

**STRATEGIC MANAGEMENT
OF
A HEALTH CARE SERVICE**

by

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Strategic Management of a Health Care Service

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ABSTRACT

In vitro fertilization (IVF) and related procedures are effective treatments for fallopian tube obstruction, severe male infertility, and persistent infertility after conventional treatments fail. IVF treatment costs, including expensive hormone medications, average \$7,000 per cycle which are not covered by the provincial medical services plan. The IVF program under discussion, the heart of a non-profit, academic health care organization, is a pioneer in reproductive medicine in Canada. Following entry of a local IVF private clinic in 1995, the program suffered significant loss in revenue and reputation, losing its monopoly and market share which plummeted to 23% by 1999. Since then, it has regained some market share and rebuilt internal strengths. The program's main issues are how to compete as a non-profit organization in the private sector, and, to re-establish as market leader and a centre of excellence in reproductive medicine.

An external analysis has identified the IVF industry to be in the mature phase of its product cycle but with underserved areas for market development and continuous technological changes for product development/enhancement. Some factors that have slowed IVF growth are the dwindling cohort of female boomers of reproductive age, the demographic trend of low fertility, geographical access and high treatment costs. Some key success factors are high pregnancy rates, excellent experience and reputation, latest technology, and quality-care service. An internal analysis has identified that the organization's generic strategy is differentiation, whereby IVF service is provided in a personalized, caring, ethical and evidence-based manner in an academic, non-profit setting with comprehensive treatments for infertile couples.

To sustain and increase its market share, the program needs to promote these differentiation features, and develop underserved market segments and new products. It needs to establish a governing body with autonomy in administration and finance management in congruence with its mission and values to compete favourably in the private sector. This includes access to private capital markets, increased capacity and freedom to network and form joint ventures. The IVF industry also provides an opportunity to study business strategies for a non-profit, academic provider of uninsured medical services under competitive pressure in the private sector.

DEDICATION

This treatise is dedicated with love and appreciation, to my wife, Bronwyn, for being so understanding and encouraging; and together with my children, Jessica and Emily, for bringing balance in my life!

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1 OVERVIEW OF THE ORGANIZATION, SERVICES AND MARKETS

1.1 Organization history

The organization is a non-profit, medical unit specializing in fertility treatment in a university hospital setting. Its *in vitro* fertilization (IVF) program was first established in 1981 when many still considered IVF “experimental”. In 1983, the IVF program had the distinction of having the first baby born in Canada and at the time, was the only IVF program west of Ontario. From its inception, the program has provided an excellent IVF service, mainly to residents of the province and was the only such facility in the province until 1995 when a private fertility clinic began operation.

IVF was initially introduced to help women with blocked fallopian tubes to conceive but in the 1990s, intracytoplasmic sperm injection (ICSI) was added to IVF to help infertile couples with a male factor. ICSI involves the injection, under the microscope, of a single sperm into each egg, thereby, overcoming the barrier to fertilization from too few sperm or sperm of poor quality. Further, IVF is now considered the end-treatment for other types of infertility as well and has helped many couples achieve a family. Such advances require continuous research in the field of assisted reproductive technologies (ART) in which the program has been both a leader and an active participant in Canada.

In 1994, following closure of the hospital, the program had to shut down operation for about three months which undoubtedly aggravated the pre-existing long wait list for IVF treatment. Consequently, the program, together with the organization, had to relocate to another hospital which is its current site. Senior academic management of the organization, caught in hospital politics, failed to anticipate potential competitors when it did not support the appointment of a senior, high-profiled, IVF expert who had relocated from Ontario. Internal conflict within the organization also led to the departure of a key IVF specialist who set up the private clinic in partnership with the senior expert from Ontario.

When the private fertility clinic entered the market in 1995, the program had a long wait list of up to one year! The organization was viewed by outside physicians as an “ivory tower”. With market potential available, the new competitor quickly changed its market position from “challenger” to “leader” through active marketing and well-executed politicking among local gynaecologists and physicians as well as within the field of reproductive medicine across Canada. There were even rumours that the program was no longer in business as the program’s

market share plummeted from 90% initially to 23% by 1999. The resulting loss in revenues and reputation led to the “unspoken” adoption of a survival strategy.

Recognizing the situation, the organization recruited an energetic fertility subspecialist in the fall of 1996 who was the catalyst to the formal establishment of the fertility and endocrine clinic. Although outside physicians knew of the IVF program, there was no designated clinic within the organization to assess couples for initial infertility workup or other forms of treatment. Not that these services were unavailable, but they were offered under each physician’s private practice. By formally organizing the whole range of fertility services under the aegis of the organization, the clinic provided the important link between consumers and its IVF program. Initially, the clinic essentially consisted of the new recruit and the previous IVF medical director as other physicians were busy with their individual referrals. As the clinic’s reputation grew, the other physicians in the organization subsequently participated a day per week to see patients under the new clinic designation. From its formal beginning, the clinic has provided a much needed service for the province but also has enhanced the organization’s reputation and indirectly, drawn attention to its IVF program. The clinic structure does not affect individual physician’s income or change the way services are delivered. Couples still see the same physician even if they have been referred to “the clinic”. Individual physicians still bill the provincial medical services plan (MSP) for these covered services. In the subsequent two years, two young clinical specialists were recruited, bringing complementary expertise and skills and patient volume to the clinic. These events were the major turning points for the IVF program.

As the clinic has gained reputation and service volume, there has also been a gradual increase in patients from the clinic to the organization’s IVF program. However, as the clinic continues to expand, it will also require additional funds to support its activities. The IVF program generates the major source of non-MSP funded revenue to support the expansion and operation of the clinic and the IVF program such as hiring of staff and other capital costs.

1.2 Current organization

The organization is a subspecialty division of the department of obstetrics and gynaecology within a university medical faculty and has the important functions of research and teaching in addition to providing patient care. The fertility/endocrine clinic and IVF program are inter-related units of the division in which the IVF program is best considered a specialized unit. Around 1999-2000, major leadership changes took place with a new department, division and IVF program head. This brought on new management style, particularly at the clinical level. Since then, the program has regained some of its market share and increased its pregnancy

success rates. The number of clinic referrals and the corresponding IVF cycles from 1998 to 2003 together with the projected numbers for 2004 are shown in Figure 1-1. The numbers of IVF cycles fell to a nadir in 1999. The increase in patient referrals to the fertility/endocrine clinic only indicates its reputation and popularity among consumers (both clients and referral physicians). As in all medical referrals, there is no referral fee, which is considered unethical. Revenue is generated only when a client goes through IVF treatment. Section 1.3 and Table 1-1 will provide more information in this regard.

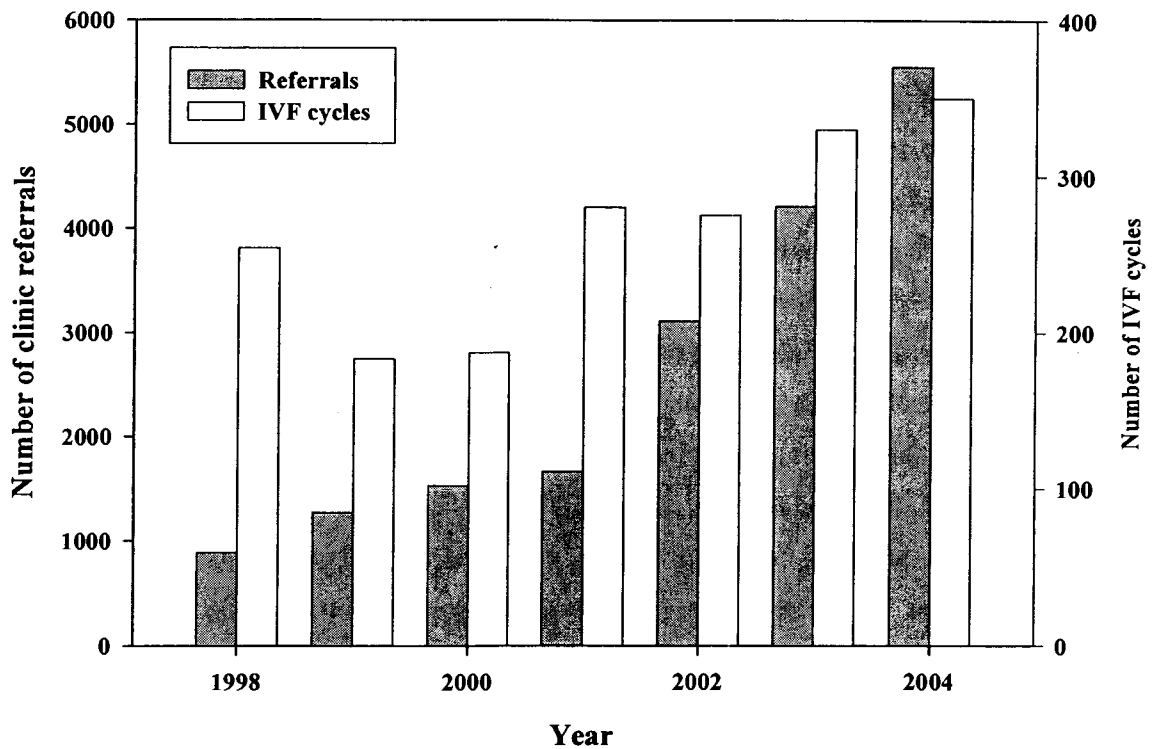


Figure 1-1: Numbers of clinic referrals and IVF cycles from 1998 to 2003, & 2004 (projected)
(Note the different y-axes)

The clinic and the IVF program currently occupy 7,500 square feet on three floors of an old hospital building which houses the outpatient clinic area, the andrology laboratory, the gamete laboratory, the gyne-endocrine laboratory, and the IVF procedure area. These areas combined, facilitate the ability to provide “one-stop”, comprehensive, fertility care from initial investigation to assisted reproduction, notably, IVF treatment. Because the clinic is located in a teaching hospital, it is supported by the hospital facilities for elective and emergency care in the unlikely and rare event of an emergency during a procedure in the clinic. Additional assets are

access to services provided by the hospital such as interpreter service. Also, as the organization is part of the university, it has support of the personnel in human resources and finance departments.

