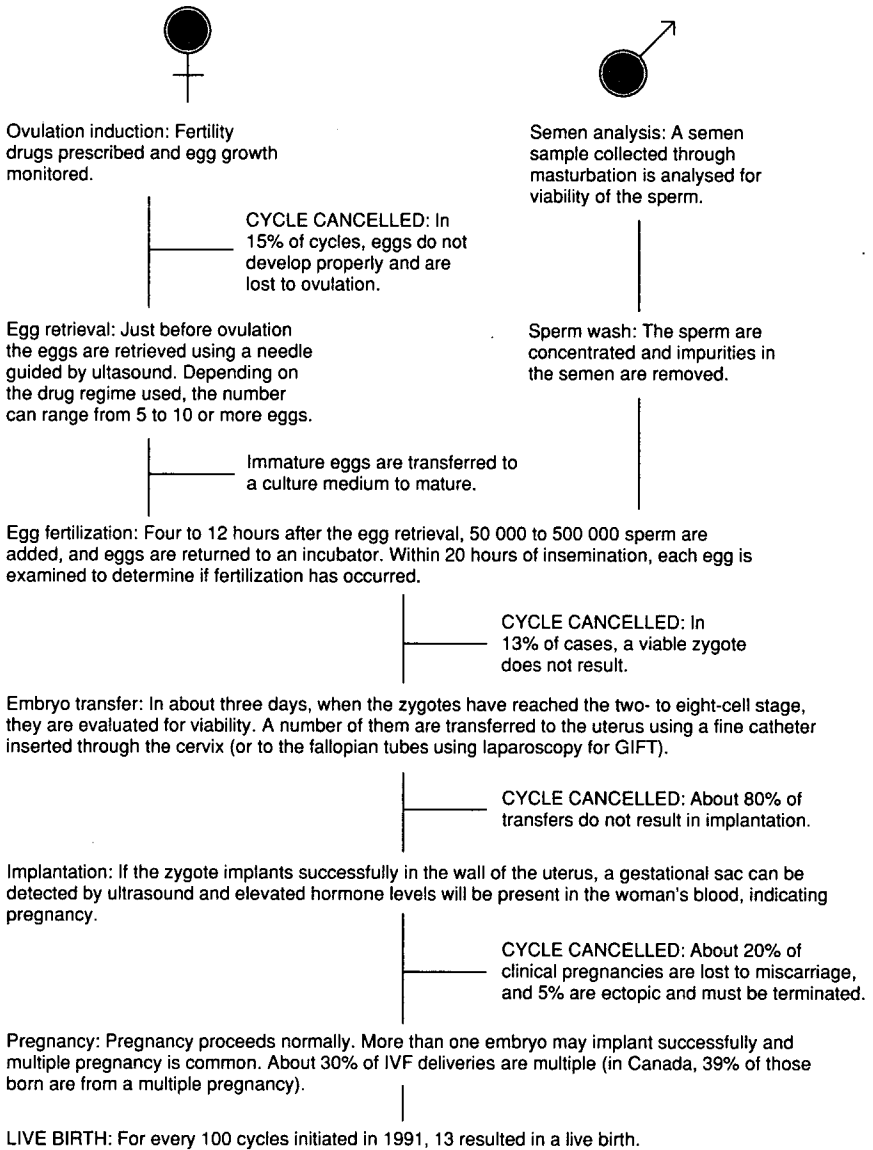
As noted earlier in this chapter, IVF has been used in an expanding range of situations as its practice has evolved. Regardless of why it is being used, IVF practice in Canada consists generally of the same basic stages, with some variation in the details of procedures from program to program. Each stage leads to several possible results and options. The stages and options are described in the accompanying boxes and flow chart (Figure 20.1); readers interested in a more detailed examination should consult the research volumes. Numbers cited in these boxes are general statistics based on international evaluations of IVF; they do not take into account variations in success rates for each infertility diagnosis or for different patient groups (see section on The Effectiveness of IVF).

Practitioners offering IVF usually see the most complex and difficult infertility cases — patients are often those for whom other treatments have failed and who may see IVF as their last chance for pregnancy. Many cases of infertility are “cured” before a couple reaches an IVF program — the woman might become pregnant without treatment or following fertility drug treatments prescribed by her general practitioner or gynaecologist; pregnancy might follow tubal surgery or less invasive techniques such as assisted insemination; or the couple might decide to adopt or to accept not having children.

The Effectiveness of IVF

One of the major areas of our investigations involved assessing the available data from the world literature of all published clinical studies about the effectiveness of IVF for specific diagnoses or indications.

Figure 20.1. One IVF Cycle



Source: Statistical estimate based on data from the Society for Assisted Reproductive Technology/American Fertility Society central registry, 1991, summarizing statistics collected from 215 Canadian and U.S. IVF programs.

Until now, an overall assessment of this information in a way that is readily available and useful in guiding policy has not been carried out. The Commission set out to remedy that gap. Our findings about the effectiveness of IVF are described later in this section — but in essence IVF has been found effective only for fallopian tube blockage; for other indications, there is a need for additional and more rigorous research. This finding is central to our conclusions about the direction public policy should take and is a driving force behind our recommendations.

We conducted our assessment by evaluating the results of all published trials of IVF that met certain criteria through a technique known as meta-analysis. This was supplemented by the findings of the Canadian Infertility Therapy Evaluation Study, the

largest study ever conducted on infertility treatments in Canada. We used this information to assess the effectiveness of IVF for blockage of the fallopian tubes, ovulation disorders, endometriosis, male infertility, and unexplained infertility. We outline the results of our meta-analysis later in this section.

We should begin, however, by noting the difficulty of statistical analysis in this area and hence the difficulty of assessing the effectiveness of infertility treatment on the basis of trials that meet our usual criteria for reliability. These problems are inherent in the chance nature of infertility and the characteristics of people seeking infertility treatment. As a result, the design and execution of appropriate randomized control trials are very difficult, involving such methodological problems as finding people who are willing to be part of the control (“no treatment”) group.

Answering the question “does the treatment work?” is seldom straightforward. For example, even couples who are fertile have a 4 percent chance of not conceiving in their first year of trying. It is therefore often difficult to tell whether an outcome (a pregnancy or birth) was the result of treatment or the result of the chance nature of fertility at work. If everyone in the treatment group were sterile, that is, unable to have a pregnancy without treatment, then any birth that occurred would obviously have been the result of receiving treatment. But the reality is that

Meta-analysis: Pooling the results from studies with similar methodologies when each study on its own may not include sufficiently large sample sizes to provide reliable results.

One of the major concerns regarding *in vitro* fertilization worldwide, as well as in this country, is the perceived absence of quality assurance and ethical guidelines for the practice of IVF.

S. Brown, Reproductive Endocrinology and Infertility Committee, Society of Obstetricians and Gynaecologists of Canada, Public Hearings Transcripts, London, Ontario, November 1, 1990.

those having infertility treatment include a mix of people who are sterile and people with low fertility. To complicate matters even further, the proportion of these two groups will vary according to the diagnostic category.

This means that the number of births following treatment is not a direct measure of the effectiveness of treatment, because the likelihood of birth among the same or similar patients who have not had treatment must also be known — hence the need for a control

The number of births following treatment is not a direct measure of the effectiveness of treatment, because the likelihood of birth among the same or similar patients who have not had treatment must also be known.

group, which can be very difficult to assemble. Sometimes couples are willing to be their own control — accepting random assignment to a “waiting” group or postponing the beginning of treatment. But some couples are understandably unwilling to do this. Multicentre trials are therefore needed in order to generate large enough numbers to permit statistically significant and reliable conclusions to be drawn.

Despite these methodological difficulties, good information about the effectiveness of IVF is needed for decision making at both the societal and the individual level, and until the Commission investigated this area comprehensively, the existing information had simply not been collated and analyzed in one overall assessment, making rational decisions difficult or impossible.

At a societal level, policy makers and others making resource allocation decisions need good information about the effectiveness of medical procedures, the population to be served, and the cost and resource implications compared with the potential health benefits. Information about these elements helps to determine whether IVF should be offered and, if so, under what circumstances.

At the individual level, practitioners and couples have to take what is known about the broad effectiveness of IVF and apply it to the couple's specific circumstances to determine whether IVF is an appropriate treatment for them. To establish an accurate assessment of whether IVF is likely to work in their case, and whether the chance of a live birth is worth the risk of treatment, information about four elements is essential. These are

- *the natural force of pregnancy* — the couple's chance of conceiving naturally, given their age, diagnosis, and other relevant factors;
- *the effectiveness of treatment* — the couple's chance of conceiving with IVF, given their age, diagnosis, and other relevant factors;
- *the known risks of treatment* — including the short-term health implications and the possible long-term effects of treatment; and

- *the relative effectiveness, risk, and cost of alternative treatments or strategies.*

In the absence of information about each of these elements, practitioners and patients are unable to weigh the options, and patients cannot make informed choices.

Commissioners decided that if the evidence showed that IVF did not pass assessment after evaluating these four elements for a given diagnosis, we would recommend that it not be offered as a treatment for that diagnosis, regardless of the demand. If IVF showed promise with respect to a given category of diagnosis, but the evidence was not sufficient to demonstrate that it was more effective than receiving no treatment, we would recommend that it be considered a priority for research. If the evidence derived from well-designed research studies showed that it was effective for a particular category of diagnosis, we would recommend that it be considered for funding as a medical service. However, the

ethical, social, and legal implications would also have to be weighed in reaching an appropriate policy decision in this regard.

When assessing the effectiveness of IVF in achieving a live birth, it is important to keep in mind that natural conception rates in couples from the general population are also far from 100 percent. The average monthly chance of conception leading to a live birth is about 20 to 25 percent. There is a range in couples' ability to conceive, so that the peak conception rate is 33 percent in the first month of trying; then it falls quickly, settling to about 5 percent each month. Fertilization may occur more frequently than this, but about half of all fertilized eggs never result in a live birth (see Chapter 7).

The Natural Force of Pregnancy

Although some couples have virtually no chance of conceiving without treatment, some infertility conditions have a known rate of "spontaneous remission" — that is, the woman becomes pregnant without intervention. The Commission's research found that time elapsed between diagnosis and

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treatment can affect this natural force of pregnancy. A meta-analysis of randomized control trials found that if a couple's infertility could be traced to partial fallopian tube blockage, mild endometriosis, male-factor infertility (low sperm count), unexplained infertility, or tubal blockage that had been treated with surgery, their chances of conceiving naturally during the first three years after diagnosis were almost as high as if they underwent IVF. After three years' duration of infertility, however, their chances of conceiving naturally declined markedly. This seems to indicate that IVF may not be called for in these categories until a couple's chances of conceiving naturally have been virtually eliminated — that is, after three years of infertility.

Another factor affecting the natural force of pregnancy is whether a couple has primary or secondary infertility. Couples with secondary infertility (that is, they have previously had a child together or one member of the couple has had a child with another partner) may be slightly more likely than those with primary infertility to become pregnant without intervention.

The Age of the Female Partner

A significant factor determining the chances of pregnancy without intervention is the age of the female partner. We have already seen that increasing age is associated with declining fertility in women (see Chapter 12). For couples whose fertility is already declining because of age, a three-year wait to let nature take its course may not be acceptable — if an older couple does wait and remains infertile, there is good evidence that treatment will be less effective.

Every stage in the IVF process has been shown to be less effective when the source of the egg is an older woman. A study of *in vitro* fertilization in the Netherlands, for example, showed that effectiveness dropped by one-third for women aged 35 to 40 and by two-thirds for women over the age of 40.¹ Thus, the age of the female partner is a very important aspect to be taken into account in decisions about whether it is appropriate to offer IVF to a particular couple.

I think it's unfair for society to expect medicine to offer a better outcome than what nature has to offer, and what I will try to show you is that *in vitro* fertilization offers, in fact, with the current technology, approximately what a couple would have if their fallopian tubes were normal.

P. Claman, -GOAL Program, Ottawa Civic Hospital, Public Hearings Transcripts, Ottawa, Ontario, September 19, 1990.

Behavioural and Environmental Factors

Although there has been little research examining the relationship between behavioural or environmental factors and the results of IVF, we would expect that factors that have been shown to reduce male or female fertility would also reduce the likelihood of a couple conceiving and giving birth to a healthy child following IVF. These factors include smoking, substance abuse, weight and eating disorders, excessive exercise, and stress, as well as exposure to harmful agents in the workplace or the environment. Preliminary research in several countries indicates, for example, that infertile women who smoke are less likely to have a live birth following IVF. Infertility specialists told the Commission that good practice would involve providing counselling or referring couples for counselling when such behavioural or environmental factors are present in one partner or both.

Effectiveness by Infertility Diagnosis

A couple's diagnosis is the most important element influencing the outcome of IVF, so it is disturbing that it is often neglected in analyses of the effectiveness of IVF. Because IVF may be effective for one category of diagnosis but not for another, Commissioners considered it essential to determine the effectiveness of IVF for each category of diagnosis (or "indication") currently used to justify IVF.

The Commission examined the existing evidence about IVF and associated techniques, by indication, to see whether they met either of the criteria below. We structured our investigation according to the five diagnostic categories usually used — fallopian tube problems, ovulatory problems, endometriosis, seminal defects, and unexplained infertility. These five categories account for a very large percentage of the infertility for which couples seek treatment at Canadian IVF clinics. For example, data collected from 10 Canadian IVF clinics² on 3 107 egg retrieval cycles indicate that

- 1 600 (51 percent) were performed on women with tubal problems only (complete or partial blockage or tubal adhesions);
- 369 (12 percent) were performed on women with other female infertility factors only (endometriosis, ovulatory problems);
- 227 (7 percent) were performed on women whose male partner had an infertility problem only;
- 464 (15 percent) were performed on women with multiple causes of infertility, whether in one member of the couple or both; and
- 446 (14 percent) were performed on women in couples with unexplained infertility.

We decided that IVF should satisfy one of two criteria before we would categorize it as effective or, in other words, as a treatment that is of benefit for a specific indication:

1. IVF would have to be shown to be effective for a specific indication (for example, blocked fallopian tubes, unexplained infertility) through appropriately designed randomized clinical trials that allowed meta-analysis of combined studies with a total of at least 200 couples in both the control group and the treatment group; or
2. if a specific mechanism is known to be causing the infertility, IVF would have to be shown to correct it in a way that is biologically convincing.

We decided that if either of these two criteria is not met, then the treatment was not of proven value and should no longer be offered, except in the context of controlled clinical trials.

Our information about the effectiveness of specific infertility treatments was drawn both from the Canadian Infertility Therapy Evaluation Study and from extensive reviews and analysis of existing randomized control trials conducted in Canada and elsewhere. Researchers for the Commission identified a total of 501 randomized trials in infertility treatment in the literature (41 different journals) over a 24-year period (1966-1990). We found relatively few were of sufficient quality to allow meta-analysis — for example, the method of randomization was unstated or pseudo-randomized in 200 of the 501 “randomized” trials. In fact, relatively few studies done to date have been well designed and carried out, or produced data that allow reliable conclusions to be drawn and comparisons to be made with other studies, although this is changing, with three times as many published clinical trials for infertility treatment in 1990 as in 1986. Nevertheless, we found that most of the studies conducted do not permit reliable conclusions because of methodological weaknesses or lack of a control group. Small sample sizes, even when study results are aggregated to do meta-analysis, also limit the conclusions that can be drawn.

Because the goal of couples seeking IVF is to have a child, we defined IVF as effective if couples who underwent the procedure had a greater likelihood of having a live birth than those in a similar group of couples who were infertile who did not undergo the procedure. This was not always possible to determine, however, because many studies reported on pregnancy rates, not live births. Notwithstanding the shortage of good data, our conclusions were influenced by five major studies providing evidence relevant to IVF in particular.³ Based on the evidence we collated and analyzed for each of the five diagnostic categories, we assigned IVF and associated technologies to one of the following groups: (1) proven effective; (2) proven ineffective; or (3) not enough evidence to categorize the treatment as either effective or ineffective (see Table 20.1).

Table 20.1. Effectiveness of IVF for Various Infertility Diagnoses

| Indication | Effective* | Ineffective | Not enough evidence to categorize as effective or ineffective |
|--|----------------------------|-------------|---|
| 1. Ovulatory defects oligomenorrhea and irregular cycles | | | IVF/GIFT/ZIFT |
| 2. Tubal defects bilateral (complete) tubal obstruction partial (incomplete) tubal obstruction tubal adhesions | IVF | | GIFT/ZIFT/DOST IVF/GIFT/ZIFT/DOST IVF/GIFT/ZIFT/DOST |
| 3. Endometriosis minimal and mild endometriosis moderate and severe endometriosis | IVF (if tubes are blocked) | | IVF/GIFT/ZIFT/DOST IVF/GIFT/ZIFT/DOST |
| 4. Seminal defects azoospermia (absence of sperm in semen) oligospermia | | IVF | IVF with egg manipulation IVF/GIFT/ZIFT/DOST IVF with micromanipulation IVF/GIFT/ZIFT/DOST |
| 5. Unexplained infertility | | | IVF/GIFT/ZIFT/DOST |

* See explanation in text.

As shown in this table and described in greater detail in the accompanying research volumes, our review of the available evidence permitted two main conclusions about the effectiveness of IVF: First, IVF is effective only in cases of complete fallopian tube blockage resulting from tubal disease or defect, severe endometriosis, or previous surgical sterilization. IVF has not been proven effective for any of the other diagnoses it is currently being used for. Second, only IVF itself has been shown to be effective for blocked tubes — variations such as GIFT and ZIFT have not been shown to be of benefit.

Our data collation and analysis showed clearly that in 1990, more than a decade after IVF was first offered, IVF procedures for most infertility

diagnoses fall into the category of not enough evidence — there simply is not enough reliable evidence to categorize them as effective or ineffective; we do not know if the treatment is more likely to result in a live birth than no treatment. This is not the same as saying that IVF does not work; rather, additional and better data are

There is simply not enough evidence to determine whether IVF or its variants are effective or ineffective when diagnoses other than fallopian tube blockage are present, such as ovulatory defects, partial tubal blockage, tubal adhesions, seminal defects, or unexplained infertility.

required before firm conclusions can be drawn about the appropriateness of IVF as a treatment for most types of infertility.

Our review of the evidence showed that IVF is effective when a woman has blocked fallopian tubes as a result of a disease, such as endometriosis, or surgical sterilization. By “effective” we do not mean that IVF will necessarily result in a live birth in every given case; however, when the results of treating many women with this diagnosis are taken together, IVF has been shown to be more effective (that is, more likely to result in a live birth) than receiving no treatment.

In Britain, data were collected for the period 1984-1989 on the outcomes of 5 055 IVF cycles in 2 735 women. The data were broken down by indication and showed that 15 percent of women undergoing IVF for tubal blockage conceived, and 10 percent had a live birth.⁴ In comparison, the natural pregnancy rate for couples who are fertile is 20 to 25 percent per cycle. However, it must be remembered that couples who are fertile who are trying to become pregnant will have coitus more than once in the month, while a woman undergoing IVF has only one chance to become pregnant each month. In addition, a woman with blocked fallopian tubes has an extremely low chance of conceiving without treatment, since sperm cannot reach the egg, so the comparison with that baseline shows clearly that IVF does make a difference.

Although based on small sample sizes, Canadian data confirm that IVF is more effective than no treatment for women who have complete tubal obstruction. Forty-eight such women who underwent IVF in Canadian infertility programs were 11 times more likely to have a live birth than 66 women who were untreated, and these results were statistically significant.⁵

While we cannot regard these results as conclusive, because of the small size of the groups in the study, they are biologically plausible. In women who have two completely blocked fallopian tubes, fertilization of an egg cannot take place. Since IVF bypasses the fallopian tubes by allowing fertilization to take place outside of the woman’s body, we would expect that the procedure would result in a higher proportion of live births than no treatment. In other words, IVF satisfies our criteria for classification as an effective treatment for this indication because it corrects a specific mechanism known to cause infertility.