There are 36 members working in the clinic and IVF program, including physicians who are all specialists or subspecialists. In addition to being members of the division and department of the obstetrics and gynaecology, some also hold university academic appointments. Their combined expertise covers assisted reproduction (including IVF), reproductive endocrinology, tubal microsurgery, endometriosis, andrology and urology. Physician appointment times are scheduled longer than usually found in other clinics, averaging 30 to 60 minutes, thus, enabling more in-depth consultation and assessment.

The nurses are experienced in fertility care and, in addition to working closely with other team members, also provide emotional support, patient teaching and a link to community resources. All nursing support is provided with attention to individual needs and with the goal of making the experience of infertility as positive as possible, regardless of the outcome.

The embryologists in the gamete laboratory perform specialized procedures, such as sperm preparation for intrauterine insemination or *in vitro* fertilization, embryo culture and cryopreservation, and ICSI. They are also cross-trained to perform detailed semen analysis and freezing of sperm for male patients prior to treatment for cancer in the andrology laboratory.

The technicians in the gyne-endocrine laboratory, which is one of the few on-site hormone testing laboratories in a fertility clinic in Canada, perform hormone assays that are pivotal to monitoring a woman's response to hormone injections during IVF treatment.

The psychological counsellor is a key member of the team, who helps couples or individuals to understand and cope with the emotional and psychological impacts of infertility. For those who are going through IVF treatment, there are three hours of individual counselling provided by the program in addition to a weekly drop in support group. For those who are going through gamete donation, psychological counselling, although mandatory by clinic policy, is designed to protect and inform the participants and provide a service that exceeds most clinics in the country.

1.3 Current business

Currently, investigations and surgery for the treatment of infertility are covered under MSP. More specific items that are not covered by MSP are discussed below. With the threat of cuts to health care funding, some of these covered services might become uninsured medical items in the future. Other fertility treatments, primarily IVF, are provided on a fee-for-service basis. While

this provides an opportunity to obtain revenues, the ability to access IVF treatment, which has an average cost of \$7,000 per cycle when medications are included, is largely dependent on affordability and hence, the general economy of the province. In addition, federal government legislation may limit services involving gamete donation.

Services available in the clinic facilities:

1. Investigation and therapy of female and male infertility.
2. Fertility surgery, including surgery for endometriosis, pelvic scarring.
3. Cannulation of the fallopian tubes for the diagnosis and treatment of tubal disease.
4. Advanced laparoscopic techniques for surgical reconstruction of fallopian tubal disease as well as associated fertility factors.
5. Induction of ovulation.
6. Medical management of complex endocrinological disorders such as amenorrhea, hyperprolactinemia, hirsutism and other syndromes of androgen excess.
7. Investigation and management of immunological aspects of infertility.
8. Management of unexplained infertility.
9. Premature ovarian failure and menopause.
10. Reversal of sterilization by microsurgical techniques.
11. Intrauterine insemination.
12. Assessment of semen, with adjunctive tests of fertilization.
13. In vitro fertilization (IVF).
14. Intracytoplasmic sperm injection (ICSI).
15. Cryopreservation (freezing) of embryos.
16. IVF with known donor oocytes.
17. Assisted hatching.
18. Blastocyst culture (a developmental stage of the fertilized egg around day 5 of *in vitro* culture).
19. Sperm retrieval procedures (MESA, TESA) for obstructive causes of male infertility.

Table 1-1: Current services offered by the clinic

Table 1-1 shows the services available in the clinic facilities. Items 10 to 19 are not covered by MSP. Only revenues not covered by MSP belong to the clinic. The exception is tubal reversal

(item 10), which belongs to the individual physician performing the surgery. Although intrauterine insemination is a source of revenue for the clinic, its contribution is relatively small. The other items such as assisted hatching, blastocyst culture and IVF using donor eggs are additional steps of IVF treatment in some couples who benefit from them. The major revenue source therefore is from IVF and ICSI (items 13 and 14). IVF with or without the extra step of ICSI will be the main focus of our discussion and as in common layman usage, will be generically referred to as IVF.

1.4 Mission, vision, values and goals

1.4.1 Mission statement

The generic strategy of the centre is to provide comprehensive treatments (“products”) for couples with infertility in a personalized, caring approach and according to evidence-based practice. As a voluntary participant in the accreditation of IVF clinics by the Canadian Council on Health Services Accreditation (CCHSA), the program steered the organization to formalize its mission statement in 2002, “As a leader in reproductive medicine, we provide compassionate, comprehensive care to our clients. As an academic unit, we maintain an atmosphere of enthusiastic enquiry, and use research and education to promote total quality improvement.” The organization has also committed its vision, values and goals on paper.

1.4.2 Vision, values and goals

1.4.2.1 Vision

The organization’s vision is to become and remain a centre of excellence for reproductive medicine.

1.4.2.2 Values

The following are the organization’s values:

- Family building is a human right and must be respected.
- The integrity of the individual must be preserved.
- All decisions must be guided by ethical principles and in the best interests of those we serve.
- Knowledge in reproductive medicine is ever expanding and must be supported.

1.4.2.3 Goals

The goals of the organization are:

- To foster and promote research in all aspects of reproductive medicine.
- To provide education to health care professionals and the community.
- To promote a holistic and comprehensive approach to reproductive care.
- To become the major referral centre for reproductive care.

1.5 Infertility management and best practice

1.5.1 Infertility management

Not all patients require IVF treatment initially. Figure 1-2 provides a simplified chart to show the stepwise manner of investigation of infertile couples and where a correctable cause is identified, management is directed accordingly. For example, if a woman has infrequent menstrual periods and ovulations, health-related causes, such as thyroid disease, are identified and corrected first. This is followed by fertility medications to bring on ovulation if appropriate. If the woman fails to achieve a pregnancy despite successful ovulations over a period of time, or her partner has subnormal sperm parameters, the couple will be counselled in detail on other treatment options in addition to IVF and ICSI. These options must take into consideration cost, the level of invasiveness of the treatment and required resources, both emotional and financial. However, despite this general approach, age, duration of infertility and other factors can influence the choice of treatment. Further, a lack of consensus of medical opinions in controversial areas may also lead to different recommendations.

In couples who are just starting to plan a family, the fecundability or probability of conceiving after one menstrual cycle (“one month”) is estimated to be 20% (say, “F”) from some studies using life-table analysis (Kaplan-Meir survival analysis). The cumulative probability of conceiving after 12 months (say, “P”) is estimated by the formula (similar to the compound interest equation in business finance): $P = 1 - [1 - F]^{12} = 1 - [1 - 0.20]^{12} = 0.93$.

The fecundability percentages (spontaneous or treated) listed in Figure 1-2 are only for infertile couples without a known cause who have been trying to conceive for a few years and are not adjusted for age. However, they provide an approximate guide to the effectiveness of the different treatment options relative to doing nothing (“manage expectantly”). The various abbreviations in Figure 1-2 and some of the fertility or IVF procedures are summarized in Table 1-2.

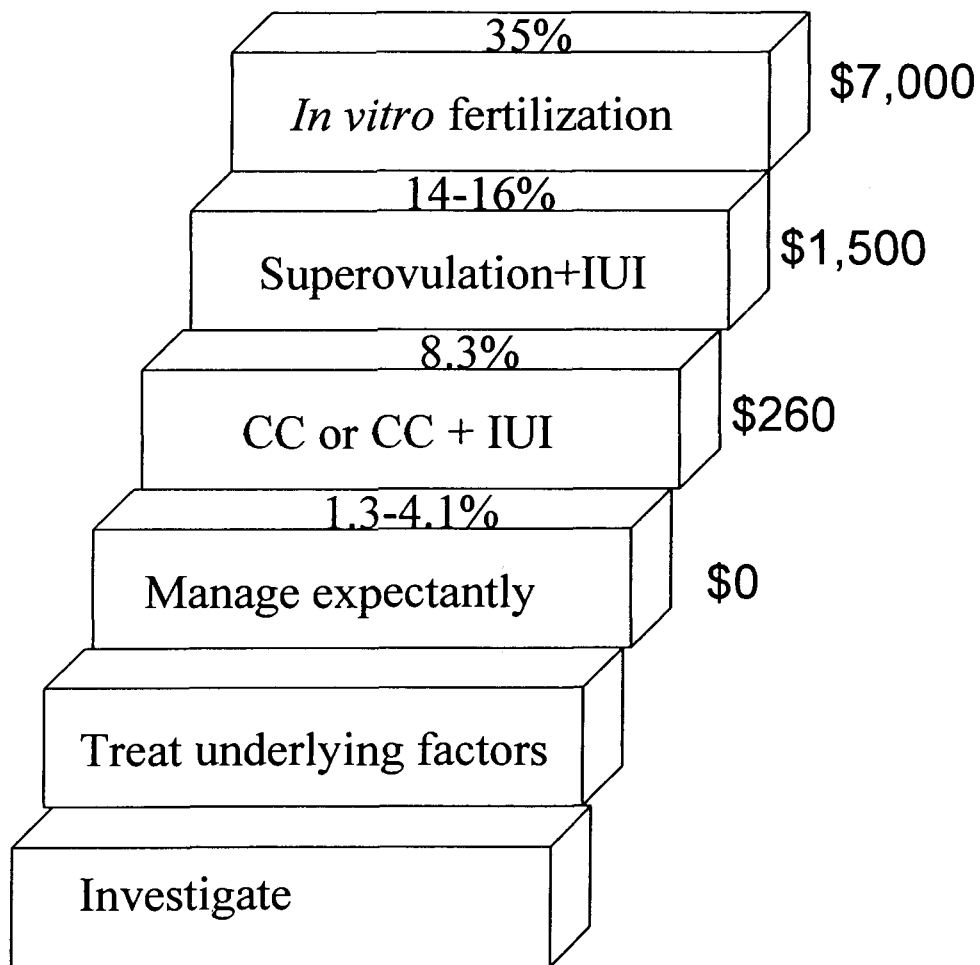


Figure 1-2: Stepwise approach to infertility management

As a couple goes up each treatment step, the probability (%) of conceiving after one cycle (fecundability) increases but the treatment also becomes progressively more complex and invasive, and the required resources, financial (\$) and emotional, markedly increase. Numbers are approximations for illustration only. See text and Table 1- 2 for details.