When other diagnoses are present, such as ovulatory defects, partial tubal blockage, tubal adhesions, seminal defects, or unexplained infertility, there is simply not enough evidence to determine whether IVF or its variants are effective or ineffective. That is, studies have not been done or, if they have been done, they contain methodological weaknesses that make them an inadequate basis on which to make judgements about effectiveness or ineffectiveness. Moreover, for diagnoses other than complete tubal blockage, IVF does not overcome a specific mechanism that makes conception impossible. For example, with partial tubal obstruction there is still some possibility that sperm may fertilize the egg, and that the fertilized egg may travel to the uterus.

In effect, a substantial proportion of women undergoing IVF at fertility programs across the country are doing so when there is no evidence that, given their diagnosis or that of their partner, IVF will help them conceive. In other words, unproven and quite possibly ineffective procedures are being offered as medical treatment, and women are undertaking the risks of these procedures without knowing whether they are more likely to have a child than

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if they received no treatment. Moreover, treatment is being offered and these risks undertaken without any comprehensive and consistent collection and analysis of information on outcomes, so that these uncertainties could be reduced.

In summary, Commissioners conclude that Canadians are justified in their concerns about the effectiveness of IVF as a treatment for many categories of infertility. The Commission believes this situation cannot be allowed to continue, and we make detailed recommendations to remedy it at the end of this section. We recognize, however, that it will take some time to put the proposed system in place and to establish the National Reproductive Technologies Commission; in our view, action should not wait until this has occurred. We therefore urge practitioners, professional bodies, and provincial/territorial governments to act now to ensure that unproven uses of IVF are discontinued as treatments and offered only in the context of research trials.

Our recommendation is that IVF be provided as treatment only for bilateral tubal blockage. Its use for any other indication should be considered research. We recognize, in making these recommendations, that we are proposing to subject IVF to a degree of rigour not generally required in other areas of medicine. As we have stated, however, we believe

that infertility treatments in general, and IVF in particular, provide models for evidence-based medicine and that in this approach lies the future of ethical, responsible, and accountable health care management.

Relative Cost-Effectiveness

In addition to assessing effectiveness from the perspective of patients — that is, whether IVF increases their chances of having a child — the Commission looked at the issue of effectiveness from the perspective of health policy makers (see research volume, *New Reproductive Technologies and the Health Care System: The Case for Evidence-Based Medicine*). Effective use of limited resources is becoming increasingly necessary, and policy makers have to take into account not only whether a treatment works, but whether its provision through the health care system constitutes an appropriate use of resources.

There isn't all that much health money to go around these days, and right now in the province of Ontario, at least to date, I understand there's been about seven million spent on funding IVF clinics ... if you shut down the clinics, then the money can be used for something I think that is much more worthwhile.

K. Kozolanka, private citizen, Public Hearings Transcripts, Ottawa, Ontario, September 19, 1990.

The Commission analyzed the cost-effectiveness of IVF as it is currently offered at a large Canadian IVF program affiliated with a teaching hospital. Researchers compared live birth rates and costs incurred by 205 couples undergoing IVF (the IVF group) and 194 couples who were either undergoing other infertility treatments, such as fertility drug therapy or assisted insemination, or receiving no treatment (the standard therapy group). The patients in the study, like those enrolled in IVF programs around the country at the time of the study, had varying durations of infertility and a variety of diagnoses. The two groups of couples under observation in the study were of comparable age and were similar in their range of diagnoses and duration of infertility. In the standard therapy group, IVF was not offered for at least six months, and both groups were followed for up to three years.

The results of the study were of significance, despite the relatively small size of the study sample. At first glance the treatment group had a higher rate of pregnancy and live birth, but, after adjusting for the difference in observation time, there was no difference in the rate of successful confinements (that is, pregnancies leading to at least one live birth) per month at risk of pregnancy.

The difference in costs, however, was great. The researchers compared the costs to the patient/couple (both direct and indirect) and to the insurer (since the program was in Ontario, physician and clinic costs were covered

by provincial health insurance). This is the perspective most widely advocated for economic evaluations. The types of costs analyzed were direct medical costs, such as diagnostic, physician, and clinic costs; direct patient costs, such as drugs and travel; and the costs of associated medical treatment, such as the treatment of spontaneous abortions, ectopic pregnancies, excessive bleeding, or other complications. Costs associated with premature and multiple births (which are more common following IVF — see section on Risks of IVF) and chronic care for long-term disabilities were not factored in.

Table 20.2. Average Costs (in Canadian Dollars) per Patient (Six Months' Observation) — 1990

| Cost category | Cost to patient | | Cost to insurer | | Cost to society* | |
|--------------------|-----------------|------------------|-----------------|------------------|------------------|------------------|
| | IVF treatment | No IVF treatment | IVF treatment | No IVF treatment | IVF treatment | No IVF treatment |
| Direct medical | n.a. | n.a. | 3 827.44 | 1 345.40 | 3 827.44 | 1 345.40 |
| Direct patient | 1 214.37 | 81.88 | n.a. | n.a. | 1 214.37 | 81.88 |
| Associated medical | n.a. | n.a. | 63.91 | 0.00 | 63.91 | 0.00 |
| Indirect | 360.68 | 101.26 | n.a. | n.a. | 360.68 | 101.26 |
| Total | 1 575.05 | 183.14 | 3 891.35 | 1 345.45 | 5 466.40 | 1 528.55 |

* Total of cost to patient and cost to insurer.

Source: Goeree, R., et al. "Cost-Effectiveness of an *In Vitro* Fertilization Program and the Costs of Associated Hospitalizations and Other Infertility Treatments." In Research Volumes of the Royal Commission on New Reproductive Technologies, 1993.

Although the overall live birth rate was not significantly better, as Table 20.2 indicates, for the current mix of patients receiving IVF, this treatment was considerably more expensive than alternative treatments or no treatment (the control group). The researchers concluded, based on costs over six months' observation, that IVF is not cost-effective when used to treat the wide variety of diagnoses for which it is

For many couples, waiting longer before beginning treatment could be as effective as the treatment itself.

now used. If IVF had been provided only for bilateral tubal blockage, costs would have been different; this study does not provide data on that point. The study shows that, overall, both the natural force of pregnancy and alternatives such as fertility drug treatment and assisted insemination are less expensive than IVF, yet equally effective for the current mix of patients. The Commission therefore concludes that many of the people currently participating in IVF programs should be considering other approaches to dealing with their infertility. For many couples, waiting longer before beginning treatment could be as effective as the treatment itself. Furthermore, factors such as the duration of infertility, the infertility diagnosis, and the chances of success of the particular couple, given their diagnosis and the woman's age, should be weighed carefully before IVF treatment (or referral to a well-designed controlled trial) is considered a reasonable approach to dealing with their infertility.

Cost-Effectiveness of IVF Compared to Tubal Surgery

The data gathered by the Commission show clearly that IVF as it is now being used is not cost-effective; this is not surprising, given that patients in IVF programs have a range of diagnoses, ages, and other characteristics, while IVF has been proven effective only in the case of complete tubal blockage. We also considered it useful to compare the cost of IVF with the traditional treatment for this condition, tubal surgery, to determine whether IVF is more or less cost-effective (see research volume, *New Reproductive Technologies and the Health Care System: The Case for Evidence-Based Medicine*).

Surgery is usually the first line of treatment for women with blocked fallopian tubes and is an insured service under provincial medicare plans. Because surgery is covered by provincial health insurance and IVF is not (except in Ontario), women with tubal defects are usually advised to “try” surgery first. Although surgery can repair damaged tubes in 80 percent of cases, this does not necessarily restore the functioning that will permit fertility — only 20 to 25 percent of women eventually become pregnant after surgery. This is in line with the pregnancy rate per cycle of IVF (18 percent). However, women who undergo more than one cycle of IVF have a higher probability of having a live birth than women who undergo tubal surgery. A Norwegian study found that 72 percent of women who had a complete IVF treatment (three to five cycles of IVF, unless a live birth was achieved after fewer treatments) had a live birth, compared to 24 percent of women who had tubal surgery.⁶

When the risks of IVF and tubal surgery are compared, women who have surgery have a much higher level of physical pain and longer recovery time. They also have a higher rate of ectopic pregnancy (23 percent) than women undergoing IVF, although the rate associated with IVF is still 2 percent (likely because of the presence of tubal damage in many women undergoing IVF). However, spontaneous abortion rates are higher in IVF

patients (28 percent) than in post-surgical pregnancies (15 percent).⁷ We would also expect IVF to be associated with a higher incidence of multiple births than tubal surgery.

Tubal surgery is associated with a lower cost than IVF. Hospital costs for surgery and the patient's stay have been estimated at \$4 200 per patient; in addition, the surgeon's fee is in the range of \$324 to \$500, for a total of approximately \$4 500 to \$4 700. Accurate comparisons for IVF are almost impossible because of the different factors involved (such as type of drugs used), but a rough estimate is that one cycle of IVF costs between \$5 400 and \$7 500 per patient.

However, comparing the costs of each procedure does not tell us which is more cost-effective. To calculate this, we must consider the cost to achieve a live birth. A recent Dutch survey compared IVF and tubal surgery for tubal blockage and found that their treatment costs, per ongoing pregnancy achieved, were very similar.⁸ The Norwegian study discussed earlier found that the costs per live birth were higher for tubal surgery (\$17 000) than after IVF treatment (\$12 000).⁹ In other words, IVF appears to be at least as cost-effective as, if not more cost-effective than, tubal surgery.

Depending on their condition and prognosis, then, some women may be better off with IVF, others with tubal surgery; given that tubal surgery is an insured medical service, there are no cost-effectiveness arguments for not insuring IVF as well.

Given that both IVF and tubal surgery increase the likelihood of having a liveborn child in cases where the diagnosis is complete tubal blockage, it would be desirable to ensure that the choice between them is based on medical factors, not financial considerations related to insurance coverage. The choice of treatment for this diagnosis should be based on the prognosis for the individual. Our data show that the cost of a treatment has a strong influence on people's treatment choices when the options offer roughly comparable results but at widely differing costs. After analyzing the data on tubal surgery and comparing the results with data on IVF for tubal blockage, the Commission concluded that IVF may in fact be an appropriate first treatment in some cases where the diagnosis is complete tubal blockage. Although IVF is not a cost-effective procedure when, as at present, it is offered for a wide range of diagnoses, IVF is as cost-effective as the alternative, tubal surgery, in cases of tubal blockage and is a useful treatment for that diagnosis. However, its inclusion under public health insurance plans must take other factors into consideration (see section on Health Insurance Coverage).

Another reason for blocked tubes is tubal ligation (tying of the fallopian tubes), the most widely used form of female contraception in Canada — 66 percent of women undergo this procedure at some point during their reproductive lives. Some eventually regret their decision, especially if they have a new partner, and they may attempt to have the sterilization reversed through microsurgery. Live birth rates after tubal

surgery to reverse sterilization (60 percent) are higher than after surgery for tubal blockage resulting from disease, and the surgery is less complex. However, if the sterilization reversal is unsuccessful, IVF may be the next treatment sought. The Commission found that between 5 and 15 percent of patients requesting IVF at Canadian infertility clinics in 1991 had had tubal ligation.

Although IVF is not a cost-effective procedure when, as at present, it is offered for a wide range of diagnoses, IVF is as cost-effective as the alternative, tubal surgery, in cases of tubal blockage and is a useful treatment for that diagnosis.

The Commission believes that surgical sterilization should be considered permanent, and those considering it should be counselled appropriately. Appropriate counselling and sufficient time to reflect on the implications of surgical sterilization will help to minimize the number of men and women who later regret their decision and attempt to regain their fertility. It would be unrealistic to assume, however, that all such decisions will not be regretted; even with proper counselling and consideration of the implications of sterilization, a small number of people will still wish to reverse their decision, as their life situations may change markedly. Commissioners believe that this option should be available to them.

In light of all these considerations, as well as our findings reported in the next section with regard to risk, the Commission recommends that

106. IVF be offered as treatment only to women with a diagnosis of complete fallopian tube blockage resulting from disease, defect, or surgical sterilization. Prior tubal surgery should not be a prerequisite for IVF; the choice of procedure should be based on medical prognosis for that woman.

and that

107. Variations of IVF, and IVF for diagnoses other than fallopian tube blockage, be offered only in the context of research, and that the Assisted Conception Sub-Committee of the National Reproductive Technologies Commission facilitate multicentre collaborative trials in this regard.

Later in this chapter we return to the issue of the nature and scope of research required on variations of IVF and IVF for diagnoses other than

blocked fallopian tubes before they could be considered for inclusion in the health care system.

Risks of IVF

The second factor the Commission assessed in examining whether and under what conditions IVF should be provided were the risks involved. As noted earlier, no medical procedure can ever be entirely risk-free. There is, however, a need to reduce the risk to the minimum acceptable level while maintaining effectiveness. The risks outlined in this section are the known effects of IVF, which include multiple pregnancies and the risks of the drugs and procedures surrounding IVF.

Multiple Pregnancies

Among the most serious risks of IVF are those associated with multiple pregnancy, a risk that is also associated with the use of the ovulation drugs, which are often used in conjunction with IVF (see Chapter 18). The usual practice in IVF is to transfer more than one zygote to the woman's uterus, as this increases the likelihood that at least one will implant; there have been reports of as many as seven zygotes being transferred at the same time, and often more than one implants and develops. Using American Fertility Society registry figures, which included both Canadian and U.S. data, the result of the practice is that about 30 percent of IVF deliveries, 24 percent of GIFT deliveries, and 23 percent of ZIFT deliveries are multiple, compared to a rate in the general population of about .1 percent. In fact, this way of counting understates the problem, as one confinement may give rise to several infants. For example, in Canada for 1991, although 23 percent of live birth confinements after IVF were multiple, one liveborn IVF child in three was part of a multiple

In addition to these risks, there are the effects associated with hormonal stimulation, which cannot be guaranteed to be innocuous in the long term. Hormonal stimulation, resulting in multiple pregnancies that lead to complications for the child, is controversial. This practice produces headaches, fatigue, and insomnia, among other things, and is associated with the formation of ovarian cysts.

Also, little is said about the disappointment of women for whom assisted reproduction has raised hope and led to feelings of failure and guilt after each unsuccessful try.

[Translation]

Brief to the Commission from Ordre des infirmières et infirmiers du Québec, April 1991.

birth (81 of 213 infants born after IVF or 38 percent). This is the more relevant statistic, because it is these individuals and their families who must deal with the consequences of multiple births.

Most of the multiple births reported in our survey of fertility programs were twins, with one set of triplets and one set of quadruplets. In a sample of this size (171 deliveries), however, no higher-order births would normally be expected — a set of triplets is expected to occur less than once in 10 000 deliveries, and a set of quadruplets less than once in a million deliveries.

Multiple pregnancies pose serious health risks for both women and their children. For women, multiple pregnancy increases the risk of anaemia, miscarriage, toxæmia, high blood pressure, kidney trouble, difficult delivery, and post-birth haemorrhage. In Canada, a woman carrying three or more fetuses usually spends the last 4 to 12 weeks of the pregnancy in hospital, and most undergo a Caesarian delivery with its attendant risks. Just as important, multiple pregnancies present risks for fetuses: miscarriage, accidents during delivery, and premature births are much more common in multiple pregnancies. Prematurity brings with it another risk — low birth weight. The incidence of low birth weight in the Canadian population is between 6 and 8 percent,¹⁰ but studies have found that 12 percent of IVF singletons, 55 percent of IVF twins, and 94 percent of IVF triplet or higher-order births result in low birth weight (less than 2 500 grams). Moreover, one-third of triplets and higher-order births result in very low birth weight (less than 1 500 grams).¹¹

The consequences of low birth weight can be serious and long-lasting: breathing problems are common in low birth weight infants, who are also more likely to have cerebral palsy, poor eyesight, short attention span, and poor learning skills as they grow up. Hyperactivity, reading difficulties, and poor coordination and motor skills in childhood are also more common. A three-year Canadian study of children with very low birth weights born between 1984 and 1986 found that 20 percent suffered some form of serious disability.¹² More recently, U.S. studies have shown that 25 percent¹³ of very low birth weight children have serious disabilities, while an additional half have other problems, such as those requiring special education services.^{14,15} In other words, a substantial proportion of very low

Our triplets are IVF children. This was really the last thing we tried in an eight-year process of infertility treatments, infertility work-ups. And right from the first time I took Clomid®, I was informed that there was a chance of multiple births. And I interpreted that as twins. It didn't occur to me that people have triplets or quads or quints, it doesn't happen to anyone you know until you've had them yourself and then you do meet others.

S. Picard, Parents of Multiple Births Association of Canada, Public Hearings Transcripts, London, Ontario, November 2, 1990.

birth weight children will need continuing attention or care in varying degrees for a good part of their lives.

In addition to posing risks to the physical health of women and children, then, the consequences of multiple births can also strain the psychological and social health of the family after birth and place additional demands on the health, education, and social services systems. Parents of multiple-birth children cope with demands on their time, energy, and finances that are much greater than those of other parents. Although there are few Canadian studies of multiple-birth families, parents of "multiples" told the Commission that they had paid a price in raising their children. Despite the joy most parents derive from having children, these parents also felt overwhelmed by the demands on them. Families often need the support of paid and volunteer caregivers after the children leave hospital. In addition to pressures on the family, multiple births also involve added costs for health and social services systems. Provincial health insurance, for example, pays for the woman's longer hospital stay before and after birth, for Caesarian delivery, and for extended neonatal intensive care for the children.

Recognizing the risks involved in multiple pregnancies and the fact that if too many embryos implant they are all likely to die, some IVF clinics (5 of the 16 surveyed by the Commission) offer a procedure known as selective reduction in the situation of multiple pregnancy; some embryos are aborted to give the others a chance to survive. As well as

People seeking reproductive medical services need to be informed before making reproductive decisions ...

There are long-term social consequences ... Recently the POMBA [Parents of Multiple Births Association] prepared a first-year cost comparison between a three-person family with one infant and families with triplets, quadruplets, and quintuplets. Our cost comparison showed that the first year... start-up costs of having triplets are \$8 000 higher, quadruplets is \$11 000 higher, and quintuplets is \$16 000 higher than giving birth to a single baby. This cost comparison does not allow for transportation needs like the purchase of a van to properly facilitate four infant car seats safely within the law, the housing needs — our family ... had to move to a larger home — or paying for the cost of part-time paid assistance ... Because of [the] extraordinary time commitment involved in caring for three or more babies at once, our families also found it necessary for at least one of the parents to relinquish the security of a second income yet assume these extraordinary costs. All these unique additional stresses put the family at risk.

D. Launslager, Parents of Multiple Births Association of Canada, Public Hearings Transcripts, London, Ontario, November 2, 1990.

ethical dilemmas, the procedure has risks, including loss of all the developing fetuses.

To avoid the physical and psychological risks of multiple pregnancy and selective reduction, Canadian associations of practitioners working in this field have recommended limits on the number of zygotes transferred, but they have not specified a standard. Most but not all IVF practitioners are now limiting the number of zygotes they transfer. Furthermore, the World Health Organization analysis of international data found that the live birth rate after IVF declines if more than three zygotes are transferred, and the guidelines of the European Society of Human Reproduction limit the number of embryos transferred to three.

After considering the health risks to women, fetuses, and children, the emotional and financial costs, and the dubious benefits of transferring larger numbers of embryos, the Commission recommends that

108. No more than three zygotes be transferred during IVF procedures, and then only after counselling of the couple to ensure that they understand the possibility and implications of having triplets. Patients should give their consent in writing if more than one zygote is to be transferred and should be assured that no more than three will be transferred.