1. **Manage expectantly** – No treatment for a while expecting natural conception to occur.
2. **CC - Clomiphene citrate**, a fertility pill.
3. **IUI – Intrauterine insemination** (sperm are washed and concentrated and placed into the uterine cavity when ovulation is imminent).
4. **FSH – Follicle stimulating hormone**, a common hormone used to stimulate the ovaries for IVF.
5. **IVF – In vitro fertilization** or “test-tube baby”, the ovaries are first stimulated with FSH to produce more mature eggs which are then retrieved from the ovaries and fertilized by sperm in the culture dish; the fertilized eggs are then transferred into the uterus a few days later and hopefully, at least one embryo will attach to the lining of the uterus, a physiological process called, *implantation*.
6. **ICSI – Intracytoplasmic sperm injection**, a process done under the microscope where a single sperm is directly injected into the egg to overcome the barrier to fertilization from too few sperm or sperm of poor quality; the remaining steps are the same as IVF.
7. **PGD – Preimplantation diagnosis**, after the fertilized eggs have been cultured in the laboratory for a few days, as in standard IVF to form a pre-embryo, a single cell from the pre-embryo (usually at the 8-cell stage) is taken out, techniques used in molecular biology are then applied to identify the genetic disease of concern; if it is absent, the pre-embryo (where a single cell is taken for diagnosis) will be transferred into the uterine cavity.
8. **ART – Assisted reproductive technologies**, a general term encompassing IVF and related procedures such as ICSI. In common layman usage, IVF is frequently used in a generic sense for ART.
9. **HSG – Hysterosalpingogram**, a special X-ray to assess the patency of the fallopian tubes and the uterine cavity.
10. **Laparoscopy** – a surgical procedure done under general anaesthetics as a day-surgery procedure; a “pencil-thin” telescopic device is inserted through a small incision in a skin fold near the navel, to assess the abdominal and pelvic cavities.
11. **Hysteroscopy** – a “pencil-thin” telescopic device is passed through the neck (“cervix”) of the womb to evaluate the inner cavity.

Table 1-2: Some common terms used in infertility management

1.5.2 Best practice

In one study of 200 women planning to have a family, the monthly probability of pregnancy decreased from 30% at one month to 3% at twelve months.¹ Thus, a clinic which offers early IVF treatment will have better success rates if they deal with couples who have been trying for a pregnancy for a relatively short time. Such a clinic would acquire a good reputation from treating these good prognostic clients. In contrast, a clinic with a more comprehensive and evidence-based approach would advise couples with an unidentifiable cause (or with a correctable cause that has been normalized), to wait or try other less expensive and invasive treatments, taking into account the woman's age, and the couple's duration of infertility. The latter approach is the general philosophy adopted by the program. However, in certain controversial instances, medical opinions on recommending IVF can vary widely. A common example is that based on some studies, a low percentage of normal sperm morphology is a criterion for IVF and ICSI without considering the couple's overall characteristics, such as age, duration of infertility, and previous history of a pregnancy. In addition to the above medical factors, our society's desire for instantaneous results might influence those who can afford IVF to proceed with treatment early. As some private clinics may adopt IVF treatment early, they acquire a "business" advantage and market their reputation of having good pregnancy success rates that are influenced by selection bias.

Another important parameter that has been downplayed by fertility physicians and infertility clients is multiple pregnancies particularly high order multiple pregnancies of triplets and above. Because low implantation is a major limiting factor in IVF practice, it has been common practice until recently to replace 3-4 embryos or more to increase the chance of pregnancy success. Such an approach is taken by some clinics, particularly in the U.S.A. where branding according to high pregnancy rates is strategic. High order multiple pregnancies are responsible for a high proportion of prematurity, low birth weight infants and perinatal mortality. Hence, there is a growing concern and heightened awareness of multiple pregnancies and related medical, social and emotional burdens associated with these perinatal adverse outcomes. In response to critics, there is a trend for many clinics to reduce the number of embryos transferred, especially in good prognostic patients and particularly in countries where IVF treatment is

¹ Zinaman MJ, Clegg ED, Brown CC, et al. Estimates of human fertility and pregnancy loss. *Fertility and Sterility* 1996; 65:503-509.

publicly funded. Indeed, some countries have made efforts to limit replacement of embryos to two (e.g., the United Kingdom, Australia and New Zealand) and even one (e.g., Sweden and Finland). In our program, we replace two embryos for women aged less than 35 years; for women aged 35-39, we also encourage replacement of two embryos but make an allowance for three in the case of previous IVF failure and embryo quality. There is, therefore, a trade-off between pregnancy rates and multiple pregnancy rates.

As a “benchmark”, preliminary results reported for 6,366 IVF treatment cycles (including ICSI) undertaken in 20 IVF centres in 2002, showed the overall pregnancy rate was 30% per cycle started. Of these cycles, 63% of pregnancies were singletons and 89% of the multiple pregnancies were twins. As expected, the woman’s age had a strong influence on the pregnancy rate: for women under 35 years old, the pregnancy rate was 37%; for women aged 35-39 years, the pregnancy rate was 28%; and, for women 40 years old and over, the pregnancy rate was 15%. The program’s corresponding age-specific pregnancy rates were 42%, 33% and 12% per cycle started, which were better than the national figures (excluding the older age group). The lower pregnancy rate in women 40 years old and over was related to a higher proportion of women aged 43-44 years. In this age group, the fertility potential of a woman aged 44 is expected to be substantially lower than a woman aged 40 compared to that for the same age gap in the younger groups. This further confirms that pregnancy rates, especially the commonly quoted overall pregnancy rates, are influenced by the profile of clients attending a particular clinic. Expressing the pregnancy rates as “per cycle started” is important to standardize the denominator, as some cycles are cancelled before reaching the stage of egg retrieval due to poor response of the ovaries to hormone injections.

1.6 Product/Service

1.6.1 IVF/ICSI

IVF and ICSI are effective treatments for fallopian tube obstruction, severe male infertility, and persistent infertility after conventional treatments have failed.² As mentioned, IVF treatment was initially introduced to help women with bilateral blocked tubes to conceive. In the

² ESHRE Capri Workshop Group. Guidelines to the prevalence, diagnosis, treatment and management of infertility. Human Reproduction 1996; 1:1775-1807.

1990s, ICSI was introduced to assist men who have poor sperm count or quality to sire a pregnancy. These procedures are now also the end-treatment for couples who fail other treatments. IVF and ICSI treatments are costly, as with any new health technologies, highly trained personnel and expensive equipment are required. In recent years, IVF, combined with concurrent technological advances in related disciplines, has further extended its potential use. For example, IVF in conjunction with pre-implantation diagnosis (PGD) has assisted couples who are carriers of a hereditary disease to achieve a healthy baby. This is facilitated by major technical advances in molecular biology.

1.6.2 Service differentiation and generic strategies

Procedural costs of IVF are around \$4,700; ICSI adds another \$1,500. However, required hormone treatment to stimulate the ovaries will add another \$1,000-4,000, depending on the response of the individual woman. While pricing of the various components of IVF treatment varies among the competing clinics, overall differences for the main procedures of IVF or IVF with ICSI are relatively small, particularly between the two local clinics (Table 1-3).

Items	Program	Local Competitor	New Clinic (another city)
IVF orientation	\$ 0	\$ 200	\$ 150
IVF	\$ 4,355	\$ 4,500	\$ 4,250
IVF+ICSI	\$ 5,900	\$ 6,000	\$ 5,250
Donor egg IVF cycle	\$ 6,180	\$ 6,500	\$ 5,300
Daycare surgery fee	\$ 350	\$ 0	\$ 0

Table 1-3: IVF fee schedules

Although the clinic is non-profit, pricing must cover the cost of providing the comprehensive services with a margin which can be used for growth, capital expenditures and, staff training and development. There is an expectation that services provided by the university program be priced lower than a private clinic. Considering these factors, average fees are 4% lower than the local competitor in other items that are not listed in Table 1-3 (e.g., cryopreservation of embryos or sperm). Direct dollar comparisons are difficult due to the different products and packages offered. Furthermore, unlike some consumer goods, the perception that “high price means high quality and low price means low quality” is probably more important in health care services.

By adhering to its values and goals, the program differentiates itself in the delivery of IVF services which has become its generic strategies. These include individualizing treatments

and counselling couples on all possible options, while not promoting IVF treatment alone. As mentioned earlier, the stepwise approach to infertility management (Figure 1-2), as well as the comprehensive services in reproductive endocrinology, provide a portfolio of options and support services. A private clinic specialising in IVF alone cannot provide these services to the same extent. Strengths in the program include a strong team approach with a responsive attitude, a comprehensive service, and psychological counselling, all without significantly increasing IVF treatment costs relative to competitors’.

From the revenue perspective, however, there are advantages and disadvantages. One reason is that unlike IVF, some of the other product offerings are covered under MSP. Reimbursements of these funded treatments are usually low relative to the time and effort required to provide them. In fact, many of these services have no fee codes to reflect the special training and expertise required to provide them. Commonly, they are charged as a return visit in a surgical specialty which amounts to just over \$20 per visit. Reimbursements from MSP belong to the individual physician and not the clinic. Meanwhile, support activities are required to sustain these activities. However, these activities are important services of the organization’s mission, whether or not these patients will become clients of the organization’s IVF program. While sperm preparation for IUI is not covered by MSP, the cost is relatively low at \$150. In contrast, because IVF is not covered under MSP, the cost is determined by full cost recovery and once minimum efficient scale is reached, a profit margin can be achieved. The high costs of IVF related procedures borne by consumers are the main revenues for IVF clinics and the main business “product” requiring strategic management. Although the other treatment options short of IVF are considered as complements, in many circumstances, they can also be considered “substitutes” in Porter’s five forces analysis.