Drug Risks

Most patients at Canadian IVF clinics undergo "stimulated" cycles; that is, ovulation induction drugs are used to stimulate the woman's ovaries to produce more than one egg. This increases the chances of at least one viable embryo being created *in vitro* and means that some can be frozen for use in a future cycle, thus avoiding the need for additional egg retrieval at that time while still giving another chance at pregnancy. We discussed what is known about the risks of fertility drug use in Chapter 18. As we noted in that chapter, although ovulation induction drugs increase the number of eggs produced, their use can also make the uterus less hospitable to implantation; as a result, even if more zygotes can be created *in vitro*, fewer may survive transfer in a stimulated cycle.¹⁶

One Canadian clinic is currently conducting a trial to determine the effectiveness of "natural cycle" IVF without drugs; the one egg produced naturally during an unmedicated cycle is retrieved for fertilization. Although the drug risks are avoided and the uterus is more hospitable to implantation, only one egg is available for fertilization; thus, there is less of a chance of obtaining a viable zygote for transfer. U.S. statistics indicate

that success rates for natural cycle IVF are increasing, but they are still less than half that of stimulated cycles.¹⁷

There is evidence, however, that the beneficial aspects of stimulated and unstimulated cycles can be combined to improve success rates and reduce risks. The ovaries are stimulated to produce multiple eggs, which are retrieved and fertilized and the zygotes cryopreserved until the woman's hormone levels have returned to normal. Then she has the opportunity to have one or two zygotes transferred, during several natural cycles if necessary, with only the one invasive egg retrieval procedure needed. Some believe that this is the only ethical way to perform IVF; drug risks are reduced, the chances of implantation are maximized, and only the most viable zygotes may be transferred. It is with this background that some physicians have expressed the view that cryopreservation of zygotes should be made mandatory in all IVF programs.

The question of whether frozen zygotes are as viable as fresh remains unanswered, but recent U.S. data show that the number of live births after fresh and frozen zygote transfer are similar.¹⁸ Moreover, as cryopreservation techniques are refined, rates of successful transfer are increasing.¹⁹ There appears to be no increase in spontaneous abortion or birth anomalies compared to pregnancies established with fresh zygotes, although more evidence is still required to confirm this.

The Commission believes that the benefits offered by cryopreserving zygotes for later implantation in an unstimulated cycle outweigh the risks. Cryopreservation reduces the use of ovulation induction drugs, gives more transfer opportunities during several cycles, and thus increases the likelihood of implantation. It also reduces the risks of multiple births resulting from the transfer of larger numbers of zygotes. The Commission therefore recommends that:

109. The Assisted Conception Sub-Committee of the National Reproductive Technologies Commission monitor developments and make recommendations regarding cryopreservation and natural cycle IVF as knowledge and practice evolve.

Procedural Risks

All invasive procedures carry some risk of infection, bleeding, damage to internal tissues, and pain; IVF is no exception. In addition, the rate of extra-uterine pregnancies (ectopic or "tubal" pregnancies) — although quite low at a few percent — is still at least 25 times more common in IVF patients than in the general population. This may be because of the characteristics of IVF patients, however, rather than being a result of IVF

procedures. Many IVF patients have tubal problems, are older, and have had trouble conceiving, so that the rate of ectopic pregnancy would be expected to be higher even if IVF had not been used. The Commission believes that data on the incidence of these various outcomes following IVF use — both ovulation induction and the procedure itself — should be collected by all facilities offering IVF. Having this information available will facilitate more informed decision making by patients, practitioners, regulators, and policy makers.

In the *in vitro* clinic where I am a consultant, only one couple of the 185 I have seen decided against IVF when informed of the profound physical, emotional, and financial costs which are part and parcel of the treatment. For me this underscores the emotional intensity of the infertility experience.

P. Gervaise, private citizen, Public Hearings Transcripts, Ottawa, Ontario, September 18, 1990.

Psychosocial Effects of Treatment

Being treated for infertility is stressful and difficult for couples. Sociological studies carried out for the Commission showed high stress levels in couples involved in IVF treatment. How much of this stress is attributable to the treatment process and how much results from their infertility are hard to disentangle. An examination of 686 couples undergoing IVF found that patients ranked higher than the general population on a list of 29 symptoms of psychological distress. Although IVF treatment places couples under greater than normal pressure in a very personal part of their lives, the study also found that the vast majority of couples were well adjusted in terms of marital happiness (see research volume, *Treatment of Infertility: Current Practices and Psychosocial Implications*). This supports the findings of other studies showing that infertility does not have a significant effect on the quality of marital life, but rather has indirect negative effects by lowering individuals' self-esteem and sense of control over their lives. The stress of repeated failures of treatment is particularly difficult for couples to deal with.

Social support, or the lack of it, plays an important role in reducing or adding to the stress felt by couples in treatment. Couples reported three common stress-causing situations: friends or family members asking each month whether the woman was pregnant yet; hints that the couple needed only to "relax" to get pregnant; and suggestions of folk cures to increase the couple's fertility. Women were more likely than their partners to discuss their infertility with others, but most women and men reported that they were not interested in taking part in support groups.

Since the female partners in couples undergoing IVF experience the most painful and invasive aspects of diagnostic and treatment procedures, not surprisingly women undergoing IVF report more stress than men do.

Women also said they feared being dropped from the program if their bodies did not seem to be responding normally to treatment, and this created stress as well. The male partners tended to report more negative consequences on privacy and feelings of control.

Not all the psychosocial implications of IVF treatment are negative. The majority of IVF patients surveyed reported positive effects on their relationship with their partner and on their feelings about themselves. Even if treatment proved unsuccessful, they felt they had done everything they could to overcome their infertility.

Long-Term Outcomes

One of the repeated messages we heard from Canadians was the need for information about longer-term risks and outcomes following IVF. As with most new medical treatments, the lack of follow-up data on IVF makes it difficult to determine whether there are any long-term adverse effects on women or children. Although some infertility practitioners have made great efforts, at present no organization or agency in Canada gathers information on the outcomes after IVF or tracks its effects over time. As described in our research volumes, record-keeping practices vary markedly among clinics and practitioners, with some clinics not even having data on whether a given IVF procedure resulted in a live birth.

One of the questions that must be asked about IVF is whether it poses any risk to the children born through its use. The many studies to date show no increased risk of congenital anomalies in IVF infants. One Australian study revealed a higher incidence of neural tube defects, but this result has not been confirmed by other studies, including a large recent case-control study by the National Institute of Child Health and Human Development.²⁰ We have

There should be some way of monitoring the future health of couples using the NRTs and the offspring born to them so that problems that occur can be tied back to those technologies and appropriate action taken.

D. Allen, private citizen, Public Hearings Transcripts, Toronto, Ontario, October 29, 1990.

already alluded to the high incidence of low birth weight infants following IVF, and perinatal death is three to four times higher for IVF births than for other births.²¹ Because the technology is relatively new, however, long-term tracking of large numbers of IVF children has not yet been possible — the oldest child born as a result of the procedure is now 15.

It is essential that data on IVF — on treatment cycles, immediate outcomes, and long-term outcomes — be collected in a systematic and consistent manner. Data are needed to evaluate whether there are longer-term implications for women and what the actual outcomes are with

respect to the health of IVF children as they grow up. To assess these outcomes in the least intrusive manner would require linkage of coded IVF patient data bases with coded data on the same individuals from health-related and other data bases to draw conclusions about long-term outcomes for both women and their children (see section on Measuring Health Outcomes).

The federal and provincial governments should provide the funds and resources to develop a "new reproductive technologies" data base.

Brief to the Commission from the Manitoba Association of Registered Nurses, January 7, 1991.

In summary, the Commission's review of the effectiveness and risks of *in vitro* fertilization showed that IVF is effective for one diagnostic category only — complete fallopian tube blockage — and that the risks of the technology, though real, are manageable from the perspective of service providers through the establishment of guidelines for practice and the careful monitoring of individual patients as treatment proceeds. From the perspective of individuals seeking treatment, however, each patient must make a fully informed decision about whether the identified level of risk is acceptable to her. It is therefore essential that anyone contemplating treatment be fully informed of what is known and what is not known about risks. These issues are discussed later in this chapter (see section on Patient Information, Consent, and Counselling).

Issues in Current IVF Practice in Canada

Based on our analysis of the effectiveness and risks of IVF, the Commission has recommended that it be offered only for bilateral fallopian tube blockage. In keeping with our ethic of care, however, we are also concerned with the conditions under which treatment is offered.

The Commission investigated current practices in Canadian infertility programs through two surveys — one of the programs themselves; the other of patients who participated in those programs. As will become clear in the next few pages, our review of the way IVF is offered in Canada today shows that there is little consistency or uniformity in the IVF treatment community. Although professional organizations have set guidelines, and some physicians in the field have worked hard to try to ensure high standards and comprehensive reporting of data, it is clear that the current situation results in little standardization of practices, little accountability, and unacceptable record-keeping practices. Compliance with recommended standards is patchy, information is not collected in a format that allows comparison or aggregation of clinic data, and definitions of success vary widely, resulting in confusion for prospective patients and great difficulty

in assessing outcomes. The Commission believes that this patchwork of practices and standards is detrimental to women and couples, prevents needed analysis of the results of IVF research and treatment, and makes meaningful comparison between clinics impossible.

It was this situation, as well as the potential for harm to Canadians if it is not rectified, that led Commissioners to recommend a system of mandatory licensing for clinics offering IVF and other assisted conception services, as well as an Assisted Conception Sub-Committee within the National Reproductive Technologies Commission to establish standards and guidelines to be adopted as conditions of licence and monitor developments in the field of IVF treatment and practices.

As a condition of licensing, centres would have to comply with guidelines to be established by the Assisted Conception Sub-Committee of the National Reproductive Technologies Commission. As outlined below, these would include such aspects as standards of practice, record-keeping procedures, and participation in national information gathering, the qualifications of practitioners employed by assisted conception programs, and standards for information provided to patients and informed consent procedures.

Licensing will achieve our goals of ensuring that the non-medical implications of IVF are considered, that country-wide standards for practices and procedures are set and complied with, and that appropriate record keeping occurs. The requirement of standardized record keeping will allow ongoing evaluation of outcomes so that results can be fed back into practice and used to inform prospective patients. The collection and publication of data in the National Commission's annual report will provide evidence that guidelines are being complied with. Licensing will also provide the opportunity for wider perspectives to be brought to bear in formulating guidelines. As in other areas, National Commission hearings of applications for assisted conception licences should be open to the public, with the opportunity for parties with relevant information to participate.

We base this recommendation for compulsory licensing of assisted conception facilities on our extensive review of current clinic practices, the conclusions of which are described below. The studies conducted for the Commission in the course of this review, which are available in the accompanying research volumes, suggested several areas Commissioners needed to address in our recommendations if treatment is to be provided in an ethical and beneficial way.

Although professional organizations have set guidelines, and some physicians in the field have worked hard to try to ensure high standards and comprehensive reporting of data, it is clear that the current situation results in little standardization of practices, little accountability, and unacceptable record-keeping practices.

Although for clarity we address these areas separately, they are not in reality separable — without good record keeping on clearly defined outcomes, effectiveness cannot be known and risks cannot be assessed. This means appropriate information cannot be given to patients and cannot be used to shape good practice, which requires

- adherence to practice standards;
- clear definitions of how success rates are calculated and used;
- appropriate record keeping on patients, procedures, and the results of treatment — at present data on clinic practices are not recorded in a standard manner, so it is impossible to know the number of people treated, the number of pregnancies, the number of confinements, or the number of live births. These data are needed not only for public policy but also to permit evaluation, development, and refinement of clinical standards;
- information about risks — we have some information about procedural and short-term risks but less information about long-term risks, and at present most clinics are not structuring their operations to provide the information that will enable these data to be gathered and analyzed;
- appropriate information provision, counselling, and consent procedures in clinics — at present some practices may be hindering people's ability to make informed choices about their options with respect to treatment and other strategies; and
- equitable access to treatment.

We consider each of these areas in turn.

Clinic Practices

The Commission's survey found many differences in the practices, standards, and protocols followed by IVF programs. Although the Canadian Fertility and Andrology Society has established guidelines for practice, there is no national body to require adherence to such standards or monitor the provision of services. In addition, IVF programs change over time, as the director and staff at each clinic make independent

Some flexibility and variation in practice may be needed to take individual situations into account, but what emerges clearly from our study is a picture of large differences in practice and procedures across the country.

T. Stephens and J. McLean, "Survey of Canadian Fertility Programs," in Research Volumes of the Commission, 1993.

decisions about policy, protocols, procedures, and services offered as part of their program.

For example, half the programs surveyed did not limit the number of times IVF could be attempted, but 7 of the 16 limited patients to fewer than five cycles. Whether a "rest" between cycles (to allow the woman's body to return to normal before another IVF attempt) was required also differed from program to program, with three programs requiring patients to wait more than three months between IVF attempts, six clinics requiring a three-month wait, six programs requiring two months, and one clinic specifying one month.

One clinic reported that it offered patients "natural cycle" transfer, cryopreserving all zygotes for three months to allow the woman's body to return to normal after ovulation induction, then transferring them to her uterus during an unstimulated cycle. One other clinic offered natural cycle IVF with fresh zygotes; only the one naturally produced egg is fertilized and transferred.

We also found variations in clinic practices with respect to whether they used donated gametes (sperm and eggs) and whether they offered cryopreservation of zygotes (and thus whether they could offer natural cycle IVF) (Table 20.3). In the five clinics offering cryopreservation, time limits on zygote storage ranged from four months to 10 years, and one clinic's policy was to store them until the woman who was the source of the eggs used to create the zygotes had turned 60.

Table 20.3. Services Offered at 16 IVF Programs, 1991

| | |
|---------------------------|----|
| IVF-ET | 15 |
| GIFT | 6 |
| ZIFT | 2 |
| IVF with donor sperm | 13 |
| IVF with donor egg/embryo | 8 |
| IVF surrogacy | 1 |
| Selective reduction | 5 |
| Embryo cryopreservation | 5 |
| Embryo genetic diagnosis | 2 |

Source: Stephens, T., and J. McLean. "Survey of Canadian Fertility Programs," Table 1. In *Research Volumes of the Royal Commission on New Reproductive Technologies*, 1993.

“Success” Rates

Given that we found insufficient evidence to conclude whether IVF is effective for most indications, concerns about how “success” rates are calculated and used by IVF clinics come into sharper focus. Many Canadians appearing before the Commission questioned the accuracy and reliability of the success rates quoted by IVF clinics, expressed concern that the methods used to calculate success rates were misleading to prospective participants in IVF programs, and asked the Commission to determine why different IVF clinics and practitioners quote such widely varying rates for the effectiveness of their procedures.

Measuring and Reporting “Success” Rates

“Success” in IVF treatment is defined differently by patients, by clinics, and by practitioners, which creates confusion for patients and policy makers alike. As a result, prospective patients cannot assess their likelihood of having a child through the use of IVF. Without clearly defined and universally used definitions of success, it is impossible to know what is being compared — is it successful fertilization, a clinical pregnancy, or a live birth — and meaningful evaluation is impossible. People are misled about their probability of having a child when “success” rates are quoted with no frame of reference. Couples considering IVF should have access to objective information about the record of a clinic in treating conditions comparable to their own, as well as overall effectiveness rates at various clinics for the treatment they are contemplating, given their diagnosis.

In response to concerns raised about this situation in the United States, the U.S. Congress, which had heard testimony from the Federal Trade Commission that the success rates claimed by IVF clinics (up to 80 percent success in some cases) routinely misled couples who are infertile and considering IVF, passed a law in 1992. The legislation, which will come into effect in 1994, will initiate an accreditation program to ensure uniformity in the definition of success and in the measurement of success rates. Accreditation of the approximately 200 private IVF clinics in the United States will be accorded only to programs that define their success rates in a standardized and clear way, based on the total number of patients treated, categorized by the age of the women treated and by the infertility diagnosis. The legislation will also ensure that clinics report the number of births following IVF (live births per cycle initiated; and live births per egg retrieval procedure). As we have seen, unless these definitions are clear, such statistics can be misleading because of the frequency of multiple births following IVF.

Consumer protection is not the only aspect to be considered, however. Records on outcomes and complications are also needed to guide practice and for research and policy making, to allow analysis that gives rise to better decisions about whether a procedure should be offered as treatment,

whether it should be abandoned, whether it should be considered experimental, and whether it should be an insured medical service.

Record-Keeping Practices

The Commission investigated the record-keeping practices of Canadian clinics. The “success” rates at a particular clinic may be much higher or lower than the average for all clinics solely because of differences in the characteristics of its patient group. Probably for similar reasons there are great differences in the success rates quoted between countries — even if the procedures used are identical.²² Thus, simply knowing a clinic’s overall success rate is not sufficient to judge its record.

We found that, in Canada, clinics record data on patients and procedures, define success, and calculate success rates differently from one to another, making it impossible to compare or analyze the effectiveness of IVF on a national or international basis. Half the IVF programs

surveyed by the Commission defined success as achieving pregnancy (8 of 16), but four different definitions of pregnancy were used (results from a blood test; evidence of conception from ultrasound scanning; a urine test; or a tissue test). Other clinics defined success as live birth (6 of 16), egg retrieval and fertilization (1 of 16), or embryo transfer (1 of 16). The clinics also conveyed information to patients about their chances of success in different ways; 6 of the 16 clinics gave a percent chance of pregnancy based on a certain number of cycles or embryos transferred. Some clinics (4 of 16) gave patients a percentage without specifying a number of cycles or embryos transferred. Others told patients their chances of a live birth per cycle, per egg retrieved, or per embryo transferred. These differing methods of calculation led to “success rates” ranging from 10 percent at some clinics to 26 percent at others, but in no way are these rates comparable to each other.

To complicate the picture still further, we found clinics use different definitions of “cycle,” making it impossible to determine how many treatment cycles were actually initiated for every live birth that occurred. Some clinics (6 of 16) defined “cycle” as ovulation induction, some (2 of 16)

The accuracy and completeness of record-keeping and the categories by which statistics are collected, leave much to be desired in many programs. This makes it difficult to judge the outcomes and quality of service being delivered. The varied and often unclear ways in which success rates are defined by different clinics make it hard for potential patients to assess programs, and mean that consent may not be fully informed.

T. Stephens and J. McLean, “Survey of Canadian Fertility Programs,” in Research Volumes of the Commission, 1993.

defined it as egg retrieval and fertilization, while others (5 of 16) defined a cycle as having occurred only if the embryo transfer stage was reached. Most clinics also did not keep records on the outcomes of treatment by specific diagnostic indications (such as tubal blockage, unexplained infertility, etc.). Current methods of calculating success rates are outlined in Table 20.4.

Table 20.4. Different Success Rate Definitions in Current Use in Canada

| | |
|--|-----------------------------|
| Number of clinical pregnancies per | patient entering program |
| | patient receiving treatment |
| | treatment cycle initiated |
| | egg retrieved |
| | embryo transferred |
| Number of confinements (e.g., triplets counted as 1) per | patient entering program |
| | patient receiving treatment |
| | treatment cycle initiated |
| | egg retrieved |
| | embryo transferred |
| Number of children born (e.g., triplets counted as 3) per | patient entering program |
| | patient receiving treatment |
| | egg retrieved |
| | embryo transferred |

The Commission's survey of 750 past and current IVF patients across Canada confirmed the findings of the clinic survey. Most patients (80 percent) were given a percent chance of pregnancy, not of live birth. A few (8 percent) said they were not told their chances of pregnancy. Some said they were given a percentage, but they "were not sure how it applied," while others were told simply that there was a "high success rate." Although most were told their chances of pregnancy were less than 25 percent, 62 percent of patients said they were confident or very confident that their treatment would result in the birth of a child.