1.7 Target population in the province

1.7.1 IVF clinics in the province

As mentioned previously, the university program was the only IVF program in the province until 1995 when the private program started in close proximity. The university program suffered a significant loss of market share from a fatigued leadership weighed down by the internal split that led to the establishment of the private clinic, and good marketing strategies from the challenger. With a new recruitments since late 1996 and a change of leadership around 1999/2000 at the corporate and program level, the program has regained its market share and markedly improved its pregnancy rates. In 2003, a new clinic started in another city of the

province but due to the referral pattern, this new clinic has more likely affected the local private clinic than the university program. It is estimated that currently, the university program accounts for approximately 35%, the private clinic 50% and the new clinic 15% of the total market share in the province.

1.7.2 Characteristics of target population

The provincial female population in the reproductive age group of 20 to 44 years has remained fairly stable for the last few years (Figure 1-3A) while the average livebirths per 1,000 women in the corresponding years have dropped (Figure 1-3B). However, these overall figures mask the age-specific statistics (Figures 1-3C and Figure 1-3D). Within the reproductive age group served by the program, the largest group of clients are aged 35-39 years (39%), followed by those aged 30-34 years (28%) and lastly, those aged 40-44 (26%). Less than 7% were under 30 years of age. This corresponds well to the trends in age-specific female population and livebirths in B.C. (Figures 1-3C, Figure 1-3D and Figure 1-4).

As information becomes widely available via the internet, consumers are becoming more sophisticated. Armed with this information, they compare individual program pregnancy successes and question why some tests or procedures are not done or not available. In part, this research is driven by the high “out-of-pocket” costs of IVF treatment, as couples want to ensure the best return for their expenses. However, as alluded to earlier, selecting a clinic for treatment purely on the basis of listed pregnancy rates can be misleading as the selection of clients to undergo IVF and the patient casemix (such as age) can have a significant influence on the outcomes.

1.8 Objectives and goals

In 2003, the organization proposed the following objectives in its strategic business plan: 1) to increase its IVF market share; 2) to expand services and 3) to expand research activities. The measurable outcomes of the first two objectives will be an increase in clinic referrals and treatment cycles, resulting in increased revenues. Expanding research activities will be measured by an increase in research funding, the number of scientific abstracts presented in national and international meetings, and papers published in professional journals.

1.9 Main issues facing the organization

There has been growth and expansion of services and patient volume following a combination of factors which include the formal establishment of the fertility and endocrine

clinic, recruitment of physician specialists and a change of leadership. This is reflected by increased referrals and numbers of IVF cycles (Figure 1-1) and increased revenues (Table 3-2). The major financial issue facing the organization is how to maintain and further increase its market share in the mature phase of IVF service. The strategic issue facing the organization is how to strengthen its competitiveness and long-term market position to regain leadership and recognition as a centre of excellence for reproductive medicine. Achieving these objectives in congruence with its mission and values as a non-profit organization, and according to good clinical and business practices, are challenges for the organization and its program.

1.10 Organization of treatise

This chapter has given an overview of the organization, its service, its target market, some characteristics of its consumers, and the key issues facing the organization. Chapter 2 will describe the IVF industry, identify key competitors and conduct an industry analysis with Porter's five forces model. Chapter 3 will describe the internal environment of the organization in terms of resources, capabilities and core competencies through criteria of sustainable advantages and value chain analysis. Chapter 4 will discuss the key issues facing the organization and integrate findings of industry analysis and internal analysis from Chapters 2 and 3. Finally, Chapter 5 will summarize the various strategies that the organization should consider and provide recommendations to the issues faced by the organization.

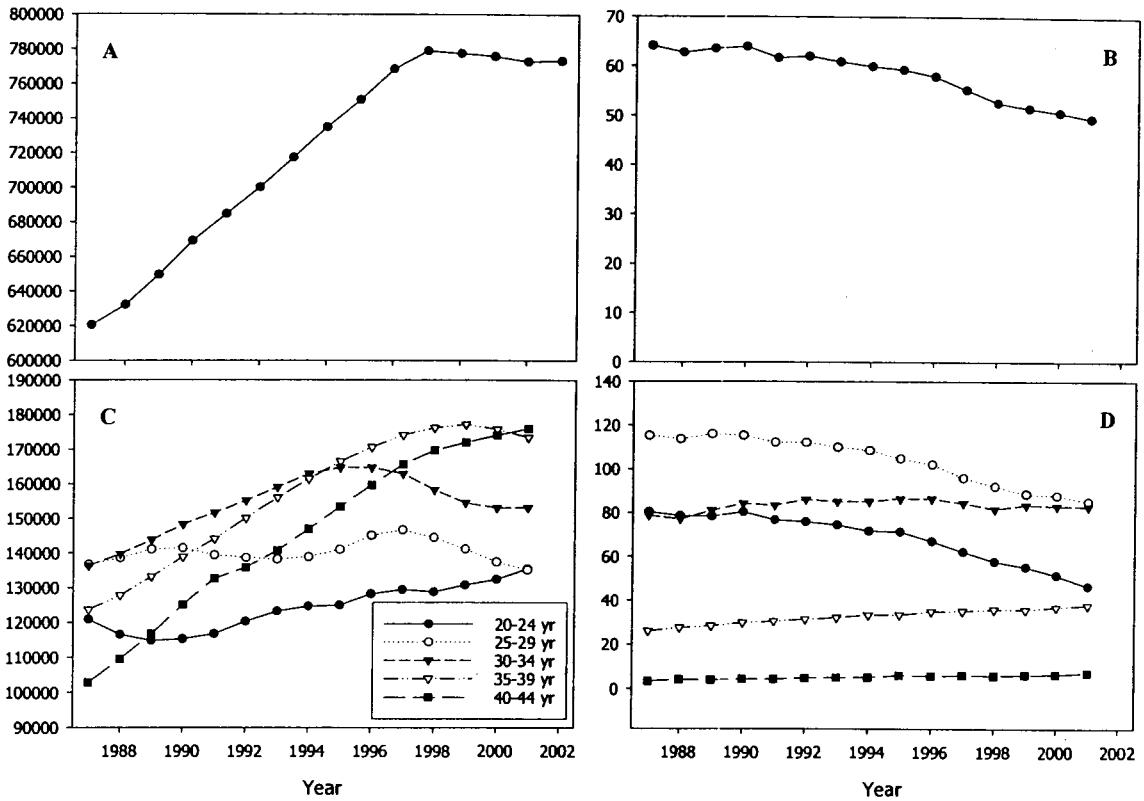


Figure 1-3: Total and age-specific female population and livebirths in B.C.

(A) Total female population aged 20-44 yr
 (C) Age-specific female population

(B) Livebirths per 1,000 women aged 20-44 yr
 (D) Age-specific livebirths per 1,000 women

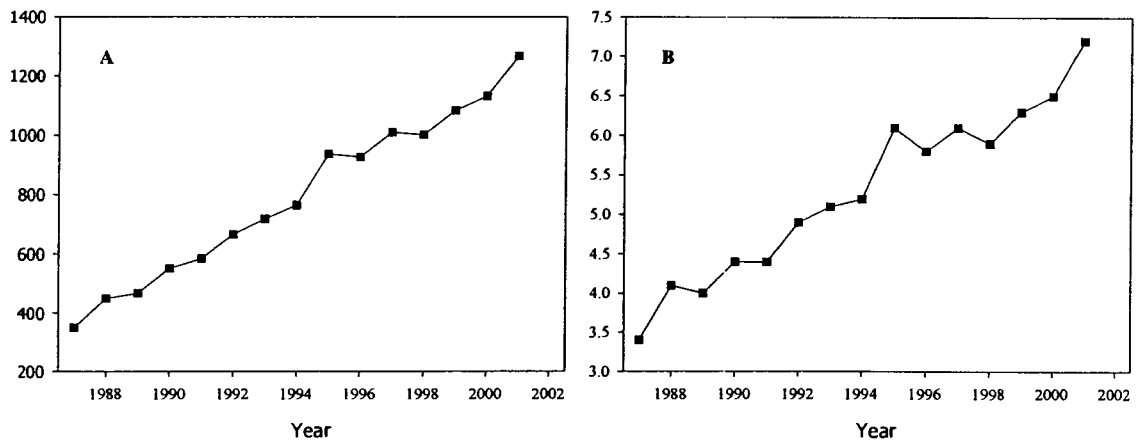


Figure 1-4: Livebirths (A) and livebirth rates (B) per 1,000 women aged 40-44 in B.C.
 (Rescaled to highlight details)

2 INDUSTRY ANALYSIS – IVF CLINICS

In addition to pathophysiological factors that govern fertility, there are also socioeconomic factors involved. These combined determinants will affect the cohort size of women in the reproductive age desiring children and subsequently, seeking fertility treatment and possibly, IVF services. This chapter will first describe some of the socioeconomic factors that determine fertility and hence, IVF service. It will then outline the IVF industry in terms of size and global/local dimensions, information on the market shares in Canada and the different service levels of infertility management. This will be followed by Porter's five forces analysis. The chapter will then provide an overview of the industry attractiveness and conclude with some key success factors.

2.1 Social determinants of fertility

“Each year Canadians spend about \$30 million on just one technology—*in vitro* fertilization—in an attempt to correct fertility problems.”³ Canadian women are having children later in life, with more women having their first child in their late thirties or early forties.⁴ In the past, traditional determinants of fertility were age at marriage, intensity of breastfeeding and level of mortality as many women died or became widowed before age 50 years. Today, despite negligible mortality before age 50 years in the developed world, the current levels of fertility are well below possible maximum. In western countries, there are less than 2 children on average per couple. A major reason is that women are postponing births to older reproductive ages. For example, in France, the mean age at first birth is now over 27 years, about 3 years older than two decades earlier. This has been attributed to the lengthening of the education period, more women entering the labour market, the uncertainties of this market and the availability of effective contraception.⁵ Advanced maternal age is associated with increased spontaneous abortion and

³ Health Canada. Report from consultations on a framework for sexual and reproductive health. 1999; http://www.hc-sc.gc.ca/hppb/srh/pubs/report/text_only.html.