Commissioners understand the need for clinics to record results at various endpoints — this enables practitioners to understand where in the process problems and obstacles are occurring and allows them to adjust their practices accordingly. However, the current variations in the way clinics record their results and calculate the rate of various outcomes preclude any substantive analysis of effectiveness and have led to a situation where policy and treatment decisions must be based on limited and deficient data.

Patients should not be put in the position of having to make a decision about participating in IVF treatment based on false assumptions about their chances of having a child. For couples who are infertile, the birth of a child is the measure of success; it is therefore misleading to present success rates based on the number of clinical pregnancies, as half the Canadian IVF clinics do, because only 70 percent of clinical pregnancies end in live births. It is also misleading to base success rates on the total number of children born, because multiple births inflate that rate. Similarly, it is inappropriate to give prospective patients figures based on the number of eggs retrieved or zygotes transferred, as fewer than half the patients treated actually reach the embryo transfer stage. It is also important to give patients a context for the rates quoted, as some clinics will not have treated enough patients with a particular diagnosis to make meaningful predictions for a given couple. Thus, it is also important for patients to have access to national data about the results of treatment with IVF (or a related technology) for their diagnostic category.

Patients are most interested in the likelihood of the birth of a healthy child, but for some this is not the only measure of success; for some women, simply achieving pregnancy represents an affirmation of their capacity to do so. Whatever their personal definition of success, patients need clearly explained and standard measures of the likelihood that treatment will result in particular outcomes — especially live birth. This measure must be the same from clinic to clinic. Thus, the Commission concurs with the World Health Organization

recommendation that the most appropriate rates to use from patients' perspective are the number of live births and the number of pregnancies per 100 treatment cycles initiated at a clinic.²³ Because most clinics do not treat enough patients with similar diagnoses and of similar ages to produce reliable figures, ideally patients should also be given national statistics on

Patients' expectations of having a baby were generally substantially higher than the estimates provided to them by the clinics. This finding, as well as the fact that patients want to know their probability of success, points to the need for more explicit, formal systems for informing patients.

SPR Associates Inc., "An Evaluation of Canadian Fertility Clinics: The Patient's Perspective," in Research Volumes of the Commission, 1993.

the number of live births per 100 treatment cycles initiated in couples with a similar diagnosis and age of the female partner. Such statistics should be included in the National Commission's annual report. The Commission therefore recommends that

110. As a condition of licence, all IVF programs collect, maintain, and report to the National Reproductive Technologies Commission annual statistics on pregnancies per 100 treatment cycles initiated and live births per 100 treatment cycles initiated at that clinic.

111. All IVF programs assemble and submit annual statistics on live births per cycle initiated by the age and diagnostic indication of each woman treated with IVF. These statistics should be published and distributed to contributing clinics in an accessible form for use in patient information materials.

and that

112. The success rate used by all clinics in patient information materials relate only to the chances of live birth per treatment cycle initiated.

Physicians are interested in rates of particular outcomes at various stages of a treatment, to help clarify what is working and at what stage. Knowing where problems occur in the treatment process enables problems to be addressed and improvements to be made. Thus, physicians need outcome data on a range of factors: whether elevated hormone levels are present; whether ovulation has occurred; whether egg extraction has been successful; whether eggs have been fertilized; whether zygotes have been transferred and have implanted successfully; whether biochemical pregnancy occurs; and whether clinical pregnancy results. Information on whether pregnancies are carried to term, whether they are multiple, and whether live birth results is also essential, as is information about the health of the resulting children. Outcome rates for these events can be calculated using different denominators — for example, the relevant outcome per number of stimulation cycles, per number of treatments attempted, or per 100 *in vitro* fertilization cycles attempted or completed — but these rates will be for specialized use by those working in this field.

Funders and policy makers have still different needs with respect to data collection. They are interested, for example, in the costs to the health

care and social service systems of particular treatments. This may include costs associated with the treatment itself, such as drugs, hospital days, and physician fees for specific services. It may also include costs associated with treatment complications, such as spontaneous losses, pre-term delivery, low birth weight, multiple births, and the continuing costs associated with chronic illness or disability. This information helps to form an assessment of the opportunity costs of allocating public resources to a treatment and its effects, relative to directing them to other public sector purposes. This assessment is part of the process taxpayers expect policy makers and funders to complete if they are to be accountable for their responsible use of public resources.

The Commission concludes that it is essential for all IVF programs to collect data that allow rates for various outcomes to be calculated in a standard and comparable way. The International Working Group for Registers on Assisted Reproduction has developed a comprehensive and useful model to collect information and has been perfecting this model

Some Canadian practitioners have made strenuous and commendable attempts to develop a Canadian registry using this model, but participation by most of the treatment community has been haphazard, with only 2 of 16 clinics submitting data in 1991.

since 1987. Some Canadian practitioners have made strenuous and commendable attempts to develop a Canadian registry using this model, but participation by most of the treatment community has been haphazard, with only 2 of 16 clinics submitting data in 1991. The organization created in 1991 to collect the data, the Canadian Voluntary Registry Association, could not secure adequate funding and has since dissolved.

Commissioners believe that the model proposed by the International Working Group is a good basis on which to begin collecting the relevant data for analysis and output in various forms to meet the needs of patients, practitioners, researchers, and policy makers. This model could serve as a basis on which to begin consistent country-wide record keeping on IVF practice in Canada. The Commission therefore recommends that

113. All facilities offering IVF be required, as a condition of licence, to provide information in standard form to the Assisted Conception Subcommittee of the National Reproductive Technologies Commission, which will maintain a data base building on the model of the International Working Group for Registers on Assisted Reproduction.

Measuring Health Outcomes

We have already alluded to the need to fill the many gaps in our knowledge about the outcomes of IVF and of the use of drugs to stimulate ovulation. As IVF and other reproductive technologies could potentially affect the next generation, it is essential that their effects be monitored and evaluated taking this into account. Monitoring encompasses the reporting of data, the tracking of selected outcomes or indicators over time, and the independent audit of these data. This process provides feedback information useful in setting licensing conditions and regulating the provision of services and in the development of practice guidelines.

The need for information about whether IVF has long-term health consequences is not being met by current systems and mechanisms. It would be possible, however, to assess health outcomes in those affected or potentially affected by fertility treatment (patients and their children) by linking their records to other population-based data banks on health outcomes, such as hospitalization data and vital statistics data. As the information needs in this area are similar for all infertility treatments, the Commission's proposals on how best to obtain information on long-term outcomes are dealt with elsewhere in the report (see Chapter 18).

Clinic Staff

In teaching hospitals, the IVF program usually falls under the responsibility of the department of obstetrics and gynaecology. Most IVF programs employ a director, a nurse/coordinator, administrative staff, and treatment teams of physicians, technicians, and other personnel. If laboratory services are offered on-site, then a laboratory manager and technicians are also part of the program staff. Some clinics also employ the services of a social worker or counsellor.

The Commission was told that IVF patients are usually assigned to an attending physician upon acceptance into the program, and he or she makes the final decisions with the couple about the couple's treatment. Attending physicians usually have a treatment team, consisting of an assistant physician, an administrator, and a nurse/clinician. In most cases it is the nurse/clinician who supervises women during ovulation induction, while the physicians (usually gynaecologists) perform egg retrieval and embryo transfer.

We believe that any assisted conception program should include, as a minimum, personnel with the following expertise:

- An individual with training and experience in reproductive endocrinology, particularly in the use of ovulation-inducing agents and the hormonal control of the menstrual cycle. An individual who has a certificate of competence in reproductive endocrinology and infertility from the Royal College of Physicians and Surgeons, or the equivalent, would fulfil this requirement.

- An individual with expertise in laparoscopic techniques and in ultrasound-guided egg retrieval techniques.
- A director of the embryology laboratory with personal experience in the organization and maintenance of a basic or clinical embryology laboratory as well as in tissue culture techniques.
- An ultrasonographer (or obstetrician/gynaecologist with specialized training and experience in gynaecologic sonography) who provides the monitoring of follicular development and supervises ultrasound-directed egg retrieval.
- A designated overall program director. If the overall program director is not a licensed physician, then there must be a designated medical director who is responsible for the clinical aspects of the treatment program.
- Nursing and support staff sufficient to perform the counselling and record-keeping functions necessary for licensing.

A single individual could fulfil the requirement for expertise in one area or more. It is also important that the clinic have available referral to social services to assist in counselling if such trained individuals are not on clinic staff.

The Commission believes that this list, adapted from the guidelines of the American Fertility Society, offers a reasonable basis on which to develop guidelines for Canadian clinics. The Commission therefore recommends that

114. The Assisted Conception Sub-Committee of the National Reproductive Technologies Commission establish, as a condition of licence, the requisite staff qualifications and expertise for facilities offering IVF and related services.

Patient Information, Consent, and Counselling

Information provision, consent to treatment, and counselling procedures that enable patients to make informed choices about their care are important components of IVF services. The ideal situation for patients is to be given full information about their treatment options in the context of other options — such as adoption or coming to terms with not having children. Counselling and social support are also needed to evaluate and weigh the options fully and make choices about treatment in light of what is important to them personally. Informed choice is best assured when decisions about treatment are shared between patients and physicians.

Individual decisions about IVF are complex. Some aspects involve the assessment of technical information as the basis for an appropriate decision, while other aspects contributing to the decision must be based on women's and couples' values, goals, and priorities. Technical information may also be inconclusive, lacking, or unhelpful in reaching some decisions, which are neither straightforward nor solely health care decisions. While patients themselves are in the best position to evaluate their own needs, beliefs, and resources in relation to the expected results of treatment, the practitioner has greater knowledge and experience with the technical aspects of treatment and its results. Both types of knowledge — the patient's and the practitioner's — need to be brought to bear in a partnership to allow the patient to make choices about treatment.

Studies have concluded that facilitating women's and couples' capacity to assume a more active role in their care improves the results of treatment.²⁴ This may be related to patients' increased sense of control and the fact that they are more likely to comply with any requirements of treatment if they have had an active role in decisions surrounding it. More active patient participation in treatment and more effective communication between patient and doctor may also enable practitioners to monitor the effects of treatment more accurately and hence to make adjustments as appropriate to improve the results of treatment. A lack of information or choice may have a detrimental effect, by increasing the patient's anxiety about treatment and its results.

To assess the quality of information and informed consent protocols now in use in Canadian infertility programs, the Commission analyzed patient information materials provided by 16 IVF programs. Researchers evaluated the readability of English-language materials and judged the reading level required to understand them. We found that, overall, IVF patients receive more information and better counselling than patients receiving assisted insemination or other treatments. In addition, informed consent procedures in IVF programs are generally more detailed and documented than those in other types of infertility treatment. We also found, however, that there was no uniformity in programs' information and procedures and that many did not measure up to the standard of informed choice for patients.

Patient Information Materials

The Commission heard repeatedly, from individuals and groups with varying views of IVF, about the need for high-quality, readable, and readily understandable information for people considering or undergoing the procedure. Lack of information was seen as seriously hindering people's ability to make informed choices. Providing such information enables patients to participate more fully in their treatment. It does not, however, remove the onus from practitioners. The burden of providing quality care rests with health care professionals. It is their responsibility to ensure that

medical treatments are provided in a safe and ethical manner. Good information is a vital component of this. The Commission considers it unethical not to explain procedures and to ensure that patients understand the implications of procedures that may not have occurred to them.

Women undergoing IVF told the Commission that four areas of information were most important to them: their personal chances of having a child as a result of treatment (85 percent of those surveyed); the long-term effects of treatment (82 percent); the emotional demands of treatment (81 percent); and short-term effects of treatment (80 percent). Fewer than half the patients surveyed were satisfied with the information they received in these areas.

The information patients need to make informed decisions about their care includes the nature and objectives of the procedure and alternatives to it; the nature and probability of the known and possible consequences of the procedure; and the costs of the procedure. They also need to know that only qualified personnel will be offering the service. (The licensing system we propose will ensure that.)

Very few programs addressed all these aspects. Most of the information materials mentioned adoption as an alternative to IVF but did not give sources of information about it,²⁵ and one program did not inform patients about the costs they would incur as part of the IVF program.

The Commission also found that patient information materials were not written in readily understandable language. Although the nature of the subject matter is technical, and this makes it challenging to present in an easily understandable way, the materials could be made more readable with help of those expert in communicating technical information to a non-technical audience. For example, essential technical vocabulary could be identified and defined, and efforts could be made to identify patients' information needs and design the contents of the material accordingly. Researchers have found, for example, that people have more difficulty absorbing information when they are in anxiety-producing or stressful situations. It would be appropriate, therefore, if IVF programs could get expert assistance in writing the material to be given to patients to ensure that they are completely informed in a sensitive and compassionate way.

The use of a clinical, technical style in conveying medical information is not unusual.... It reflects the kind of technical, scientific writing with which most health professionals are comfortable and familiar. It uses the passive voice, deals with facts rather than feelings, and is concerned primarily with transmitting information rather than experience.

J. Wood Catano, "An Assessment of the Readability of Patient Education Materials Used by Genetic Screening Clinics," in Research Volumes of the Commission, 1993.

One of the characteristics affecting patients' understanding of the information materials was the general style of the writing. Our analysis showed that most information about IVF was written in a very clinical and directive style, inadvertently conveying the message that patients could not hope to understand this complicated treatment, but should in any case comply with the directions of clinic staff. Our analysis concluded that a more informal and less directive style would be easier for most patients to understand and would reflect a commitment by clinics to promoting patients' informed choice.

Although every question patients might have cannot be anticipated and answered in written materials, written information should answer the basic questions about treatment. Gaps in existing research, evaluation, and record keeping may make it impossible to provide full information in all areas, but where information needs cannot be met, materials written for patients should state explicitly that reliable data are not available. Therefore, the Commission recommends that

115. The Assisted Conception Sub-Committee of the National Reproductive Technologies Commission, in consultation with relevant professional and lay groups, develop standard information materials explaining IVF procedures; and that these materials be analyzed for readability, content, and non-directiveness and distributed routinely to all patients accepted into IVF programs as a basis for discussion between patients, practitioners, and counsellors. Patients should be given time to discuss and fully comprehend information materials before any treatment is initiated.

Consent Procedures

It is standard medical practice and a legal requirement to obtain consent to treatment from patients, indicating that they are fully informed about, and agree to, the treatment course outlined by the attending physician. We found no standard procedure at Canada's IVF programs for obtaining informed consent; policies vary widely from clinic to clinic. Some have detailed written consent forms for each stage or procedure in the IVF process; at the other extreme, one clinic gained written consent for only one procedure (egg retrieval), considering all others routine medical care for which consent is implied by consent to egg retrieval.

Consent procedures should entail the following elements or criteria:

- the patient must be legally competent to consent to treatment;
- the patient must possess the mental capacity to authorize care;
- the patient must receive proper disclosure of information from the caregiver;
- the authorization should be specific to the procedure to be performed;
- the patient should have an opportunity to ask questions and to receive understandable answers;
- the authorization obtained should be free of undue influence and coercion; and
- the authorization obtained should be free of misrepresentation of material information.

**Types of Consent Forms Completed by
IVF Patients***

- ▲ Authorization for surgery (standard consent form)
- ▲ Consent to drug therapy
- ▲ Consent for results of treatment to be used in a study/trial of treatment
- ▲ Consent to IVF (verifies that alternatives have been considered and patient is free to withdraw from treatment at any time)
- ▲ Consent to egg retrieval
- ▲ Consent to cryopreservation and disposition of embryos (outlines clinic's protocols with respect to embryos)
- ▲ Authorization for embryo transfer
- ▲ Authorization for release of information (for research)

* Not all forms are completed by all patients; consent procedures and forms vary from clinic to clinic.

Although the Commission's survey of IVF patients showed that they were more likely to experience a rigorous consent procedure than were patients undergoing other types of treatment, the consent forms they were given were difficult to read and understand. The forms used by four programs (4 of 16) were rated as requiring at least one graduate degree to understand, while six others were rated as requiring at least two years of post-secondary education. It was also disturbing that many of the forms required patients to consent to procedures that were not explained in the information materials provided. In addition, few patients were told that

consent could be withdrawn at any time, nor were they given copies of the signed consent forms. Therefore, the Commission recommends that

116. The Assisted Conception Sub-Committee of the National Reproductive Technologies Commission develop standard patient consent materials to be distributed routinely to all patients accepted into IVF programs as a basis for discussion between patients, practitioners, and counsellors.

117. Patients should be given time to discuss and fully comprehend the meaning and implications of consent to treatment before any treatment is initiated. They should be given copies of all consent forms they sign and should be informed of their right to withdraw consent at any stage of treatment without jeopardizing future care or treatment.

and that

118. Adherence to these standards should be a condition of licence for facilities offering IVF.

Counselling

Counselling is a central issue in the provision of infertility treatment. Although two-thirds of IVF programs have a counselling specialist on staff, such as a psychologist or social worker, the patients we surveyed found this aspect of their experience at the clinics the least satisfying. They told the Commission that they would have liked more counselling, especially during and after treatment.

Most of the information gathered by the Commission indicates that the majority of IVF clinics use the terms "counsel" and "educate" interchangeably. In some clinics, the role of "counsellor" was filled by in-house doctors, nurses, and administrators. It was not clear whether any of these staff members had specialized training in infertility or medical counselling.

Some of the clinics indicated that they would refer couples to outside counselling if it was requested, if staff members observed "inappropriate" behaviour during treatment, or if a history of physical or sexual abuse was

suspected. Other clinics organized self-help groups for patients and encouraged patients to contact local or national infertility support groups.

Most programs offered professional counselling only when the patient requested it specifically, but one clinic reported that 94 percent of IVF patients took advantage of professional counselling when it was offered. The Commission's survey of patients indicated a similar desire for counselling; patients told the Commission they wanted more time to discuss their treatment with physicians or professional counsellors. In particular, post-treatment counselling was identified as important; 80 to 91 percent of those who did not receive post-treatment counselling would have wanted it. Many patients would have liked more counselling both during and after treatment; only 35 percent were satisfied with the counselling they received, and only 31 percent were satisfied with the counselling offered to their partners.

As we have recommended elsewhere, supportive counselling should be available on referral from infertility clinics if a social worker/counsellor is not attached to the clinic. The Commission therefore recommends that

119. Counselling be an integral part of assisted conception services and be offered either on-site or by referral to appropriate professionals.

and that

120. Standard written materials to be used in counselling be developed and made available by the Assisted Conception Sub-Committee. These materials should include information about alternatives to medical treatment, such as adoption and living without children; avoiding exposure to risk factors that could affect the results of treatment (for example, smoking); some exploration of questions related to values and goals that patients may wish to factor into decisions; and the physical and psychological effects of treatment.

Access to Treatment

Two factors that could constitute barriers to IVF for some people are the cost of treatment and the location of IVF programs. Our recommendations with respect to the inclusion of IVF in provincial health care systems for diagnoses for which it has been demonstrated effective will go some way toward addressing the financial barriers to access. Even when

a service is insured, however, other costs are involved, such as unpaid time away from work, travel, and accommodation costs, the costs of related services or treatments (particularly drugs), and so on. Canada is a large country; it is not appropriate that highly specialized services such as IVF be provided in every area, and, consequently, a service may not be available close to a prospective user. Some provinces are taking measures to assist in this regard when people live in remote communities. As Canadians pointed out in our public hearings, however, cost and distance are not the only barriers.

Two other types of potential barriers to access to new reproductive technologies emerged in our hearings and research. The first were criteria used by the clinics themselves to refuse treatment. We found that possible and probable reasons for refusing IVF treatment varied from clinic to clinic. Some of these criteria may be appropriate, given that age, diagnostic category, duration of infertility, and other characteristics may affect the results of treatment. However, other reasons given by clinics for refusing treatment bear no relation to the likelihood of having a child (see Table 20.5).

Table 20.5. Possible or Probable Reasons Clinics Would Refuse Patients for IVF Treatment, 1991

| | Teaching hospital (11) | Private and other (5) |
|----------------------------|---------------------------|--------------------------|
| Doubtful parenting ability | 8 | 3 |
| Psychological immaturity | 5 | 3 |
| Unmarried (with partner) | 0 | 0 |
| Unmarried (no partner) | 7 | 3 |
| Lesbian | 7 | 2 |
| Below average intelligence | 2 | 1 |
| Physically disabled | 3 | 2 |
| Other living children | 2 | 1 |
| Low income | 1 | 0 |
| Province of residence | 1 | 1 |
| Country of residence | 1 | 1 |
| Other | 2 | 1 |
| Not stated | 1 | 0 |

Source: Stephens, T., and J. McLean. "Survey of Canadian Fertility Programs," Table 16. In Research Volumes of the Royal Commission on New Reproductive Technologies, 1993.

In the Commission's estimation, policies and guidelines should not be arbitrary, they should be applied to everyone equally, and they should not be misused in a discriminatory way to deny services. Lack of a partner, sexual orientation, or disability should not be reasons in and of themselves to deny access, yet, as Table 20.5 shows, they clearly are in some clinics.

If a woman is diagnosed as having bilateral tubal blockage, we have recommended that she have access to IVF to treat it. As with any other medical service provided through the publicly funded health care system, this would be available whether she is married or single, heterosexual or homosexual. However, as the diagnosis of tubal blockage is usually made following a failure to conceive by natural means, it is likely that very few women not in heterosexual relationships would be aware that they have this problem. It is theoretically possible that a woman would find out, for instance, following failure to conceive using donor insemination, and in such a case there are no grounds for denying a single woman or a lesbian access to IVF using donor sperm as a medical treatment available to any woman with this diagnosis.

The second category of potential obstacles consists of factors in the health care delivery system that make gaining access to infertility services more difficult. For example, Canadians whose first language is neither English nor French may be reluctant to approach an infertility treatment program, or less likely to be able to make fully informed decisions if they do, if services are not designed with the pluralistic nature of Canadian society in mind. Similarly, level of education influences income, awareness, empowerment, and other attitudes and characteristics. These characteristics are significant factors in allowing people to negotiate the complex and unclear route to new reproductive technology services and therefore in gaining access to them.

Workplace policies can also influence access to services depending on whether paid sick leave or vacation leave is available and whether sick leave can be used when undergoing infertility treatment; the degree of flexibility in work schedules and the amount of time off that can be taken, when it can be taken, and how much notice is required; and the existence or nature of employer-sponsored supplementary health insurance (to cover services and drugs not included under public health insurance).

Admission policies are set by IVF clinic directors and treatment teams, and individual cases are usually decided upon by the attending physician and the rest of the treatment team. Our review of current practices showed that admission policies set by clinics do present barriers to treatment and that they vary from clinic to clinic. We found that speed of access to IVF also varies widely across Canada; private clinics and four of the five non-teaching hospitals had no waiting list at all. Patients at most (16 of 20) teaching hospitals, however, could expect to wait at least a week for an initial appointment, and five hospitals reported waiting lists of 30 weeks or more for treatment. Close to half the programs (7 of 16) told the

Commission, however, that they turned away fewer than 5 percent of applicants in 1991. Only one clinic reported that more than 10 percent of applicants were turned away. Most programs told applicants who were refused treatment about other clinics — referral to U.S. clinics was almost as common as referral to other Canadian programs. Six clinics said they did not refer to other programs.

Clinics told us that they accepted patients who had been infertile for varying lengths of time. Couples with a clear diagnosis of the cause of their infertility were accepted right away, but for couples with no clear diagnosis (about 20 percent of IVF patients have “unexplained” infertility), some clinics would allow admission after one year of infertility, while others accepted patients only after three years of infertility. Although most programs considered previous fertility treatment (fertility drug treatment or assisted insemination using the partner’s sperm) before deciding to admit a patient to the IVF program, there were few fixed criteria in this regard. If there was no clear diagnosis — and if drugs or insemination with the partner’s sperm had not worked — some clinics offered IVF as a method that might enable the couple to have a child related to them both.

Many groups and individuals told the Commission that upper middle class, well-educated, married couples are more likely than other people to use IVF treatment. The Commission’s survey of patients based on voluntary return of questionnaires confirmed this. Of the 750 IVF patients surveyed by the Commission, 66 percent were employed full-time, 41 percent had professional occupations (compared with 31 percent of the general population), and 80 percent had annual family incomes over \$50 000 (compared to 33.3 percent of the general population).

The Commission believes that no medical treatment offered through the publicly funded health care system should be limited to a select group of people. Although physicians may encounter instances where non-medical factors mean it is appropriate to refuse access, these instances should be rare, and the use of discriminatory criteria such as marital status, income, or sexual orientation in and of themselves to deny access violates fundamental constitutional and human rights guarantees. If the situation is one into which any child born would clearly be harmed, then a physician may in conscience refuse to provide access, but decisions about who is “worthy” of treatment should not be made in an ad hoc way using such discriminatory criteria by practitioners. The Commission therefore recommends that

121. Access to IVF treatment be determined on the basis of legitimate medical criteria, without discrimination on the basis of factors such as marital status, sexual orientation, or economic status.

Referring Physicians

The physicians practising in the community — family or general practitioners and obstetricians/gynaecologists — are relevant to our consideration of the issues surrounding IVF for two reasons. First, these are the physicians usually consulted first by couples having difficulty conceiving. The doctor may offer to prescribe fertility drugs or to refer the couple to an infertility specialist or facility. We dealt with the issue of fertility drugs in an earlier chapter (see Chapter 18). Here we are concerned with referral practices.

Our survey showed that twice as many patients reach a fertility clinic on referral from a gynaecologist as from a general practitioner (see Table 20.6). Patients are likely to have seen several different physicians before entry into an IVF program; sometimes they are referred from one professional to another over a period of years before they receive a firm diagnosis. In the Commission's survey of patients, 86 percent had attempted previous fertility treatments before being admitted to an IVF program.

Table 20.6. Source of Referral to Clinic* (Sample Size 750 IVF Patients)

| | |
|---------------------------------------|-----|
| Family physician/general practitioner | 25% |
| Gynaecologist | 52% |
| Self-referred | 19% |
| Spouse/partner | 7% |
| Friends | 8% |
| Other family member | 4% |
| Other specialist | 2% |
| Other fertility clinic | 4% |
| Other | 1% |

* Multiple responses were possible.

Source: SPR Associates Inc. "An Evaluation of Canadian Fertility Clinics: The Patient's Perspective," Figure 3.3. In Research Volumes of the Royal Commission on New Reproductive Technologies, 1993.

Shuttling patients needlessly from professional to professional is stressful and wastes valuable time and resources. It is doubly important, then, that gynaecologists and family practitioners have adequate information about the management of infertility, how to evaluate fertility effectively through history, examination, and infertility investigation, and how to assess whether referral to a fertility program is indicated. The

Commission endorses the model for general practitioners proposed by the British Royal College of Obstetricians and Gynaecologists, which outlines the steps in evaluating fertility and the circumstances under which a referral to a fertility specialist is indicated. This useful guide sets out the steps involved in diagnosing infertility, the various risk factors for infertility, and the types of treatments available. It also provides guidance on counselling infertile patients. We find the model to be clear and logical and that it promotes responsible use of resources by discouraging premature or unnecessary referrals while ensuring a rational step-by-step approach to investigating and treating infertility. Such a guide may also be useful to those practising obstetricians and gynaecologists not focussing on infertility. The Commission therefore recommends that

122. A practical referral guide for general practitioners, modelled on that of the British Royal College of Obstetricians and Gynaecologists, be developed by the College of Family Physicians of Canada.

and that

123. The guide be distributed widely and that knowledge of its content be examined in qualifying examinations for family practitioners.

Priorities for IVF Research

Fallopian tube blockage is the only indication for which IVF has been demonstrated effective; the evidence now available is insufficient to permit a determination of effectiveness for all other uses. Any use of IVF to treat other diagnoses must, therefore, be done only in the context of research, so that these uses can be evaluated further in well-designed research studies before being considered for inclusion in the health care system as medical treatment.

Several factors differentiate clinical trials from standard medical services. In particular, clinical trials require prior ethical review, a more rigorous consent procedure for patients, and funding from research agencies, as opposed to health care budgets. Commissioners believe that any clinical trials done with the participation of licensed clinics should be funded at arm's length from organizations with a vested interest in the results (for example, pharmaceutical companies).

The Medical Research Council already has guidelines for research involving human subjects, which include, among other aspects, full disclosure of the nature of the research and counselling about the known and potential risks of the experimental treatment, leading to informed consent on the part of participants. The clinical trials necessary to assess the effectiveness of IVF treatment for diagnoses other than tubal blockage should comply with these guidelines.

As IVF and related technologies have developed, they have sometimes been referred to as "innovative therapy." In the Commission's view, this is misleading to prospective patients. A procedure is not "therapy" unless it has been shown to be of demonstrable benefit; experimental treatments should not move from the realm of research to the realm of therapy unless and until effectiveness and risks have been identified. Providing treatment under the guise of "innovative therapy" thus has two undesirable consequences, both arising from the fact that it involves the provision of experimental treatment outside the context of research, with its concomitant standards and protections for research subjects.

First, "innovative therapy"

may expose women to risk without their full awareness that the treatment is not of proven benefit and may have unknown risks. Second, "innovative therapy," provided in an ad hoc way by individual practitioners working independently, will never generate the answers patients, practitioners, and policy makers need about the effectiveness and risks of treatment; thus, it creates a situation where women are being exposed to risk, some-

times unknowingly, without the data being gathered that could, when aggregated with data on others, provide the knowledge on which to base evaluation or further refinement of the technology. In the Commission's view, therefore, if IVF and related technologies are to be provided ethically and beneficially, this must be either as treatment or as research, depending on the current state of the evidence. The rubric "innovative therapy" must not be allowed to obscure this fundamental means of protecting the health and well-being of women and children.

As to the form this research should take, the Commission sees the development of multicentre randomized control trials as one essential approach to clarify the effectiveness of IVF for diagnostic categories other than tubal blockage, and to ensure progress in the field while minimizing unnecessary exposure to risk. These trials will help to ensure that couples

The Commission sees the development of multicentre randomized control trials as one essential approach to clarify the effectiveness of IVF for diagnostic categories other than tubal blockage, and to ensure progress in the field while minimizing unnecessary exposure to risk. These trials will help to ensure that couples with negligible chances of success do not waste precious time, energy, and resources on IVF or incur the risks without a probability of benefit.

with negligible chances of success do not waste precious time, energy, and resources on IVF or incur the risks without a probability of benefit.

One priority for research is whether IVF and GIFT are effective treatments for couples with unexplained infertility of more than three years' duration. Preliminary results indicate this may be the case. Although the conventional wisdom among practitioners currently favours GIFT, there is in fact no concrete evidence demonstrating that it is more effective than IVF — or, indeed, than no treatment at all — in increasing the likelihood of pregnancy in cases of unexplained infertility. Therefore, the Commission recommends that

124. IVF and GIFT be evaluated for the treatment of three-year unexplained infertility in the context of a randomized control trial organized by licensed IVF clinics, facilitated by the Assisted Conception Sub-Committee of the National Reproductive Technologies Commission and funded by provincial/territorial ministries of health.

Although gamete intrafallopian transfer is contra-indicated in cases of tubal disease because of poor tubal function and the risk of ectopic pregnancy, after reviewing the evidence the Commission believes that a priority for research should be to determine the effectiveness of GIFT and the related technologies ZIFT and DOST for unexplained infertility. Preliminary results indicate they may be promising, and the Commission therefore recommends that

125. Randomized control trials be organized by licensed IVF clinics, facilitated by the Assisted Conception Sub-Committee of the National Reproductive Technologies Commission and funded by provincial/territorial ministries of health, to investigate the effectiveness of gamete intrafallopian transfer and zygote intrafallopian transfer as treatments for unexplained infertility.

Using the criteria outlined earlier, there is not enough evidence to conclude whether IVF is effective or ineffective as a treatment for minimal, moderate, or severe endometriosis, unless the disease has resulted in blockage of the fallopian tubes. More data are needed before IVF can be

assessed as a treatment for infertility associated with endometriosis. Therefore, the Commission recommends that

126. IVF for the treatment of minimal, moderate, and severe endometriosis that has not resulted in fallopian tube blockage be evaluated in a randomized control trial organized by licensed IVF clinics, facilitated by the Assisted Conception Sub-Committee of the National Reproductive Technologies Commission and funded by provincial/territorial ministries of health.

There is no evidence that IVF is an effective treatment for ovulation disorders, and it is not biologically plausible that IVF would overcome a problem with ovulation — rather, appropriate diagnosis of hormonal problems and relevant fertility drug treatment make sense. IVF for infertility resulting solely from ovulation disorders is not a treatment that has been shown to be effective, it is not promising for the reasons just discussed, and it should not therefore be a priority for research.

We found that there is insufficient evidence to categorize IVF as either an effective or an ineffective treatment for cases in which the male partner has oligospermia (low sperm count). Further, it is not biologically plausible that IVF would overcome male-factor infertility, as the sperm must have the capacity to fertilize, whether *in vitro* or *in vivo*. Given as well the paucity of data demonstrating benefit, the Commission concludes that *in vitro* fertilization should not be offered as a treatment in cases of oligospermia. This conclusion is beginning to be recognized in practice — at least one major Canadian centre does not offer IVF if the male partner has a sperm count under 5 million, because the probability of fertilization is too low. We consider the procedure to have relatively little promise in such cases. It is not a treatment, and it should not be a priority for research.

Micromanipulation of the egg is currently being explored as a means of increasing the effectiveness of IVF in cases of oligospermia; micromanipulation (of necessity, in combination with *in vitro* fertilization) is of unproven benefit in such cases. Its risks are unknown, as relatively few live births have been documented to date. Although we recognize the possibilities offered by micromanipulation, the techniques may pose risks. It is possible, for example, that micromanipulation may allow sperm with deficiencies to fertilize an egg or may cause subtle damage to the egg, with long-term consequences for any resulting child. Nevertheless, given the

potential of micromanipulation to be an effective treatment in cases of oligospermia, the Commission recommends that

127. Research and evaluation of micromanipulation of eggs be conducted under strict research protocols. Outcome studies on primates should be available before such research studies are considered in human beings. Any such studies should be conducted only at a licensed IVF facility and should be reviewed and approved by local research ethics boards, and by the Embryo Research and Assisted Conception Sub-Committees of the National Commission working in concert.

Health Insurance Coverage

We have recommended that IVF be offered as treatment only in cases of tubal blockage; for other diagnoses it should be offered only in the context of research because it is not a treatment of proven benefit. It is possible, however, that IVF will be demonstrated effective through multicentre clinical trials, at acceptable levels of risk for indications other than tubal blockage; thus, the issue of whether IVF should be an insured service for a greater range of indications will arise again. When we considered the arguments for and against public health insurance coverage of IVF, two major considerations emerged: the arbitrary nature of existing criteria for public health insurance coverage, and the implications of a two-tier private/public health care system.

Criteria for Coverage

The Commission examined a range of medical procedures to determine whether there are common criteria determining which are insured and which are not. We found many unexplained discrepancies: some elective services are insured, while others are not. Some very high risk treatments are covered, while others are labelled “experimental” and are not covered. Some insured services have very low rates of effectiveness — many much lower than IVF — and many were insured without any evidence that they were effective at all. Our most disturbing finding about public health insurance coverage, however, is that once a treatment becomes an insured service, it is extremely difficult to remove it from the list of insured services

— even when the evidence shows subsequently that it is ineffective, excessively expensive relative to its effectiveness, or dangerous.

Health economists often evaluate medical services by examining their cost per quality-adjusted life year (QALY): that is, the cost of the service is divided by the number of years the procedure adds to the patient's life, adjusted to take into account whether the patient was pain-free and mobile during those years. Such measures provide a basis for evaluating emerging technologies relative to traditional treatments (although they may not be suitable for evaluating IVF). Some procedures have a very high cost per QALY but are nevertheless used extensively and frequently.

Given the current cost pressures on the health care system, and given its capacity to expand indefinitely in response to the availability of new treatments if rational limits are not set, our findings with respect to IVF indicate that the provinces would benefit from a re-evaluation of their current criteria for extending health insurance coverage generally. Technology assessment and cost-benefit analyses have proven very effective in determining the relative value of medical procedures and would constitute valuable input to future decisions about which services should be insured. Commissioners therefore believe, and we have recommended with respect to research on IVF, that provinces fund studies to generate data on which to base such decisions and ensure that they will be in the best interests of Canadians.

Dangers of a Two-Tier System

To help guide the policy makers who will make decisions about extending public health insurance coverage to IVF for tubal blockage and funding clinical trials of IVF for other diagnoses, it is instructive to examine the alternatives to public funding. Many of those who believe that we cannot afford to provide infertility treatment within the health care system have suggested that private clinics could step in to provide such treatments. This is the situation that has developed in the United States and some other countries, where IVF is provided primarily by this method. Even in Canada there are now four private IVF clinics in existence.

The Commission has serious ethical and public policy objections to the establishment of a parallel system for providing IVF or, indeed, other medical procedures.

The Commission has serious ethical and public policy objections to the establishment of a parallel system for providing IVF or, indeed, other medical procedures. First, there can be no such thing as a purely private system. As we discussed in Chapter 4, the publicly funded system unavoidably ends up bearing financial costs generated by the private system, with no means of recovering those costs from the private system.

This means that the existence of a parallel private system leaves the public system without control over its costs. The nature and number of privately provided services are determined solely by the private providers, but they have unavoidable consequences for the publicly funded system, which has no way of controlling them in light of its own priorities or spending constraints. This is precisely what is happening with private IVF provision in Britain; it has the potential to happen in Canada as well if policy makers are not vigilant.

IVF service delivery in Ontario is in some ways an instructive case of how private health care affects the public system. Patients at private IVF clinics in Ontario pay physicians directly for certain services, but physicians also bill the provincial health care plan for a wide range of related laboratory and diagnostic services. These costs include much of the fertility investigation and follow-up to IVF, such as blood tests, ultrasound, and laparoscopies. The line between investigating infertility and treating it is vague and is left to the physician to determine. In addition, the public system bears the cost of treating adverse health affects resulting from IVF — the extra pregnancy monitoring and delivery care needed for the more frequent premature and multiple births and the subsequent cost of neonatal care. These costs, while significant, are short-term costs. There are also longer-term costs that arise from private provision of IVF. For instance, chronic disease or disability in low birth weight children resulting from IVF pregnancies also generates ongoing costs to the public purse. The key point, however, is that the public system is obliged to cover these costs without having any control over the number or nature of the procedures that generated them in the first place.

In summary, a great deal of the cost of IVF is already being funded by provincial health plans, whether the procedure itself is performed in a public or a private setting. The “private” clinics are never truly outside the public system and can operate only because part of their cost of doing business is subsidized by these additional payments from the public system. Moreover, the training of personnel for these clinics (physicians, nurses) is heavily subsidized by society.

If the amount charged to patients at private infertility clinics reflected all costs actually involved in the provision of treatment (including training of personnel; laboratory tests and other diagnostic procedures; and the additional costs of health care arising from complications, multiple births, and other consequences of the provision of treatment), the cost would be so prohibitive as to discourage clinics from opening. Fees would have to be set so high that very few prospective patients would be able to afford them.

The existence of private IVF clinics also gives rise to other concerns. The three private clinics in Ontario — Toronto Fertility Sterility Institute, C.A.R.E. Centre (Mississauga and its affiliated referral centre in southern Ontario), and IVF Canada (Scarborough) — are owned and operated by physicians. Studies have shown repeatedly that physician ownership of medical facilities providing services increases the use of services when the

physician is in a position to recommend to patients that they need these services. This increases the cost of care substantially, while the quality of care has been observed to stay the same or decline. Although no studies have examined IVF clinics specifically, evidence from several other fields of medicine indicates that physician ownership of health care facilities has generally negative consequences.