⁴ Grindstaff CF. Canadian fertility 1951 to 1993: From boom to bust to stability? Canadian Social Trends 1995; 39 Winter: 12–16. Ottawa: Statistics Canada.

⁵ Leridon H. Les nouveaux modes de planification de la famille en Europe. In: Van de Kaa D, et al. (ed). European populations: unity in diversity 1999; Kluwer Academic Press, Dordrecht.

declining fecundability. The common question is whether there is any correlation between low birth rates and the availability and practice of contraceptive methods and abortion rates. This is unlikely since countries where contraception practice and abortion rates are low, as in Spain and Italy, also have low birth rates of 1.17 and 1.18 respectively. There is also no clear correlation between age at first marriage and birth rate. In Spain and Italy, the age at first marriage is around 26-27 years but the birth rates are very low as reported above. Yet in Denmark and Iceland where the age at first marriage is 29 years, the birth rates are higher at 1.81 and 1.87 respectively.⁶ The most likely reason for low birth rates in western countries is socioeconomic.

2.2 Socioeconomic factors and fertility

There are two economic theories to explain the fertility rates observed in Western countries. One is the “price of time” model and the other is the “relative cohort size” hypothesis. The “price of time” model⁷ suggests that the desire for children, assumed to be positively related to family income, is related to the price of time spent in caring for children. It emphasizes the importance of a woman’s labour force participation and her wage relative to her partner’s in determining that price. It is hypothesized that during the postwar 1940s and 1950s, the wages of men rose more rapidly than those of women who were displaced by men returning from the military. The “price of children” therefore fell relative to the ability of the families to support them and led to the baby boom. This was reversed in the late 1960s and 1970’s as labour market opportunities for women increased, raising their wages, and leading to an increase in the relative “price of children” and the subsequent baby bust.

The premise of a positive relationship between the desire for children and family income is the same in the “relative cohort size” hypothesis but assumes that the couple’s material aspirations, which relate to the standard of living they experienced growing up, influence their

⁶ ESHRE Capri Workshop Group. Social determinants of human reproduction. *Human Reproduction* 2001; 16:1518-1526.

⁷ Butz WP, Ward MP. The emergence of countercyclical U.S. fertility. *American Economic Review* 1979; 69:318-328.

decision to have children.^{8 9} They feel able to afford children only if their family income exceeds some threshold determined by material aspirations. Young adults in the 1950s belonged to a very small cohort of the baby bust in 1930s relative to the size of the labour force. Their wages were driven up compared to workers of their parents' generation. These young adults in the 1950s were also raised in the depression and war years and had lower material aspirations than adults in the 1960s and 1970s, leading to the baby boom.

A model combining these two theories has also been used to explain the pattern of fertility rates observed in the U.S.A. both before and after 1980. In the late 1960s and early 1970s, the sharp rise in women's wages was thought to buffer the U.S.A. from the extremely low fertility rates observed in other Western countries. During this period, women's higher wages became an important source of family income relative to those of men and this exerted a positive effect on fertility rates because of the ability to purchase child care.

In essence, these theories indicate that the most important factor contributing to the current low fertility in developed countries is the relative income of young couples. The income of young men relative to the income of prime aged adults, namely their parents, sets a desired standard of living for them to gauge their ability to support a family. The relative cohort size is a main influence on the young man's income. Young women's wages exert both a negative "price of time" and a positive income effect on fertility. This in turn is influenced by the couple's willingness to accept purchased child care according to their total income, their differential income relative to one another, and their perceived standard of living.

2.3 Socioeconomic factors and IVF service

Because IVF is not funded by MSP and is an elective procedure, affordability with respect to total household income is expected to play an important part in deciding on IVF treatment, even when it is the only treatment to achieve a pregnancy. Access to service is another factor because of the complexity of IVF treatment, requiring daily hormone injections, monitoring of ovarian response with frequent blood tests and periodic ultrasound assessment.

⁸ Macunovich DJ. The role of relative cohort size and relative income in the demographic transition. *Population and Environment* 1999; 21:155-192.

⁹ Welch F. Effects of cohort size on earnings: the baby boom babies' financial bust. *Journal of Political Economy* 1979; 87:137-144.

Thus for “out-of-town” couples, there is the added inconvenience and extra indirect costs. In the last two decades, the large cohort of female boomers who had delayed childbearing and were racing against the biological clock, overwhelmed the existing IVF service. This cohort is now dwindling as a large proportion of the female boomers have now passed the reproductive age. The question is whether the demand for IVF service has peaked.

2.4 Industry in terms of size and global/local dimensions

2.4.1 Demand for IVF services

It is estimated that there is a need for 3000 IVF/ICSI cycles per million population per annum (c.p.m.pa). Because only 50% of infertile couples seek consultation and treatment services for infertility, the optimal demand is more like 1500 c.p.m.pa.⁶ The actual number might be even less, as the cost of IVF and ICSI is more than some infertile couples are able to afford and/or the service may not be available in a particular geographical region. Combining various surveys available in 2001, Collins reported a total of 2,203 IVF centres from 48 countries, giving an estimated average of 0.50 centres per million population within the 48 reporting countries or 0.37 centres per million population in all of the 191 WHO member countries.¹⁰ The range varied from 0.01 IVF centres per million population in Indonesia and Pakistan to 4.34 in Greece. In 2001, Canada had 23 IVF centres giving 0.75 centres per million population.

2.4.2 Target population

Using the optimal demand of 1,500 c.p.m.pa, the number of IVF/ICSI cycles would be 6,000 cycles since the B.C. population is about 4 million. This might be too generous as demand is influenced by factors other than availability. Social determinants of fertility and the trend of low birth rates have been detailed earlier. Further, fertility rates are influenced by the actual age and gender composition (Figure 1-3) and not just the absolute population. In BC, the number of females aged 20-44 years was 779,098 in 2001 and remained the same in 2002 (777,346). If we apply these estimates for IVF service to the number of eligible women aged between 20 and 44 years, our target population, a more conservative estimate would be 1,169 cycles (1,500 multiplied by 779,098/1,000,000 of women aged 20 to 44). Indeed, it is estimated that there were

¹⁰ Collins JA. An international survey of the health economics of IVF and ICSI. *Human Reproduction Update* 2002; 8:265-277.

about 1,000 cycles performed in the province in 2003. At this level of service, there is a negligible wait list suggesting that this conservative estimate might be more realistic and that service volume might indeed have peaked at current treatment costs. If true, it means that a volume increase in one clinic will be at the expense of another's market share. However, as mentioned earlier, other factors also influence demand. Affordability, government funding and geographical access will undoubtedly change the level of demand.

2.4.3 Price elasticity

In a randomized study, Manning et al. confirmed the relationship between cost to the consumer and utilization of health services. He showed that the use of health care services declined when cost sharing rose from 0 to 25% of the total cost.¹¹ To assess the relationship between the cost of IVF service and utilization of IVF service, Collins applied the price elasticity formula to utilization and cost information available from 25 countries relative to those of the U.S.A.:

$$\text{Elasticity} = \frac{\% \text{ Change in quantity of service}}{\% \text{ Change in price to consumer}}$$

For example, in 2002, the U.K. c.p.m.pa was 441 and average costs were US\$2,955 per cycle. In the U.S.A., corresponding figures were 126 c.p.m.pa and US\$9,547. Using these numbers, Collins obtained a price elasticity of -3.62:

$$\left(\frac{441 - 126}{126} \right) \div \left(\frac{2955 - 9547}{9547} \right) = -\frac{2.5}{0.69} = -3.62.$$

Correspondingly, the average of the price elasticity calculated for each of the 25 countries relative to the U.S.A. was reported to be -3.18, implying a 10% reduction in cost per IVF cycle would result in a 32% increase in utilization of IVF cycles.

However, these numbers need to be interpreted with caution. Firstly, in the situation under discussion, the arc price elasticity formula should have been used to approximate the price elasticity of demand instead. The arc elasticity formula is:

¹¹ Manning WG, Newhouse JP, Duan N, et al. Health insurance and the demand for medical care: evidence from a randomized experiment. *American Economic Review* 1987; 77:251-277.

$$\text{Arc elasticity} = \frac{\text{Change in quantity of service}}{\text{Change in price to consumer}} \times \frac{\text{Average price}}{\text{Average quantity}}$$

Using this formula on the U.K./U.S.A. example, the price elasticity would be:

$$\begin{aligned} &= \left(\frac{126 - 441}{9547 - 2955} \right) \times \frac{(9547 + 2955) \div 2}{(126 + 441) \div 2} \\ &= \left(\frac{-315}{6592} \right) \div \left(\frac{6251}{283.5} \right) = -1.05. \end{aligned}$$

This revised number would suggest that IVF demand was not as price sensitive as Collins had found. Secondly, the IVF cycle costs available for the above calculations were not necessarily borne by the individual consumer as the actual costs to the consumer could vary from 0 to 100%, depending on how much IVF treatment was funded in each of the 25 countries. Further, IVF costs as a percentage of the household income and cost of living in each country were expected to differ from that of the U.S.A. Converting treatment costs from each country's currency to U.S. dollars using the respective market rate would not have adjusted for purchasing power parity among these countries. Thus, although this academic exercise suggested that IVF treatment might be sensitive to costs, the results obtained would not be sufficiently reliable to be used to predict service volume in Canada. Another way of interpreting the data is that in countries where IVF treatment is publicly funded, the treatment costs are lower and service volumes are higher. As discussed earlier, the elective nature combined with the high "out-of-pocket" costs of IVF treatment relative to the consumer's income are likely stronger deterrents to IVF utilization in addition to clinical and regulatory policies governing access.

2.5 Market shares

2.5.1 Annual total number of IVF cycles in Canada

The estimated total number of IVF/ICSI cycles in Canada in 2003 was around 6,500 cycles. This estimate was extrapolated from information provided by IVF clinics to the Canadian ART Registry (Table 1). Currently, there are 25 clinics in Canada: one each in Alberta, Saskatchewan, Manitoba, New Brunswick and Nova Scotia, three in British Columbia, five in Quebec and twelve in Ontario. About half of the total cycles are done in Ontario.