If the amount charged to patients at private infertility clinics reflected all costs actually involved in the provision of treatment (including training of personnel; laboratory tests and other diagnostic procedures; and the additional costs of health care arising from complications, multiple births, and other consequences of the provision of treatment), the cost would be so prohibitive as to discourage clinics from opening.

Some of the private clinics also provide commercial laboratory services to their patients. This situation raises a conflict of interest, as well as concerns about quality control, because some such facilities do not have to be licensed. Ontario regulations, for example, do not require physicians doing simple testing procedures in their offices or testing for the sole purpose of diagnosing and treating their own patients to undergo the rigorous licensing and monitoring requirements for free-standing laboratories.

Perhaps most important, however, from the Commission's perspective is the fact that private ownership of clinics places assisted reproduction technologies in the realm of

Private ownership of clinics places assisted reproduction technologies in the realm of consumer-driven markets.

consumer-driven markets. In the Commission's view, this is inappropriate, primarily because it is at odds with the principle of non-commercialization of reproduction, one of our guiding principles. Commercialization also leads to inequality because only those who can afford it have access. Access to safe and effective procedures should not be determined by ability to pay; having children is too important in people's lives to allow such a situation to persist.

If a technique is of benefit, it should be available to Canadians on an equitable basis; if it is unproven, then it is in the realm of research and should not be provided as a service, but only in the context of research, with the protections of more stringent standards and informed consent inherent in research. Moreover, if treatment is being provided in the context of research, patients should certainly not be charged for it. Adopting our recommendations in this regard should protect Canadians from the potential dangers of research involving treatment of unknown benefit by ensuring that it is conducted only in the context of well-run trials that have been subject to prior scrutiny by research ethics boards — trials that will generate information of use in evaluation while minimizing risk.

In summary, the Commission sees a two-tier or mixed private/public medical care system as both inappropriate and unacceptable to the vast majority of Canadians. As we have discussed, IVF has been shown to be an effective medical treatment for one type of infertility; as such it should be offered within the public health care system, where priorities can be set, equitable access can be maintained, and standards can be promulgated and monitored. The Commission therefore recommends that

128. IVF for bilateral fallopian tube blockage be an insured service under provincial medicare programs within the regulatory framework recommended by the Royal Commission on New Reproductive Technologies.

and that

129. The province of Ontario discontinue coverage of IVF for indications other than bilateral fallopian tube blockage and that the resources now devoted to those services be reallocated to fund clinical trials of unproven but promising techniques.

Recommendations

The Commission has concluded that *in vitro* fertilization should be offered as treatment only for indications for which it has been proven effective. To date, this includes only one category of infertility disorders — those involving complete blockage of the fallopian tubes. We have recommended clinical trials and evaluation of other uses of IVF, or variations of IVF technology, before they can be considered for introduction as services. We have identified those we consider to be of highest priority for such trials.

We have shown the need for rigorous and thorough data collection on outcomes to enable development and refinement of clinical standards in response to findings. We have also shown that no mechanism exists to collect these data on a continuing basis, despite the dedicated efforts of some physicians and organizations such as the Canadian Fertility and Andrology Society and the Society of Obstetricians and Gynaecologists of Canada. The guidelines for practice they have developed are simply not being adhered to in some cases, nor are clear and standard definitions being used to record and collect data, thus making it very difficult to

compare or aggregate data from different clinics. Our investigation also revealed wide variations in standards and practices; voluntary self-regulation has not led to consistency of standards and practice in the treatment community, but rather to practice ranging from excellent to completely unacceptable.

We have also shown the need for ongoing evaluation of the results of IVF treatment across the country. The great inadequacy of current record keeping makes it necessary to require that all clinics and practitioners conform to specified guidelines and standards as a condition of obtaining and maintaining a licence to offer IVF services. In our view, the experience with IVF in Canada to date demonstrates that a voluntary system is not adequate to protect the well-being of Canadians; instead, the standards developed and established by practitioners must become part of the licensing conditions under which IVF practice will be permitted.

Finally, we found that the criteria used to limit access to IVF treatment differ from clinic to clinic and that those who are admitted to IVF programs are not always given the information and support they need to make informed choices about their treatment. To provide a good standard of care for IVF patients, clinics require not only highly trained medical and technical personnel, but also access to a range of other specialized personnel, including individuals with psychosocial counselling expertise. Our data show wide variations in the quantity and quality of information, counselling, and consent procedures, with the result that patients' needs may go unmet.

We have examined the resource implications of offering IVF as an insured medical treatment and judge that in cases of diagnosed bilateral fallopian tube blockage, coverage of IVF as a medical service under provincial health insurance plans is justified. Other uses of IVF should be evaluated for effectiveness before being considered for public health insurance coverage. We also believe that IVF should not be offered except through the public health care system. To permit the development of a parallel private system would put serious burdens on the public system, as well as violating principles of equality and non-commercialization of reproduction.

We recognize that some of our recommendations set a more rigorous standard for IVF than exists in many other areas of medical practice. This is clearly necessary, however, given the nature and goals of infertility treatments, the fact that they are intended to influence human reproduction, their many social implications, the vulnerability of participants, and the need to consider the potential effects on children and on future generations — all these factors justify rigorous standards of practice and care. At the same time, the standards we recommend are entirely achievable. This approach could also be applied to other areas of health care, particularly in emerging areas of medical technology but also in long-established areas of practice. Indeed, in our view, assuring the

health and safety of Canadians and the integrity of the health care system requires such an approach.

Licensing Requirements for Assisted Conception Services*

The Commission recommends that

- 130. The compulsory licensing requirements for assisted conception services apply to any physician, centre, or other individual or facility providing any of the following services or any other service related to assisted conception:**
- *in vitro* fertilization (IVF);
 - embryo transfer (either to the woman who was the source of the egg giving rise to the embryo or to another woman);
 - gamete intrafallopian transfer (GIFT);
 - zygote intrafallopian transfer (ZIFT);
 - preimplantation diagnosis;
 - insemination at sites other than the vagina; and
 - direct egg/sperm transfer (DOST).
- 131. Providing assisted conception and related services without a licence issued by the National Reproductive Technologies Commission, or without complying with the National Commission's licensing requirements, constitute an offence subject to prosecution.**

* The following section contains only those recommendations related to the proposed licensing scheme. Recommendations not related to licensing appear only in the body of the text, while some licensing recommendations appear both in the text and in the following listing. The goal was to enable the reader to see the licensing regime in its entirety and also to have recommendations follow on from their rationale in the text where necessary.

132. The Assisted Conception Sub-Committee of the National Reproductive Technologies Commission develop standards and guidelines to be adopted as conditions of licence, with input from relevant professional bodies and individuals and groups representing patients and other key sectors of the community. The recommendations of the Royal Commission on New Reproductive Technologies should serve as a basis for these guidelines.

133. Only drugs and procedures of proven effectiveness for the infertility condition in question should be offered as treatment. Procedures whose effectiveness has not yet been clearly established should be offered only in the context of clinical trials.

134. Guidelines for determining which drugs and procedures are of sufficiently proven effectiveness to be offered as treatment (by indication), and which interventions require further research, should be established by the Assisted Conception Sub-Committee of the National Reproductive Technologies Commission, in consultation with relevant professional bodies and other interested groups.

135. In particular, the following treatments shown as being of unproven effectiveness should not be offered except in the context of research, unless or until their effectiveness is established:

- **IVF (for any indication other than complete tubal obstruction);**
- **GIFT;**
- **ZIFT; and**
- **DOST.**

and that

136. Drugs and procedures now in use that are of unproven benefit should be offered only in the context of multicentre clinical trials. The Assisted Conception Sub-Committee should facilitate participation by licensed centres in such trials, which should have prior research ethics board approval. Funding from provincial/territorial ministries of health would be desirable for those trials designated as of highest priority. Projects involving the micromanipulation of eggs should also have express approval of the Assisted Conception Sub-Committee in concert with the Embryo Research Sub-Committee of the National Commission.

Conditions of Licence Applicable to Assisted Conception Services

The Commission recommends that

137. Assisted conception services should not be offered without assessment of the male as well as the female partner to determine the probable cause of infertility.

138. IVF should be offered only after less intrusive and costly options have been discussed and considered.

139. Sperm for use in assisted conception services (with the exception of the partner's) must be obtained from a licensed facility, as outlined in our recommendations on assisted insemination.

140. IVF should be offered as treatment only in cases of diagnosed bilateral fallopian tube blockage, and tubal surgery should not be a precondition for IVF in such cases.

141. IVF treatment should not be offered to women who have experienced menopause at the usual age.

142. Treatment should be offered only after counselling regarding behaviours or personal habits that could render successful treatment less likely.

143. A maximum of three zygotes should be transferred to a woman's uterus in any IVF attempt, in order to minimize the risk of multiple pregnancies.

144. Any proposal to use preimplantation diagnosis on zygotes should be approved by the Assisted Conception Sub-Committee in consultation with the Prenatal Diagnosis and Genetics Sub-Committee, and no proposal should be approved for preimplantation diagnosis to determine the sex of the embryo for non-medical reasons.

Impermissible Barriers to Treatment

145. Access to IVF treatment should be determined on the basis of legitimate medical criteria, without discrimination on the basis of factors such as marital status, sexual orientation, or economic status.

Patient Information, Consent, and Counselling

146. Standard information materials and consent forms should be developed by the Assisted Conception Sub-Committee in consultation with professional, patient, and other interested groups and distributed by licensed centres to all persons contemplating or receiving assisted conception services.

147. Information materials should include clear information on the nature of the proposed treatment and its alternatives; the nature and probability of known and possible consequences of the procedure; and the costs of treatment.

148. Consent forms should identify fully the specific procedures and treatments being consented to, including egg retrieval and fertilization, zygote cryopreservation, embryo transfer, zygote donation to another recipient, donation for research, or disposal.

149. Patients should be given time to discuss and fully comprehend consent forms, which should be signed by the patient before any treatment is initiated.

150. Patients should also be informed of their right to withdraw consent at any stage of treatment, without affecting their access to future care or treatment in any way.

151. Counselling should be an integral part of assisted conception services and should be offered either on-site or by referral to appropriate professionals. Standard counselling materials should be developed by the Assisted Conception Sub-Committee and should include information about alternatives to medical treatment such as adoption and living without children; avoidance of exposure to risk factors that could affect the results of treatment (for example, smoking); some exploration of questions related to values and goals that patients may wish to take into account when making their decisions; and the physical and psychological effects of treatment. Specific additional counselling materials for donors and recipients of eggs and zygotes should also be offered.

Calculation of Clinic Success Rates

The Commission recommends that

152. Clear definitions for rates of pregnancy and live birth rates per treatment cycle initiated, by categories of indication, should be specified by the Assisted Conception Sub-Committee as the basis upon which licensed facilities would submit data annually.

153. All information provided to prospective patients about clinic rates for live birth or pregnancy per treatment cycle initiated should be based on clear and standard definitions established by the Assisted Conception Sub-Committee.

Non-Commercialization of Assisted Conception Services

The Commission recommends that

- 154. Assisted conception services should not operate on a for-profit basis.**

Reporting and Record Keeping

The Commission recommends that

- 155. Licensed assisted conception services should report to the National Reproductive Technologies Commission on their activities in a standard form, annually and in the event of any change (such as the departure or replacement of qualified personnel) substantially affecting the conditions of licence.**

and that

- 156. In particular, the following be reported annually to the National Commission:**
- **data to allow rates per treatment cycle initiated and by diagnostic category to be established for the following outcomes: biochemical pregnancy, clinical pregnancy, live birth (number of confinements as well as number of individuals born), stillbirth, and ectopic pregnancy. Information on pre-term birth, birth weight, and congenital anomalies should also be submitted;**
 - **written diagnostic criteria should be developed by the Assisted Conception Sub-Committee and be used by clinics to allocate patients to diagnostic categories for purposes of data reporting;**
 - **frequency of pregnancies in patients on the waiting list; and**
 - **social and geographic categories of data.**

157. Confidential records should be kept on individual cases, including patient history, examination, investigation, procedures, operations, and treatments.

Licence Renewal and Revocation of Licences

The Commission recommends that

158. Licensed assisted conception facilities be required to apply to the National Commission for licence renewal every five years. At the outset, the Commission should grant licences of varying duration, so that applications for five-year licence renewals would be staggered over several years.

and that

159. Assisted conception licences be revocable by the National Commission at any time for breach of conditions of licence.

The Role of the Assisted Conception Sub-Committee

The Assisted Conception Sub-Committee would be established and chaired by the National Reproductive Technologies Commission. As discussed in Chapter 5, it would be one of six permanent sub-committees, along with those dealing with infertility prevention; assisted insemination services; prenatal diagnosis; embryo research; and the provision of fetal tissue for research and other designated uses. Like the other sub-committees, the Assisted Conception Sub-Committee should include both National Commission members and non-members, and, like the National Reproductive Technologies Commission itself, at least half the members of the sub-committee should be women. All sub-committee members should be chosen with a view to ensuring that they have a background and demonstrated experience in taking a multidisciplinary approach to issues, as well as an ability to work together to find solutions and recommend policies to address the issues surrounding assisted conception in a way that meets the concerns of Canadian society as a whole.

The Assisted Conception Sub-Committee would have several functions. It could decide to establish ad hoc working groups to deal with one or more of these functions, if appropriate:

- Setting and revising, from time to time, the licensing requirements for individuals and centres providing assisted conception services (including staff qualifications and expertise; guidelines for recognized and experimental procedures; protocols for prescribing drugs to patients undergoing fertility treatments; record keeping and reporting requirements; etc.), to be applied through the National Reproductive Technologies Commission hearing process. As noted earlier, relevant professional associations, patient, and other interested groups would have input into this process.
- Developing standard information materials, counselling materials, and patient consent forms to be used in the provision of assisted conception services.
- Monitoring the assessment and introduction of new assisted conception technologies; advising on which clinical trials are most urgent; and facilitating and funding, or coordinating provincial/territorial funding, for such trials.
- Developing guidelines and standardized definitions for the collection and reporting of data on the results of treatment.
- Gathering relevant country-wide data and information about facilities, technologies, and practices, consistent with the registry model proposed by the International Working Group for Registers on Assisted Reproduction. This information will serve as a basis for the Sub-Committee's guideline- and standard-setting activities. It will allow evaluation of long-term health outcomes for women using assisted conception and related drugs and services, and for children born as a result of such technologies. It will also be of use to the provinces in their planning and resource allocation decisions, and to medical and other researchers undertaking primary and academic research in this field.
- Consulting with the provinces and territories, directly or through the Conference of Deputy Ministers of Health, on matters relating to technology assessment and the funding or provision of assisted conception services, where this is useful or necessary.
- Discussing and setting policy on new issues and dilemmas as they arise, including training and education issues, ethical and legal concerns, and international issues; monitoring practices in referral to IVF and ensuring appropriate levels of regulation on an ongoing basis.
- Providing advice, in the revised federal drug approval system, on issues relating to fertility drugs, and monitoring marketing and other activities in this sector.

- Working with the Assisted Insemination and Prenatal Diagnosis Sub-Committees on issues related to sex-selective assisted insemination and prenatal diagnosis, preimplantation diagnosis on zygotes, the implantation of zygotes subject to manipulation, and eggs subject to micromanipulation.
- Promoting public awareness and debate regarding IVF and related technologies and services in Canada, in part through the publication of the National Commission's annual report.
- Establishing protocols for screening egg donors and testing eggs for sexually transmitted diseases and other infections; developing standards and guidelines for the collection, recording, encoding, and secure storage of identifying and non-identifying egg donor information, recipient information, and information relating to children born through the use of donated eggs. (These functions are discussed in the next chapter, "Handling of Eggs and Embryos.")
- Overseeing the National Commission's information registry system relating to egg donors, recipients, and births; and establishing appropriate procedures for making such information available, pursuant to court order, in the case of emergency. (These functions are discussed in Chapter 21.)

Increasing the level of informed public debate about assisted conception technologies and services is a particularly important part of the role we foresee for the Assisted Conception Sub-Committee. Public input into the monitoring and control of assisted conception services will be promoted by the Sub-Committee's information gathering, reporting, and public consultation functions. Public accountability will also be enhanced by the composition we have recommended for the Sub-Committee, which should include members both from the National Commission and from outside the National Commission, ensuring broad representation of the various interests involved. In particular, we recommend that the Assisted Conception Sub-Committee have a multidisciplinary make-up, including membership from relevant professional bodies, federal and provincial/territorial health ministries, and individuals representing the concerns of patients and other key segments of the community, particularly women.

We are of the view that the Assisted Conception Sub-Committee's activities in regulating and monitoring technologies and practices, in gathering and disseminating much-needed information, and in bringing together the various interests involved will help to ensure that assisted conception services are delivered in a safe, ethical, and effective way, consistent with the expectations of those directly affected and of Canadian society at large.

Conclusion

The breadth and detail of the Commission's recommendations demonstrate the seriousness with which we view how IVF is being provided in Canada today. We believe that there is a place in our health care system for effective, safe infertility treatments, but that IVF as it is now being offered does not meet those criteria. We also believe that IVF has been overemphasized in terms of the resources and public policy attention devoted to it relative to other infertility treatments, such as drug therapy and assisted insemination. For example, currently at least twice as many children are born each year in Canada after assisted insemination than after IVF.

In some areas, such as the cessation of unsafe or ineffective treatments, we have called for immediate action. Our long-term goal, however, is the creation of a system in which individuals who are infertile can be helped, where possible, to conceive, with a treatment that promises the greatest chances of success based on their diagnosis and other characteristics; in which practitioners are free to practise within well-defined parameters; and in which scientists and researchers can carry out approved research to expand the boundaries of infertility treatment without harm to women. We believe that our recommendations will lead to the creation of that system; we look to governments and practitioners to implement them.

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15. Eilers, B.L., et al. "Classroom Performance and Social Factors of Children with Birth Weights of 1250 Grams or Less: Follow-Up at 5 to 8 Years of Age." *Pediatrics* 77 (1986): 203-208.
16. Porter, J.B., P.J. Manberg, and S.C. Hartz. "Statistics and Results of Assisted Reproductive Technologies." *Assisted Reproduction Reviews* 1 (1)(1991): 28-37.
17. Ibid.
18. McGuire, R. "Big Surprise; Frozen Embryos Make Better Babies." *The Medical Post*, December 1, 1992, p. 24.
19. There remains some question about the viability of cryopreserved embryos. Australian data indicate that the rate of clinical pregnancies is significantly improved when frozen and thawed embryos are implanted during natural cycles

(cited in Mullen, M.A. "The Use of Human Embryos and Fetal Tissues: A Research Architecture." In Research Volumes of the Royal Commission on New Reproductive Technologies, 1993). Past studies have indicated that frozen embryos are only half as viable as fresh. A study published in the *New England Journal of Medicine* concluded that freezing embryos significantly reduces their capacity for implantation (Levrin, D., et al. "Pregnancy Potential of Human Oocytes — The Effect of Cryopreservation." *New England Journal of Medicine* 323 (17)(October 25, 1990): 1153-56); and one researcher concluded that embryo freezing is much more difficult and time consuming and much less successful than might have been anticipated (Ashwood-Smith, M.J. "The Cryopreservation of Human Embryos." *Human Reproduction* 1 (5)(1986), p. 330).

20. Lancaster, P.A.L. "Congenital Malformations After In-Vitro Fertilisation." *Lancet* (December 12, 1987): 1392; Mills, J.I., et al. "Risk of Neural Tube Defects in Relation to Maternal Fertility and Fertility Drug Use." *Lancet* (July 14, 1990): 103-104.