	Year			
	1999	2000	2001	2002
No. of cycles	4,292	4,896	5,380	6,366
No of centres submitting data	18	19	19	20
Total no. of centres	24	24	23	22

Table 2-1: Number of IVF cycles (including ICSI) reported to the Canadian ART Registry

2.5.2 Competitors in the province

As mentioned in Chapter 1, there are currently three IVF clinics in the province, two in close proximity within the main city, the university program, which is one of the oldest in Canada and a private clinic started in 1995, and a new one in a second city started in 2003. Because of the referral pattern, the new clinic has more likely affected the private clinic than the university program. It is estimated that the university program accounts for approximately 35%, the private clinic 50% and the new clinic 15% of the total market shares. Although both clinics in the main city have American consumers, the majority of clients are from the province and most from the metropolitan area. As in other health care categories, it is uncommon for residents in the province to seek treatment in other provinces or in the U.S.A. because of the time lost from work and away from home, and other indirect costs. Hence, this industry analysis will focus on the province where the program is located.

The main local competitor is a private clinic, located in a modern, office building and co-owned by two physicians. Both are reputable subspecialists in reproductive medicine in Canada. As mentioned in Section 1.1, hospital politics, internal conflict within the organization and successful marketing and politicking of the local competitor were some factors that led the program to lose its market share. Specifically, these factors have encouraged many gynaecologists, at least in three regional hospitals, to send patients to the local competitor. The hospital base of the organization's department was the origin of hospital politics and internal conflict while two other hospitals have physician staff who at one stage or another, was working in the local private clinic.

Another important factor that might have encouraged consumers to go to the local competitor is the perception that a private clinic might provide more personalized care. However, clients who subsequently switched to the program had commented that the local competitor was "too business oriented" or "difficult to have direct contact with a nurse or a physician". Some clients switched to the program after they had been rejected for IVF treatment by the private

clinic because of a “low ovarian reserve” based on a hormone test on day 3 of the menstrual cycle. A woman who has a low ovarian reserve has a poor response to hormone medications which leads to cancellation of IVF treatment. However, this hormone test has its limitations and strict adherence to this criterion does not make allowances for variations and inaccuracy of the hormone test, other factors such as age, duration of infertility and previous fertility, and a more holistic approach to fertility treatment. Nevertheless, by pre-selecting patients according to this criterion alone, a better prognostic group of clients and hence, better pregnancy rates, are guaranteed.

The new clinic is located in another city of the province and is run by a single physician in private practice who was formerly a gynaecologist with the university program before moving his medical practice to the second city almost ten years ago. Due to his previous referral pattern to the local competitor, this new clinic has limited impact on the program so far.

2.6 Infertility and IVF service providers

Three main groups of health care professionals provide infertility care: infertility subspecialists, general gynaecologists and family physicians. After graduating from medical school, a family physician typically has undergone a two-year training program in family medicine; a general obstetrician and gynaecologist typically has completed a 5-year residency training program in obstetrics and gynaecology; and, a fully-qualified fertility subspecialist has completed another 2-3 years of fellowship training in the subspecialty of reproductive endocrinology and infertility, after residency in obstetrics and gynaecology.

2.6.1 Service categories

Service categories for management of infertility include the following (see Table 1-2 for explanation of some of the medical terms):

1. General services – family physicians provide the initial assessment of the couples with infertility problems and subsequently refer them to the gynaecologist or infertility subspecialist, sometimes after arranging some preliminary tests within the realm of their expertise. These tests typically include a semen analysis for the man; some blood tests to assess reproductive function and occasionally, a pelvic ultrasound and/or a hysterosalpingogram (HSG) for the woman.
2. Specialized services - Gynaecologists typically provide additional medical and surgical services within their knowledge and skills. These services can include performing the HSG and the operative procedures of laparoscopy or hysteroscopy. If they have a special interest

in infertility, they may sometimes initiate treatment with fertility medications and minor office procedures such as IUI.

3. ART services - An infertility subspecialist provides all the above services but with in-depth expertise and skills to interpret test results and execute fertility-related surgical procedures respectively. Of particular importance is his expertise in providing *in vitro* fertilization (IVF) service and access to facilities providing such service (frequently referred to as IVF clinic or IVF program). In this province, there are about 8 fully trained infertility subspecialists although frequently, general gynaecologists practice as such because of their special interest in infertility management. Although a few general gynaecologists are team members in the IVF clinic, the majority of gynaecologists lack special training and expertise and are not directly involved in providing IVF treatment to their patients.

2.6.2 IVF treatment costs

As summarized in chapter 1 (Table 1-3), IVF treatment costs around \$4,700 but hormone medications increase cost from \$1,000 to \$4,000, depending on the response of the ovaries to these hormone injections. If required, ICSI will add another \$1,500. Additional steps such as cryopreservation of surplus embryos for future use or assisted hatching may be appropriate for some patients and will add another few hundred dollars. These are “out-of-pocket” costs to the patients as IVF treatment is not covered by MSP. Some employer-sponsored extended health care plans may partly cover the costs of the hormone medications but not the IVF service itself.

2.7 Porter’s five forces analysis

Figure 4 gives an overview of Porter’s five forces analysis. It highlights the main factors in each of the five forces that are discussed in more detail below.

2.7.1 Threat of new entrants

2.7.1.1 Barrier to entry

The threat to new entrants is deterred by regulations required to set up an IVF clinic and the highly specialized credentials required. Only subspecialists or gynaecologists who have been trained in IVF and have access to it can perform the procedure. The qualifications required have been outlined previously. Recent strict government regulations (Bill C6) and stringent accreditation and credential requirements from professional bodies have further raised the entrance barrier. In clinical practice and public health safety, ART is increasingly being

scrutinized not only for its adverse perinatal outcomes related to multiple births, preventable by reducing the number of embryos replaced to the womb, but the possibility of an increased risk in birth defects and other yet to be defined long-term sequelae. In addition, some areas of IVF practice such as donor eggs and surrogacy are potentially subject to abuse and commercialization, which touch on broader social and ethical issues. Indeed, Bill C-6, *An Act Respecting Assisted Human Reproduction and Related Research*, recently received Royal Assent in March, 2004 when it became law. This gives Canada one of the most comprehensive legislative frameworks in the world regarding assisted human reproduction (AHR). The law prohibits human cloning and other unacceptable activities, while protecting the health and safety of Canadians who use AHR. The Act provides controls for AHR-related research and will lead to the establishment of the Assisted Human Reproduction Agency of Canada, responsible for licensing, inspecting and enforcing activities controlled under the Act.

2.7.1.2 High upfront costs

A major component is the high fixed costs of special laboratory equipment such as gamete micromanipulators and microscopes, cryopreservation equipment and liquid nitrogen freezer tanks for embryo and sperm freezing and storage. Ultrasound machines (which can cost \$100,000 per unit) are also required to monitor ovarian response to hormone stimulation and to retrieve oocytes for *in vitro* fertilization. An IVF clinic also requires specialized clinic and laboratory space, and setup requirements such as filtered clean air and marble slabs to ensure precision by eliminating vibration to house gamete manipulators.

2.7.1.3 High operating costs

IVF service is highly specialized and labour-intensive, requiring high-cost, experienced staff such as physicians, nurses, embryologists and psychological counsellors. There are also expensive disposables needed to perform the procedures such as specialized culture media and embryo transfer catheters. For example, an embryo transfer catheter that can be used only once costs \$60. Secretarial and hormone laboratory support add further to the costs.

2.7.1.4 Learning curve and economies of scale

Existing providers have already climbed the learning curve, having established a highly integrated team for the procedure: physicians, nurses and embryologists. Experience level is important for successful outcomes. Because of the high operating costs, the minimal efficient

scale (MES) is high and a minimum number of treatment cycles is required to achieve economies of scale. However, once the break-even number is reached, the profit margin is also high.

2.7.1.5 Reputation

The reputation of an IVF clinic and its staff is important to draw patient referrals and to build clientele. However, for a new clinic in a city without an existing IVF service, referrals would not be a problem. The new clinic in the second city of the province has such an advantage. Therefore, geographical choice for a potential clinic can promote entry into the market, given the right resources.

2.7.1.6 Conclusion

Threat of new entrants into the market is presently low due to all the forces mentioned but particularly, from barrier to entry. However, the barrier can be overcome by a qualified specialist with IVF training who has the right resource and chooses his potential clinic site strategically, as demonstrated by the entry of the new clinic.

2.7.2 Intensity of rivalry

2.7.2.1 Slow industry growth and short wait lists

High “out-of-pocket” treatment cost and the lack of government funding compared to other medical treatments deter many potential buyers. As in many new technologies, IVF facilities are located in major cities only and thus geographical availability further reduces the number of potential buyers. As the majority of the large cohort of female baby boomers, who have delayed childbearing, passes through the reproductive years, the high demand for IVF observed in the last two decades is levelling off. Short IVF wait lists mean most couples can start treatment once relevant investigation is completed. This adds to competition for potential clients.

2.7.2.2 Competition for high pregnancy rates as branding

Pregnancy success depends on many factors but particularly age and the number of eggs and embryos available (which is often age related as well). The broad practice guidelines for IVF also mean that a client who elects to do IVF sooner might have a higher chance of pregnancy success. As detailed earlier (Section 1.5), some couples might be able to achieve a pregnancy just by trying the natural way a little longer or using less invasive and expensive treatment with appropriate counselling. In this regard, clinics, particularly private ones, that have a lower threshold in recommending IVF treatment, might have a competitive advantage from a business

perspective by targeting these good prognostic clients and marketing their higher pregnancy rates to potential clients.

2.7.2.3 Homogeneous product offerings

Rivalry is also intensified since IVF treatment and related procedures are fairly homogenous. Although positioning for cutting-edge technologies does occur, these new techniques are usually publicity strategies as many fall short of their promise in practice. Differences among most clinics are access to other infertility treatment options, practice philosophy (compassion, evidence-based medicine) and quality of the service.

2.7.2.4 Low switching costs

Low switching costs to rival brands add further to competition. Although client loyalty exists, when treatment fails, the frustration coupled with high treatment expenses lead some clients to try another clinic.

2.7.2.5 Others

Because the product line is narrow, strategy stakes are high. There are high exit costs due to specialized assets that have restricted alternative use and therefore, little salvage value. Fixed costs, such as labour or contract agreements, leases and a need to maintain parts for existing equipment add to the high exit costs. Also, if clients leave, the reputation of the clinic would suffer and affect referrals to its other services.

2.7.2.6 Conclusion

The intensity of rivalry in IVF services is considered high. Some private clinics have competitive advantage for reasons already described. In addition, some clients prefer the more exclusive environment of a private clinic to that of a university program. While comparison of clinics based on pregnancy success rates alone can be very misleading, it is unfortunately the bottom line that most clients focus on.

2.7.3 Threat of substitutes (also see Section 1.5 and Figure 1-2)

2.7.3.1 Voluntary childlessness

This option is uncommon. This occasionally occurs when couples fail to achieve a pregnancy with treatment options other than IVF and decide not to pursue further treatment.

2.7.3.2 *Expectant management*

This option is appropriate if a couple is young, has tried to conceive for a relatively short duration, has no obvious infertility factors, or is averse to invasive treatment intervention.* A more common reason is a lack of financial resource.

2.7.3.3 *Fertility pill (clomiphene citrate) and intrauterine insemination (IUI)*

The fertility pill and IUI is a good option for (*) above. The total cost is less than \$300 but the pregnancy rates are lower.

2.7.3.4 *Superovulation and IUI*

Superovulation and IUI is an alternative before considering IVF treatment in those with no factors identified after complete investigation. The cost is much less, around \$2000 depending on the amount of hormone injections required. Although pregnancy rates are lower than those of IVF, they are higher than the fertility pill and IUI. While multiple birth rates of *high order* are generally low, their occurrence is also more unpredictable. Hence, some argue for IVF treatment instead, where a pre-determined number of embryos are transferred back into the womb.

2.7.3.5 *Therapeutic donor insemination (TDI)*

TDI for male factors used to be the only option before the ICSI procedure was introduced, apart from involuntary childlessness or adoption. It is inexpensive and much less invasive than IVF/ICSI but the desire of many couples to have their own genes transferred to their offspring overrides the cost issue. Bill-C6 will eliminate reimbursements for sperm donation to make it an altruistic act similar to blood donation. Whether this will affect the availability of sperm donors remains to be seen.

2.7.3.6 *Surgical treatment*

Surgical treatment for infertility due to pelvic or tubal factors is an option if scarring of the fallopian tubes or pelvis is amenable to surgical correction. However, there is an increased risk of having an ectopic pregnancy, frequently in the damaged tube itself.

2.7.3.7 *Alternative medicine*

Increasingly, infertile couples are turning to alternative medicine for solutions to their infertility. While there is insufficient evidence in most of these alternatives from controlled trials, some couples are pursuing acupuncture, herbal medicine and other naturopathic approaches.

2.7.3.8 Others

Adoption is usually the end-stage decision after failed IVF treatment or when IVF treatment is inappropriate. While surrogacy is an option for some women without a uterus, social, commercial and medico-legal issues are potential concerns. Bill-C6 will eliminate reimbursements for surrogacy as practiced by some clinics.

2.7.3.9 Conclusion

The threat of substitutes is from low to moderate. The major driving force for users of substitutes is the lower costs of these options. However, because of different medical opinions and approaches in some instances, some of these options are considered complements and appropriate use of these options before IVF treatment is valid in clinical practice. Some despondent couples decide to pursue adoption or to be childless rather than going through another cycle of IVF treatment.

2.7.4 Bargaining power of customers

2.7.4.1 Elective procedures

The elective nature of IVF treatment means that consumers can defer the procedure to a later date or change their mind. This also gives them time to shop around for success rates and service. On the other hand, because of marked decrease in fertility with age, a woman in her mid 30's but particularly late 30's has tremendous biological pressure to pursue treatment.

2.7.4.2 Out-of-pocket costs

Because IVF treatment is not covered by MSP, the large expense relative to disposable income means that consumers will compare clinics, talk to friends or clients who have gone through IVF treatment and may even participate in internet chat rooms. Outgoing ex-clients or current clients from different clinics can be very vocal with their opinions or testimonials. While the numbers are relatively small compared to the silent majority, they can generate enough "noise" and rumours to influence the perception of a "naïve" consumer researching clinics.

2.7.4.3 Easy access to treatment information

With widely available websites worldwide, there is more information on infertility management, particularly ART, than the consumer can absorb. These websites vary from government, education, research or public health institutions (e.g., WHO, CDC, Health Canada), professional organizations (e.g., American Society of Reproductive Medicine, Canadian Society

of Andrology and Fertility), infertility support organizations (e.g., IACC) to private clinics (individual physicians or facilities marketing their “product offerings”). They provide the potential client with useful background information to assess each clinic accordingly. Individual clinic websites can become the portal for potential clients to obtain additional information and “shop” for success rates and services.

2.7.4.4 Low switching costs

Low switching costs are a very critical factor, particularly for the two local clinics which are in close proximity (see Section 2.7.2). As mentioned, websites provide an important overview of the clinic for couples, particularly for those out-of-town or U.S. clients who come to Canada for treatment to take advantage of the lower treatment cost and currency exchange rates. However, recent changes in medico-legal liability for non-elective procedures have temporarily stopped this potential growth sector.

2.7.4.5 Can opt for less expensive treatment

This has been covered under “Threat of substitutes” in Section 2.7.3.

2.7.4.6 Lack of buyer concentration

Because going through infertility treatment is a private matter and is undertaken by the individual couple, the lack of buyer concentration means that buyers’ power is weak from this perspective. However, this drawback is relatively minor when compared to buyers’ strength as discussed above.

2.7.4.7 Ticking biological clock

Although IVF treatment is an elective procedure, as mentioned earlier, women in their late 30’s and early 40’s are racing against their biological reproductive clocks and initiate treatment promptly.

2.7.4.8 Conclusion

The bargaining power of customers is considered high. Because their financial and emotional resources are at stake, there is a willingness to switch to rivals if their desire for a pregnancy is not met. Low switching cost to rivals is the main bargaining power that clients have. Public relations, indirect marketing and word-of-mouth recommendation are therefore very important.

2.7.5 Bargaining power of suppliers

2.7.5.1 Few suppliers and substitutes for equipment and disposables

Microscopes, gamete micromanipulators, ultrasound machines, transfer catheters, culture media and other treatment-related disposables such as micropipettes for ICSI are highly specialized and some are modified specifically for IVF related procedures. There are few substitutes for these equipment & disposables. For instance, specific culture media and specially-designed ultrasound-guided needles for egg retrieval mean that they have to be obtained from one of the few specialized suppliers. Once a particular supplier is chosen, so is the choice of equipment accessories and other peripheries. For example, an ultrasound-guided needle for egg retrieval has to match the ultrasound probe (which costs over \$10,000) corresponding to a particular ultrasound machine model (which costs \$80,000) of a certain manufacturer.

2.7.5.2 Equipment and disposables essential to business

Suppliers recognize that equipment and disposables are essential for the operation of an IVF laboratory and clinical IVF practice and charge a premium price for their supplies. For example, an embryo transfer catheter, costing \$60, is only usable once! Malfunctioned equipment or delayed supplies of essential disposables can hold up a clinic's operation.

2.7.5.3 Equipment and some disposables suppliers not dependent on IVF clinics

Because equipment like microscopes and micromanipulators are used in many scientific disciplines for research and other industrial applications, suppliers of scientific equipment are not dependent on IVF clinics. This gives them more power to negotiate a premium price for their products. They have another advantage with high switching costs since expensive equipment accessories are not complementary. The alternative would require buying a whole new set of equipment and accessories from another supplier. The same applies to suppliers of ultrasound machines and related accessories. Ultrasound machines are used in other medical disciplines, particularly radiology. IVF clinics are only one of many customer categories for these suppliers. Suppliers of disposables can fall into the equipment category or the hormone category (see below) depending on whether the companies are narrowly focused on human IVF.

2.7.5.4 Few suppliers and substitutes for hormone medications

There are also few suppliers of hormone medications; only two pharmaceutical companies supply the state-of-the-art hormone medications (manufactured by recombinant technology) to clients. Couples undertaking IVF pay a premium price for these medications

which average just a little under \$1 per international unit (IU). In a typical IVF cycle, a woman can easily use 1,000-4,000 IU.

2.7.5.5 Hormone medications essential to business

The costs of medications, which are separate from IVF procedural fees, are directly borne by couples going through IVF treatment (unless covered by their employer-sponsored medical plans). These hormone medications are essential to the clinical practice of IVF and any shortage of supply could delay the clinic's operation. Because of patent protection, there are no substitutes for these medications. However, a supplier has taken up distribution of the older hormone preparations (manufactured from urinary source), which used to be patented by the above pharmaceutical companies. These generic, urinary hormone preparations may re-circulate more widely as reliable substitutes if they are priced markedly lower than the recombinant hormone preparations, particularly if the pregnancy rates are not appreciably different.

2.7.5.6 Hormone suppliers' reliance on relatively few IVF clinics

Intensity of rivalry between these companies also means they have to access the few IVF clinics in existence rather than forming alliance with a single clinic. Unlike equipment suppliers, there are no switching costs to an alternative supplier for hormone medications. As an indirect marketing strategy, the pharmaceutical companies provide education grants and other support that are invaluable to clinics which operate under good practice guidelines as defined by the various medical professional organizations. However, such support may provide the additional funds that make a new clinic more resourceful and thus, fuel competition among clinics. In the process, a pharmaceutical company may indirectly integrate forward as a silent partner in a new clinic that it has a pecuniary contribution.