21. Stephenson, P.A., and P.G. Svensson. "In Vitro Fertilisation and Infertility Care: A Primer for Health Planners." *International Journal of Health Sciences* 2 (3)(1991): 119-23.

22. American figures for 1989 show that 15.6 percent of embryo transfers resulted in the birth of a healthy baby. In Australia and New Zealand, where statistics are compiled in more detail and IVF is generally agreed to be more advanced, the clinical pregnancy rate per treatment cycle initiated was 13.4 percent, and the live birth rate per treatment cycle initiated was 9.4 percent.

23. World Health Organization. Scientific Group. *Recent Advances in Medically Assisted Conception*. Geneva: WHO, 1992, p. 53.

24. Deber, R.B., with H. Bouchard and A. Pendleton. "Implementing Shared Patient Decision Making: A Review of the Literature." In Research Volumes of the Royal Commission on New Reproductive Technologies, 1993.

25. One clinic stood out in the depth and accessibility of the information provided about other options. In addition to listing the options, their risks, and their benefits, the information materials from this clinic also instructed patients on how to arrange public, private, and international adoptions.



Handling of Eggs and Embryos



As we saw in the previous chapter, the process of *in vitro* fertilization involves removing eggs from a woman's body, fertilizing them in the laboratory, and returning the resulting embryos* to her body where, it is hoped, they will implant and a pregnancy will result. If many eggs are retrieved, or if more viable zygotes are created than can be transferred safely, the situation of "excess" or "surplus" eggs or zygotes arises. The possible uses of these eggs and zygotes raise social, ethical, and legal dilemmas that have not been adequately considered by society to date.

These possible uses of surplus eggs and zygotes include donating them to another couple who is infertile, donating them for use in research, or allowing the clinic to dispose of them. We look at the issue of embryo research in the next chapter. Our focus in this chapter, therefore, is egg and embryo donation.

While recognizing that egg and embryo donation can be beneficial for some individuals and couples who are infertile, Canadians expressed concern about aspects of these practices, such as whether the donors fully understand the implications of donation, and whether appropriate counselling and consent procedures are available.

* There is a problem with terminology, as the term "embryo" is used in different ways. In the language of biologists, before implantation the fertilized egg is termed a "zygote" rather than an "embryo." The term "embryo" refers to the developing entity after implantation in the uterus until about eight weeks after fertilization. At the beginning of the ninth week after fertilization, it is referred to as a "fetus," the term used until time of birth. The terms embryo donation, embryo transfer, and embryo research are therefore inaccurate, since these all occur with zygotes, not embryos. Nevertheless, because the terms are still commonly used in the public debate, we continue to refer to embryo research, embryo donation, and embryo transfer. For accuracy, however, we also refer to the developing entity during the first 14 days as a zygote, so that it is clear that we mean the stage of development before implantation and not later.

We also look at the issues raised by the potential to cryopreserve surplus zygotes. If a couple undergoing IVF has more eggs fertilized than they need for their current cycle, they may be able to have these surplus zygotes frozen for use in a later cycle. These cryopreservation techniques have created ethical and legal dilemmas of their own. For example, if the couple later decides they do not wish to have their frozen zygotes transferred, do they want to make them available for donation? If the couple's relationship ends, what is the status of the frozen zygotes? If the male partner dies, is it ethical to transfer a zygote later, with the resulting child to be raised by the woman? If it is the woman who dies, could the surviving male partner use the zygotes with a subsequent partner and raise the resulting child?

These concerns are discussed in the next section, where we examine what we learned about the views and attitudes of Canadians toward egg and embryo donation, and toward zygote freezing.

The Views of Canadians

The Commission heard a great deal about egg and embryo donation during its public consultation activities. Many people recognized the potential benefits of donation but were concerned about the circumstances under which donations are made and the implications of donation for the people concerned.

The Commission heard from both practitioners and individuals who are infertile, who believe that egg or embryo donation offers opportunities to help another woman or couple who is infertile in cases where a donation would be their only chance of becoming pregnant. In some cases, for example, the woman may not produce any eggs herself; in other cases, she may be at risk of passing on a genetic disease to her children. For instance, women with Turner syndrome are born with ovaries containing eggs, but the eggs degenerate before the women reach reproductive age, rendering them infertile.

In vitro fertilization, egg donation and embryo transplants are now [currently] the only forms in which Turner's syndrome women can conceive ... Not everyone with Turner's syndrome would want to go this route of egg donation and bearing children ... But there are lots of women with Turner's syndrome who have been unable to adopt because of the long waiting lists and the other various reasons that they feel that this is an option that they don't want to have the door closed on them.

D. Galszechy and S. Rowden, The Turner's Syndrome Society, Public Hearings Transcripts, Toronto, Ontario, November 19, 1990.

Canadians were concerned that women might be pressured into donating eggs. For instance, some intervenors thought that women might agree to donate eggs in the belief that access to infertility treatment would be restricted if they did not agree. The Commission heard strong representations about the need to ensure that women's autonomy is respected and that the choice to donate eggs or zygotes is made independent of treatment decisions or other factors, and with appropriate counselling and consent procedures.

The Commission also heard that a woman should not undergo the risks and discomforts of invasive procedures such as ovulation induction and egg retrieval solely for the purpose of donating the resulting eggs to someone else.

There were questions about whether donation should be anonymous, or whether women should be permitted to designate a recipient for their eggs or zygotes. Some clinics currently permit designated donation. One Canadian clinic said that it would prefer anonymous donation, but that it did not have the organization in place to facilitate this. Many concerns were raised about the future relationship between the child, the birth mother, and the donor in circumstances where the donor's identity was known to the recipient.

Still other issues were raised by the question of who receives donated eggs or zygotes. Canadians seemed to believe that donation is justified to help women who are infertile because of ovarian damage resulting from disease or medical treatment, or women at risk of passing on a genetic disease to their children. However, they had many difficulties with the question of whether post-menopausal women

should be recipients of donated eggs. Many people were concerned about women becoming parents at a later stage of life and the implications of this for the children. Others pointed out, however, that there are no barriers to

The women who are the candidates [to receive] egg donations are women who have gone through premature ovarian failure or whose ovaries have been removed, who have no possible source of eggs on their own, or women who have genetic indications, who do not wish to pass on a serious or potentially lethal genetic disorder.

M. Fluker, private citizen, Public Hearings Transcripts, Vancouver, British Columbia, November 26, 1990.

We support the use of egg donation in circumstances where a woman is not able to produce her own eggs.

R. Reid, Society of Obstetricians and Gynaecologists of Canada and Canadian Fertility and Andrology Society, Public Hearings Transcripts, Montreal, Quebec, November 22, 1990.

men becoming parents at any age, and that this was not necessarily considered a detriment to the child.

There was also opposition to the practice of a woman contracting with a couple to gestate a zygote created from their egg and sperm and to surrender the resulting child to them at birth. This use of technology is discussed in Chapter 23, "Preconception Arrangements."

Like donor insemination, egg and embryo donation raise legal and social issues for families and for the children who are born. Socially, the family must deal with the fact that the child is not genetically related to at least one of his or her parents. And just as family law has not caught up to the implications of donor insemination, it is not structured adequately to deal with the issues raised by egg and embryo donation — for example, the possibility that a zygote could be gestated and a child born several years after his or her genetic parents are dead. Many people pointed to the need for appropriate record keeping to enable children to find out about their genetic origins.

The Commission heard opinions on whether those donating eggs or zygotes should be paid for their donation. Sperm donors are usually compensated for their donation, to cover the time and inconvenience involved. The risk, time, and inconvenience are far greater in the case of egg or embryo donation if it is done specifically for this reason (and not in the context of a woman's own infertility or other treatment). If this is to be allowed and compensation is to be provided, many Canadians wondered how decisions about it would be made and identified many dangers of commercializing this area.

Other jurisdictions have also grappled with the question of when, if ever, people should be able to donate eggs and zygotes and who should

Each fertilized egg must be given its due respect and protection whether in the laboratory or in the body of its mother. Eggs which are not utilized for introduction to the maternal uterus must continue to be protected. They must not be discarded as mere tissue but preserved for embryo adoption at some time in the future when they can be introduced into the uterus of some other infertile mother.

J. Bromley, Fort Smith Pro-Life Group, Public Hearings Transcripts, Yellowknife, Northwest Territories, September 12, 1990.

The treatment of embryos, like all other human genetic materials, semen and ova, must be similar to the treatment of blood by the Canadian Red Cross. The donation of an embryo must be considered as a gift.

C. St. Peter, Canadian Research Institute for the Advancement of Women, Public Hearings Transcripts, Ottawa, Ontario, September 20, 1990.

Other jurisdictions have also grappled with the question of when, if ever, people should be able to donate eggs and zygotes and who should

receive them. The international consensus appears to be that donation is permissible, as long as appropriate counselling and consent procedures are in place.¹

There is also widespread international acceptance of zygote freezing. Storing frozen zygotes may be of considerable benefit to the couple whose gametes were used to create them. As we explained in the previous chapter, if the transfer of zygotes in the first IVF cycle is not successful, the woman does not have to undergo egg retrieval a second time if zygotes created after the first retrieval are frozen for future use. Similarly, a couple wishing to have a second child through IVF may also avoid the need for additional egg retrieval.

However, the ability to freeze zygotes means that they can be maintained for a considerable period of time outside the human body. The Commission heard that there is a pressing need to decide who has the legal authority to make decisions about the disposition of the zygotes, including how long they should be stored and whether, if they were not used by the couple, they could be donated to another couple, disposed of, or donated for research purposes.

We discuss these issues and concerns, beginning with egg donation, then turning to embryo donation and zygote freezing.

Egg Donation

Egg donation became possible only when IVF procedures became available. The Commission heard about four categories of egg donors: women who donate their "excess" eggs after undergoing egg retrieval for their own IVF treatment; women paid specifically to undergo procedures to donate their eggs; women about to undergo surgery on the uterus and/or

In those cases where a couple have jointly decided to bear responsibility for children potentially conceived through IVF/ET, they should jointly decide, prior to the commencement of their procedure, on what they desire to be done with nonimplanted embryos; their wishes should be specified in writing as part of the consent procedure. Where an individual woman has decided to undergo IVF/ET, the decision should rest with her solely. At the health facility, the individual woman or couple should be given standard consent forms which grant the choice of discarding the embryos, donating them to research, or designating donation to other infertile people. The disposal of eggs or sperm also should be governed by the patients' wishes with the same range of available options.

Brief to the Commission from the Canadian Advisory Council on the Status of Women, March 1991.

ovaries who agree to egg recovery for donation at the same time; and volunteers willing to undergo the procedure specifically to donate to individuals or couples who are infertile, often a relative. The processes of ovulation stimulation and egg retrieval are the same for the latter three categories of egg donors as they are for women undergoing IVF. Some have speculated that another source of eggs may be possible in the future: maturing the eggs of female fetuses to a point where they can be fertilized and used for donation.

U.S. studies of IVF using donated eggs have shown a higher overall success rate than IVF using the eggs and sperm of a couple who is infertile;² this is probably because the egg donors tended to be younger than most IVF patients, with the result that their eggs are more likely to be viable. As with IVF pregnancies generally, however, record keeping by Canadian clinics has left us with no way to know reliably how many children have been born in this country through egg donation. U.S. estimates for 1990 indicate that at least 547 zygotes created with donated eggs were transferred to recipients at 67 clinics in that country, although no rates of live birth were available.³

Egg donation raises significant ethical and legal questions. How these issues are perceived depends in part on the motivations of participants. For example, when the egg "donor" intends to raise the resulting child gestated by another woman, we refer to the situation as a preconception arrangement. When the recipient intends to raise the child, however, we refer to egg donation or embryo donation. Thus, it is clear that the intentions of participants influence the way we view the process and its participants, and hence how we assess the legal and social implications.

We examine the social, ethical, and legal questions raised by egg donation, beginning with the most well-known form — anonymous egg donation from a woman undergoing IVF to another couple who is infertile. We then consider other forms of egg donation, payment for egg donation, and legal issues.

If more ova are removed than can be reimplanted from a woman who is herself undergoing IVF, she should retain the right to decide whether the surplus are to be donated.

*D. Day, Nova Scotia Advisory Council
on the Status of Women, Public
Hearings Transcripts, Halifax, Nova
Scotia, October 17, 1990.*

Anonymous Egg Donation by Women Undergoing IVF*

Donors

It is essential to ensure respect for the autonomy of women donating "spare" eggs after undergoing egg retrieval as part of their IVF treatment. We have noted the concerns we heard that women could be subject to undue pressure to donate eggs, believing that they might be rejected from the program or that their future care could be jeopardized if they did not agree to donate. This situation could arise, given the call for donated eggs; Commission research found that 8 of the 15 IVF clinics participating in our survey offer IVF with donor eggs, and there are waiting lists of up to 120 prospective recipients (see research volume, *Treatment of Infertility: Current Practices and Psychosocial Implications*). Since one woman can produce many more eggs in a stimulated cycle than she can have transferred, the possibility exists that clinic staff could pressure women to donate eggs not needed for their own IVF treatment for use by other couples.⁴

As we have shown, counselling protocols for IVF patients are inadequate at some clinics and, as discussed in relation to assisted insemination using donor sperm, gamete donation can have psychological repercussions for the donor, the child who results, and their families. This situation could also lead to women donating eggs without being fully informed and considering all the implications of this act.

A third dilemma for a woman considering egg donation while undergoing fertility treatment is the possibility that her donated egg may fertilize, implant, and gestate successfully in the recipient woman, while her own treatment could prove unsuccessful. Even if she is unaware of the fate of her donated eggs, the possibility could cause psychological distress for the donor if she remains childless.

Finally, we must take into account that any eggs deemed "surplus" during an IVF cycle may not be of the highest quality; presumably, the practitioner would reserve for the donor those eggs considered most viable for fertilization and transfer. In addition, as cryopreservation becomes more reliable and available (or, indeed, if cryopreservation of eggs becomes available), many women may choose to have their eggs fertilized and the resulting zygotes cryopreserved for their own use in future cycles instead of donating them.

Recipients

Couples who receive anonymously donated eggs face many of the same concerns as couples undergoing donor insemination: many of the psychosocial issues discussed with regard to DI also apply to the children

* See Annex for dissenting opinion.

and families that result from egg donation. These issues include secrecy about the child's origins, access to information about the donor, how records are compiled and stored, and what the best interests of the child are.

As discussed with respect to donor insemination (see Chapter 19), the Commission believes the best interests of the family and the child are served if non-identifying information about the gamete donor is available to the parents and child at any time and if identifying information on children and donors is preserved for 100 years, so it is available if ordered by a court in cases of medical necessity. As outlined in Chapter 19, we believe donors should not have access to identifying information about their genetic offspring.

The Commission does not consider, however, that sperm donation and egg donation are completely parallel situations. In egg donation, both parents have a physical link to the child — the male partner is genetically linked, and the woman is the gestational mother. This is not the case with donor insemination. Cultural attitudes and other pressures are also different for women and men with respect to their genetic links to their children. The Commission therefore believes that distinct programs of prior counselling, consent, and post-treatment counselling and support are necessary for couples involved in egg donation.

For some infertility-related conditions, a donated egg may be a woman's only chance of achieving pregnancy. Women with premature ovarian failure, ovarian failure after radio- or chemotherapy, or a genetic disease they could pass on to their children could therefore be candidates to receive donated eggs.⁵ This may be ethically

We are more troubled, however, by the prospect that the technique could be used not to help overcome infertility at a time of life when the ability to become pregnant is normal, but to expand the human reproductive lifespan.

justified if done within accepted protocols and with fully informed consent. We are more troubled, however, by the prospect that the technique could be used not to help overcome infertility at a time of life when the ability to become pregnant is normal, but to expand the human reproductive lifespan. Studies have shown that, with hormone treatment, post-menopausal women can successfully gestate a fetus from a donated egg or embryo and carry it to term.⁶

Egg donation to post-menopausal women raises concerns about whether older women are physically and psychologically prepared for the demands of pregnancy and parenthood, as well as concerns about the best interests of the resulting child. The Commission's objections to this practice rest not on these types of considerations, but rather on a more fundamental principle regarding the appropriate circumstances in which finite societal resources should be used to provide medical services. We

find the use of donated eggs for post-menopausal women inappropriate — it is invasive, expensive, and an inappropriate use of resources. Moreover, because it is normal for women to be infertile at this age, there is no medical justification for the practice.

Finally, where zygote cryopreservation is not available, recipients of donated eggs would have to be informed of the potential for the transmission of HIV through donated eggs and be fully informed of the nature and extent of this risk before deciding about whether to proceed with treatment using donated eggs. Because egg cryopreservation and thawing have not been successful to date, it is not possible to establish an egg quarantine period, with testing of the donor six months after the donation, before the donated eggs are used in treatment. The Commission's conclusion with respect to the use of fresh eggs differs from that on fresh sperm because egg cryopreservation is not available at this time and zygote cryopreservation is available only in some clinics. This means the only option for some women who want donated eggs will be the use of fresh eggs. (They will be unable to have the donated eggs fertilized with their own partners' sperm and frozen for six months if zygote freezing is not available.) We do have concerns about the potential for transmitting HIV through donated eggs, but we believe that steps can be taken to minimize this risk, for example by ensuring that thorough medical and social histories are obtained from donors. We have also emphasized the importance of fully informing the recipient about this risk. As zygote cryopreservation becomes available at all facilities offering IVF, however, we believe that the use of fresh donated eggs should be phased out. In any event, donated eggs will likely be difficult to obtain, because most women undergoing IVF will want to have their "surplus" eggs fertilized by their partners' sperm and the resulting zygotes cryopreserved for their own use in future cycles.

In summary, the Commission recommends that

160. Egg donation by women undergoing IVF be permitted only if

- (a) the woman has read, understood, and discussed her consent to donate and has been informed that a decision not to donate eggs will in no way jeopardize or affect her current or future care; and**
- (b) the woman has had appropriate counselling to assist her in understanding the implications of egg donation and has given her informed consent to it.**

161. The Assisted Conception Sub-Committee of the National Reproductive Technologies Commission, with input from experts, develop protocols for evaluating egg donors, with the donor being tested for sexually transmitted diseases potentially transmissible to the recipient or the child; with zygotes created using donated eggs being cryopreserved for six months where possible and the donor retested for HIV; and with the donor providing identifying and non-identifying information for purposes of inclusion in a national data base for gamete donations.

162. Women who have experienced menopause at the usual age should not be candidates to receive donated eggs.

163. Record-keeping protocols should be developed and followed for egg donors; non-identifying information about the egg donor would be maintained and be available to the parents and child(ren) of families that result from the donation, and regulations about access to identifying information would be comparable to those governing families created through donor insemination.

and that

164. The Assisted Conception Sub-Committee, with input from relevant experts, develop interim protocols for counselling and obtaining the informed consent of prospective recipients of fresh donated eggs, in particular regarding the risk of transmission of HIV given the impracticability of an egg quarantine period and the fact that zygote freezing is not available in

some clinics. These interim protocols should be used until zygote cryopreservation becomes available as a safer option.

Egg Donation Before Surgical Sterilization

British and U.S. practitioners have obtained eggs for donation from women about to undergo surgical sterilization.⁷ From the practitioner's perspective, women undergoing surgical sterilization are good candidates for egg donation. The women have usually proven their fertility, there is no risk of jeopardizing their health by ovulation induction or egg retrieval, and they have presumably completed their families.⁸ Eggs from this source would be a safer option for couples who need egg donation because, unlike IVF patients, the donors would not want the eggs for their own future treatment. The donated eggs could therefore be fertilized with the recipient's partner's sperm and the resulting zygotes frozen and quarantined for six months until the egg donor was retested for HIV.

Commissioners have concerns about this practice. Although women undergoing surgical sterilization may be less psychologically vulnerable than women undergoing fertility treatment, Commissioners would not want to see them feel pressured in any way to donate eggs. If a woman is to be asked to consider this, it is essential she too have appropriate counselling to enable her to make an informed choice about egg donation. The Commission therefore recommends that

165. Egg donation by a woman undergoing a surgical sterilization be subject to the same protocols regarding informed consent, donor testing, and record keeping as those for women donating eggs in the context of IVF procedures.

"Altruistic" Egg Donation

Some women have been willing to undergo ovulation induction and egg retrieval in order to donate the eggs retrieved for use in an unknown recipient. Mount Sinai Hospital in New York has reported that some women are motivated to participate in their donor program because they have a friend or relative who is infertile.⁹ Our survey of Canadian clinics revealed that although women who need ova sometimes find their own donors (for example, a friend or a relative), there is no evidence that women are being recruited by the clinics as donors.

The Commission does not believe that it is ethical to permit such an invasive surgical procedure, with its attendant risks, on an otherwise healthy woman for the benefit of someone else, particularly in the absence

of information about the long-term effects of these procedures. We therefore conclude that voluntary anonymous egg donation is appropriate only in the context where women would be having the egg retrieval procedure anyway — that is, in IVF programs or during surgical procedures that are to be carried out for reasons unrelated to egg donation. The Commission therefore recommends that

It is essential to ask, for example with respect to oocyte donation and contract motherhood, what is altruism? What kinds of altruism are good, and what kinds may be problematic for those, primarily women, who are expected to be altruistic? Why should there not be more emphasis on male altruism in reproduction?

C. Overall, reviewer, research volumes of the Commission, 1992.

166. Eggs for donation be obtained only from women already undergoing surgical procedures or egg retrieval as part of their own treatment. Egg retrieval exclusively for purposes of donation should not be permissible.

Designated Egg Donation

Designated egg donation refers to the situation where a known donor, often a sister or close friend of the recipient, donates an egg for use in IVF. Seven of the eight Canadian programs offering IVF with donated eggs permit designated donations, and two have reported live births from sister-donated eggs. Some clinics encourage women to find their own donors because of the scarcity of anonymously donated eggs. One hospital-based clinic, however, explicitly forbids designated donations in its program.

There appears to be somewhat greater acceptance of designated egg donation than designated sperm donation.¹⁰ Surveys have shown, for example, that couples are more comfortable with the idea of the sister of a woman who is infertile providing an egg for IVF than with the notion of the brother of a man who is infertile providing sperm for use in donor insemination.¹¹ The former is usually depicted as a “gift,” while donor insemination still carries some of the cultural connotations and psychological implications associated with adultery.

Advocates of designated egg donation cite advantages: there is first-hand knowledge of the donor’s physical, psychological, family, and social history; no third party or “broker” has to be involved; and relationships between the parties can be discussed and clearly defined before the donation takes place.¹²

But the practice also raises serious concerns. The potential for coercion of the women involved exists, especially between family members, who may feel it is their "duty" to supply eggs. The potential donor may be subject to overt or covert pressure from the recipient or from other family members. Most important, donation would require her to undergo the risks, discomfort, and inconvenience of medical procedures that will be of no benefit to her and may even cause her harm.¹³

The most troubling aspect of such arrangements is the potential for harm to the eventual child. Although egg donation is relatively new, and we therefore have little knowledge on which to base an assessment of the likely effects on children, there is reason to believe this could cause considerable difficulties in relationships between the child and its parents, the child and its genetic mother, and the social parents and the egg donor.

The Commission believes that the potential for coercion and exploitation of the donor, as well as the potential adverse effects on the resulting child, are too great to justify designated egg donation. Therefore, the Commission recommends that

167. Designated donation of eggs to a named recipient not be permissible.

Oocyte donation programs must also operate using anonymous donors. The use of known donors is still acceptable, however, since obtaining oocytes is more complex than obtaining sperm, and follows an in-depth psychological assessment of the receiver and the donor. [Translation]

C. Duchesne, Section de reproduction du département d'obstétrique-gynécologie, Hôpital Saint-Luc, Public Hearings Transcripts, Montreal, Quebec, November 21, 1990.

Payment for Egg Donation

Although the Commission is not aware of any Canadian cases of payment for egg donation, U.S. clinics regularly advertise for egg donors and pay them a fee. There are also cases where U.S. clinics have offered free medical care to women who want a tubal ligation, provided they agree to undergo ovulation induction and egg retrieval.¹⁴ As we have recommended with respect to sperm donation, payment for human gametes is inappropriate, as it would constitute commercialization of human reproductive material, a situation that the Commission considers ethically unacceptable.

The Commission considers payment for eggs unacceptable on other grounds as well; multiple egg induction and retrieval are accompanied by medical risks, pain, and the possibility of long-term health effects. As already established with respect to organ and tissue donation, it is unethical to allow people to risk their health to sell parts of their bodies. The potential for exploitation is simply too great to justify this practice. Thus, the Commission concludes that payment in connection with egg donation is never acceptable. Only women who would be having invasive procedures anyway (egg retrieval during IVF procedures; surgery for other reasons) would be in a position to consent to donate eggs. The Commission therefore recommends that

□ **168. Payment for egg donation not be permissible.** □

Potential Use of Eggs from Fetuses

We would object strongly to fertilization of eggs obtained from female fetuses, even if it becomes technically feasible to retrieve and mature them. We find this suggestion deeply offensive to all notions of human dignity and have recommended that it be among the activities prohibited outright in the *Criminal Code* of Canada (see Chapter 5).

Legal Issues

Before the introduction of IVF, legal motherhood was attributed unequivocally to the woman who gave birth to a child. There was no need to determine whether that presumption was grounded in genetics or gestation. Thus, egg donation challenges existing legal principles that define who is a child's mother. When donated eggs are involved, two women are physically involved in the creation of the same child, one as the source of the genetic material and one as the person who gestated the fetus and gave birth to the child. In other words, it would be possible for the egg donor to seek to establish her biological link with the child and to pursue a legal declaration of motherhood, just as it is possible,

Who has control of the embryo? The researcher who made its creation possible or the donors of the gametes? If it is accepted that the embryo may be owned, who is the owner? At what point does the embryo become a person or a human being? The controversy surrounding "humanization" is far from being resolved. [Translation]

Brief to the Commission from Ordre des infirmières et infirmiers du Québec, April 1991.

in the absence of legal rules to the contrary, for a sperm donor to seek a declaration of paternity in cases of assisted insemination.¹⁵

If egg donation is permitted, the most important step in resolving the legal issues surrounding egg donation is the determination of legal parenthood. In Canada,

because there is no legislation dealing specifically with egg donation (although some provinces/territories have taken legislative steps to clarify parenthood in cases of sperm donation), it is difficult to say with certainty who currently would be accorded the status of legal mother. This must be the first legal principle established with regard to egg donation. For

We would object strongly to fertilization of eggs obtained from female fetuses, even if it becomes technically feasible to retrieve and mature them. We find this suggestion deeply offensive to all notions of human dignity and have recommended that it be among the activities prohibited outright in the *Criminal Code of Canada*.

example, the provisions of the revised *Quebec Civil Code* state explicitly that “contribution of genetic material to medically assisted procreation does not allow the creation of any bond of filiation between the contributor and the child born of that procreation.” The Commission recommends that

169. Provinces and territories that have not already done so amend their family law legislation to clarify legal parenthood in cases of egg donation, with the recipient gestating and giving birth being declared the legal mother of the resulting child.

In the Commission’s view, an egg donor should have no parental rights or responsibilities toward any child born as a result of the donation. The woman who receives donated eggs or zygotes should be deemed to be the mother of any resulting child. The male partner of the recipient, if he has given his consent to the procedure, should be deemed to be the father of the resulting child. In other words, the legal principles that should govern parenthood in cases of egg donation are similar to those that should govern legal parenthood in cases of sperm donation.

Dealing with “Spare” Embryos

IVF patients are usually asked to determine before the eggs are retrieved what they want done with any “spare” zygotes resulting from IVF procedures. If the clinic does not offer cryopreservation, the couple can usually choose to donate the zygotes for use by other couples who are

infertile or to donate them for research; or they can ask the clinic to dispose of them. If the facility offers cryopreservation, other decisions have to be made about the disposition of frozen zygotes. If the couple later decides they do not wish to have their frozen zygotes transferred, do they want to make them available for donation? If the couple's relationship ends, what is the status of the frozen zygotes? If the male partner dies, is it ethical to transfer a zygote later, with the resulting child to be raised by the woman? If it is the woman who dies, could the surviving male partner use the zygotes with a subsequent partner and raise the resulting child?

Embryo Cryopreservation

After an egg has been fertilized, the resulting zygote can survive for only a few days at most outside the body, even when kept in the special medium developed for this purpose. The advent of techniques making it possible to freeze and thaw zygotes successfully has extended the period that they can remain *ex utero*, but these techniques have created ethical and legal dilemmas of their own. In particular, whether human embryos are categorized as property, as potential human beings, or otherwise will have an effect on the way rights with respect to their control are formalized. Resolving these issues is of fundamental importance to the creation of a coherent and cohesive approach to the regulation of new reproductive technologies.

Embryo (Zygote) Cryopreservation

The practice of IVF changed dramatically after 1984, when the first child developed from a frozen zygote was born in Australia. Zygote freezing is now a routine component of many assisted conception programs. Before the advent of cryopreservation, IVF clinics had three options for dealing with excess zygotes: implanting them all, running the risk of multiple pregnancy; using the extra ones for research; or disposing of them. The ability to freeze zygotes now means that clinics can transfer fewer embryos in a given cycle and freeze the remainder for the couple's use in later cycles. This avoids the need for another invasive egg retrieval procedure and gives more chances of pregnancy from a single retrieval.

1. The zygote is introduced to increasing concentrations of cryoprotectant agents to dehydrate the zygote and replace the water with agents that do not promote ice formation.
2. The zygote is slowly cooled to sub-zero temperatures.
3. The zygote is then stored in liquid nitrogen.
4. When needed, the zygote is thawed rapidly in a warm bath.
5. The zygote is rehydrated and the cryoprotectant solution removed. It can then be transferred to the uterus.

Legal Control and Informed Consent

The main issue with respect to the legal status of embryos is who may exercise decisional authority and what the scope of that authority is — in other words, who has the authority to decide among legally available alternatives in relation to the zygote, such as transfer, storage, disposal, donation, and research. Questions that must be answered include not only who has authority, but whether that authority can be exercised in advance, when and how that authority can be transferred to others, and how disputes are to be resolved. At present, Canadian law and jurisprudence are largely silent on these issues, and although there have been U.S. court cases, their application to the Canadian situation is uncertain. Because the technologies and the law in this area are so new, the answers to these questions are not clear when the embryo (meaning the zygote) exists outside a woman's body.

It has been suggested that property law may be an appropriate mechanism to achieve the goal of giving the two individuals who were the source of the gametes joint control over what happens to a zygote created from their

The complex issues of control and decisional authority with respect to human zygotes must be addressed in a conceptual framework that makes it clear that they are not "property."

gametes. Yet, in the Commission's view, reproductive material should never be characterized as property, because terms such as "ownership" and "property" suggest that human zygotes can be treated as objects, which is contrary to principles such as respect for human life and dignity and non-commercialization of reproduction. The Commission therefore believes that the complex issues of control and decisional authority with respect to human zygotes must be addressed in a conceptual framework that makes it clear that they are not "property." (We discuss this in more detail in Chapter 22, "Embryo Research.")

The Commission concludes that the two individuals who were the source of the gametes should have joint authority to determine what happens to zygotes created from their gametes and that decisions in this regard should be taken before egg retrieval and fertilization — that is, before the zygotes are created. This means that information, counselling, and consent procedures for those contemplating IVF must take into account the fact that surplus zygotes could result and that decisions about them are necessary before treatment can proceed.

This is also the position of the American Fertility Society, whose ethical statement on IVF holds that only the gamete sources have the right to decide on the disposition of resulting zygotes, and of the Warnock Committee in the United Kingdom, which stated that "the couple who have stored an embryo for their use should be recognized as having rights to the use and disposal of the embryo."

Because Canadian law is so uncertain at this stage, however, clear rules are necessary to establish this principle and to ensure that zygotes do not become the object of disputes. Our proposal would also make it unnecessary for the courts to sort out disagreements with respect to the disposition of embryos, a situation that has the potential to create conflicts of the type the Commission believes should be prevented with respect to human reproductive tissues and capacities. In other words, from the Commission's ethical perspective, these rules are a matter for society, through its legislators, to decide — not for the courts to decide through an adversarial process.

As far as the Commission has been able to determine, IVF clinics in Canada that offer cryopreservation of “spare” zygotes have consent procedures regarding the disposition of these zygotes in the event that the couple decides not to have them transferred or in circumstances (such as the death of the partners) that make this impossible. Some of these consent procedures include a provision directing the clinic what to do with the embryos after a specified period of storage — the choices are donation to others for use in infertility treatment, donation for research, or disposal by the clinic. What is happening to “excess” zygotes in clinics that do not offer cryopreservation varies from clinic to clinic.

We believe that the rules regarding the handling of surplus zygotes must be clarified and standardized. Moreover, patients should not be subject to pressure to consent to any particular use of their zygotes, be it donation or research, and they should be assured that refusal to donate zygotes or to consent to their use in research will not in any way affect their current or future treatment. The Commission therefore recommends that

170. Decisions regarding the disposition of zygotes be made by women and couples before any gametes are retrieved or zygotes created, with such decisions being binding on the IVF clinic or facility involved. The Assisted Conception Sub-Committee of the National Reproductive Technologies Commission should develop standardized consent forms listing the decisions required from donors.

This will, however, be in the context of what is allowable. Given that the outcomes of longer-term storage are unknown, we believe it makes sense to set a limit of five years for the duration of storage. Another issue is whether storage should be permitted after the death of one partner. The wish to transfer a stored zygote after the death of a partner may be understandable. It is relevant, though, that for all other couples pregnancy is not an option when one partner has died.

Enabling the use of stored zygotes to establish a pregnancy after the death of one of the partners would require societal resources to be used for

the storage and transfer. It would also require legal reform to ensure clear succession and inheritance rights if the interests of already existing children are not to be harmed; the distribution of estates could be considerably delayed, and administration of an estate difficult. If embryo transfer is allowed after the death of a man, it should also be allowed after the death of a woman, provided a subsequent female partner consented to gestate the zygote. The potential complexities, consequences, and ramifications are unclear. Given this, it seems to Commissioners necessary to have some limits, and the death of either partner is a clear and practical limit. It is moreover a limit that does not deprive people of an option that most people have. If transfer is not allowed, they are simply like all other couples when one dies. This position may seem contradictory when we have recommended allowing single women to have donor insemination; however, we do not know the social and psychological effects on the child of coming from a father known to be dead. The Commission therefore recommends that

171. Zygotes not be stored for more than five years from the date they are frozen, or beyond the death of one of the gamete donors.

Embryo Donation

As now constituted, IVF programs are not set up to deal with the implications of embryo donation. Social and medical data about the egg donor, who would usually be an IVF patient, would have to be collected, as would information about the sperm donor. This information would be necessary if zygote recipients and the resulting child were to have access to information similar to that given to recipients of donated sperm or eggs. Information about the genetic health, physical characteristics, identity, ethnic origin, and other characteristics of potential embryo donors would have to be available. This information is not routinely attached to cryopreserved zygotes, however, and the decision to donate could potentially be made months or years after the zygote was created.

Embryo donation raises concerns about the psychosocial implications for the donor and recipient couples and the best interests of any child who results. In the Commission's view, if donated eggs are available and the recipient's partner's sperm can be used to fertilize them, with freezing of the resulting zygotes to allow for donor testing, this would be the preferred alternative so that both parents raising any child born have biological links — one has gestated the child and one is the genetic parent. In practice, however, we recognize that zygotes, rather than eggs, are more likely to be available for donation. Even so, we believe that it is only under unusual circumstances that embryo donation, rather than egg donation, should be

considered the preferred course of action if donated eggs are available. These circumstances would all entail situations where both partners have medical conditions that make pregnancy using their own gametes inadvisable or impossible — for example, if the female partner has ovarian failure or a genetic disease and the male partner has one of the indications for donor insemination.¹⁶

We believe that embryo donation is permissible, subject to safeguards similar to those discussed earlier in the context of egg donation, such as the prohibition of designated donation and payment for donation, and the requirements for informed consent and proper record keeping.

Recommendations

Egg and Embryo Donation

The Commission recommends that

- 172. Designated donation of eggs and zygotes to a named recipient is not permissible.**

- 173. Women who have experienced menopause at the usual age should not be candidates to receive donated eggs or zygotes.**

- 174. Eggs and zygotes for donation or research should be obtained only from women already undergoing surgical procedures or egg retrieval as part of their own treatment. Egg retrieval solely for purposes of donation is not permissible. Any woman asked to donate (whether in the context of IVF or a surgical procedure) should be subject to protocols regarding counselling, informed consent, donor testing, and record keeping established by the Assisted Conception Sub-Committee of the National Commission.**

- 175. (a) Full and informed consent to any egg or embryo donation should be obtained under circumstances that make it clear that a decision not to donate will in no way affect the patient's current or future care or access to treatment.**
- (b) Counselling and informed consent of potential embryo donors must include the fact that donors will be tested for HIV antibodies at the time of donation and six months later and that their embryos will be quarantined for six months to allow for this testing.**

- 176. (a) In the case of eggs and zygotes for donation, identifying information, including the donor's full name, address, and date and place of birth, should be collected from the donors as soon as they consent to donation under specified conditions (for example, in the event of their deaths). Immediately upon collection of the identifying information, a donor identification code number should be attributed to it.**
- (b) Non-identifying information about the donor's medical and genetic history, age, and physical and social attributes, including race and ethnicity, should be collected in a standardized form once consent to donation has been obtained. Non-identifying donor information, all test results, and the donated eggs and zygotes should then be identified only by the donor identification code number. Appropriate record storage procedures should be in place to preserve confidentiality.**

(c) Where a child is born as a result of a donation, identifying information about the donor, the donor's identification code number, the name of the egg or zygote recipient, and information about the child born as a result of the donation should be forwarded to the National Reproductive Technologies Commission, for storage under secure conditions for a minimum period of 100 years.

177. All necessary steps for testing donors of eggs and zygotes for infectious diseases or other conditions that could potentially affect the health of the woman receiving the donated egg, of the zygote, or of the resulting child should be strictly followed.

178. Testing for HIV 1 and 2 should include a zygote quarantine period of at least six months, with re-testing of the donor's blood for antibodies to HIV at the expiry of that period.

and that

179. Egg and embryo donors should not be compensated in any way.

Disposition of Unused Eggs and Zygotes

The Commission recommends that

180. Zygotes should be disposed of in accordance with the wishes of the gamete donor(s), expressed in writing before gamete retrieval. Zygotes should not, however, be stored for more than five years from the date they are frozen. Zygotes stored for a couple's own use should be stored only up to the death of either partner.

181. Surplus eggs should not be fertilized or used without the express permission of the egg and sperm donors.

and that

182. Adherence to these requirements, set by the Assisted Conception Sub-Committee of the National Reproductive Technologies Commission, with respect to the handling of eggs and embryos would be a condition of licence to offer assisted conception services. Failure to comply would result in loss of licence.

Conclusion

The Commission considers that donating eggs and zygotes could enable women who are infertile and who would not otherwise be able to conceive to have children. We believe, however, that the interests of the donating woman or couple must be protected, and we have recommended a system of controls to ensure that women's autonomy in deciding whether to donate is protected, and to prevent what we consider to be unethical uses of the act of donation. We also consider that the interests of the children born would mean that appropriate donor testing and record keeping be put in place.

In this chapter we alluded to the fact that frozen zygotes can also be donated for use in research. Chapter 22, "Embryo Research," examines the aims of embryo research, the uses to which it may be put, and the ethical and social issues it raises.

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