2.7.5.7 Conclusion

Suppliers' bargaining power is considered moderate to high. Apart from maintenance, equipment suppliers surface prominently in capital investment at the initial establishment of an IVF clinic or its subsequent expansion, and are an important part of sunk costs. While reliance on IVF-specific disposables and hormone suppliers is high, suppliers' reliance on the relatively few IVF clinics is also high. Goodwill alliances with pharmaceutical companies provide some advantages with education and other support to an IVF clinic. However, in their strategy to increase the utilization of hormone medications, their indirect support to all clinics, particularly start-up clinics, might also fuel competition in the IVF industry.

2.8 Overall assessment of industry attractiveness

Recent growth rates in the industry have been dampened by demographic changes as the large cohort of baby boomers pass through the reproductive years. However, there will be continuous, albeit slower growth, since assisted reproductive technology is the final “panacea” for treatment of all types of infertility. With constant innovation and technological refinement, it is at the cutting edge of reproductive medicine and as such, will not become obsolete. In this regard, it is an exciting and sustainable industry. However, until costs begin to decline and the procedure becomes less complex and labour-intensive, providers need to perform a fixed number of cycles per year to break even; but once this number is reached, the profit margin is high. Because it is an elective procedure, economy and job security can affect its demand. Demographic changes and government policy are other environmental influences. For example, if IVF treatment were to become publicly funded, the number of treatment cycles would increase markedly as there are patients who are candidates for IVF but cannot afford treatment, particularly when pregnancy success is not guaranteed. However, once it is publicly funded, the reimbursement, and hence, the profit margin, will also drop correspondingly.

The two local IVF clinics in the main city are in a strategic group because the strategy of one would directly affect the other. Both provide a referral base for clients in the province and, to a limited extent, the U.S.A., while the distant, new clinic currently serves only its regional clients. A new provider would need to have a reputation, be experienced and willing to invest heavily in “advertising” within the guidelines of the profession in order to develop a position in the market. Given the risks, high barriers to entry and competitive rivalry, the provider will also need to have financial resources to tolerate low IVF volume initially to cover high fixed costs. Potential industry support from pharmaceutical companies (see Section 2.7.5.6) might just be able to provide the additional buffer needed to set up a new clinic under these circumstances. Efficiency can be further improved by “batching” treatment cycles which is an approach some small clinics tend to adopt. By doing a batch a few times a year, labour costs can be optimized as well as the utilization of disposables which have a limited shelf-life. By having this arrangement, a smaller clinic can afford to contract an experienced, laboratory director to provide hands-on supervision of the laboratory personnel for a defined period of time and oversee, on a hands-off basis, the up-keep of the laboratory for the remaining of the year. This is a mutually beneficial arrangement as it involves less cost to the clinic and allows the hired, laboratory director to manage his other commitments. Having an excellent embryology laboratory and personnel with the know-how to troubleshoot is critical to the success of an IVF clinic. From a start-up clinic

perspective, this arrangement would be perfect if the IVF service is part of the product offerings of a gynaecological practice. In this setting, the infrastructure and fixed assets required are already part of the medical practice, particularly if it is a large group practice. The IVF service merely provides an additional source of revenues. Finally, in cities with a high ethnic population, the new provider may have an additional competitive advantage if he and/or his team are multicultural and able to provide service to a diverse ethnic group.

2.9 Key success factors

From the above analysis, the key success factors for the IVF industry are those that lead to achievement of a healthy baby from a caring, quality provider. To achieve this, the provider needs to be ethical, has climbed the learning curve, and has economies of scale by having a high volume of IVF treatment cycles and economies of scope by having a comprehensive portfolio of infertility treatments. In turn, these rely on a team of dedicated, experienced and caring, health and laboratory professionals in a reputable organization with quality clinical and laboratory facilities that brings in referrals and support from the medical community and consumers. Reputation is dependent on, pregnancy success rates first and foremost, latest technology, good quality service (both pre- and post-treatment), and evidence-based practice combined with a caring and compassionate approach. Patient volume is dependent on the demographics of the target population, the location of the IVF clinic, the concentration of competitors and the economy. From the financial perspective, an IVF clinic will succeed and weather economic downturn or demographic changes much better if IVF and related procedures are part of the total product offerings of the clinic rather than the sole product.

2.10 Summary

This chapter has summarized some of the environmental factors that can influence the demand for IVF and examined the IVF industry using Porter's five forces analysis to assess its attractiveness and its key success factors. The next chapter contains a situational analysis of the internal environment to assess the performance of the organization, specifically, its IVF program.

IVF Clinics

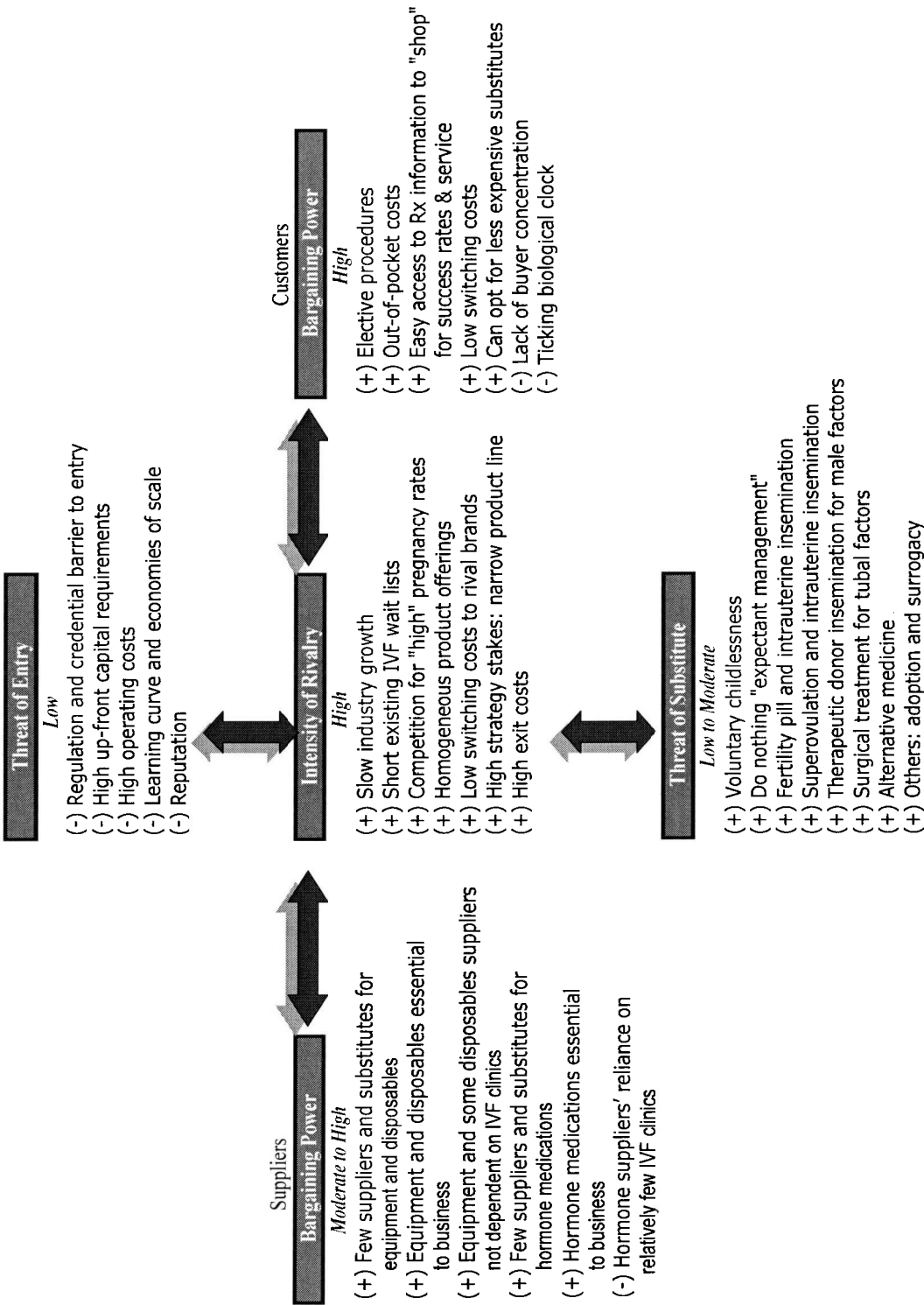


Figure 2-1: Porter's five forces chart (Based on Bukszar, 2004, after Porter, 1979).

3 INTERNAL ANALYSIS

This chapter will first provide an overview of the goodness of fit between the organization and the IVF program's generic strategy. It will then describe the organization's resources, capabilities and core competencies. Next, the chapter will outline the industry value chain and the key success factors from a service provider's perspective. This is followed by a detailed description of the organization value chain, which is a patient-oriented service value chain: its primary activities according to pre-service, point-of-service and after-service, and its supportive activities according to organization culture, structure and strategic resources. Materials and supplies management will be described in a separate value chain. This is followed by an examination of the organization's finance. The chapter will end with a conclusion on organizational fit and organizational strengths and weaknesses with respect to the key success factors.

	Cost Based					Differentiation				
	Low Cost / Adequate Quality					High Quality / Adequate Cost				
	1	2	3	4	5	6	7	8	9	10
Product Strategy	Rapid Follower					Innovative				
						7				
R & D Expenses	Low R & D					High R & D				
						6				
Structure	Centralized					Decentralized				
						6				
Decision Making	Less Autonomy					Autonomy				
						6				
Manufacturing	Economies of Scale					Economies of Scope / Flexible				
									9	
Labour	Mass Production					Highly Skilled / Flexible				
									9	
Marketing	Comparative / Push					High Cost / Pioneering / Pull				
									9	
Risk Profile	Less Risk					High Risk				
		2								
Capital Structure	Leveraged					Conservative				
										10

Table 3-1: Overview of generic strategies of the in vitro fertilization (IVF) program

3.1 Overview of strategic fit: organization vs. IVF program

An overview of the goodness of fit between the organization and the generic strategy of its IVF program is outlined in Table 3-1. Each of the items will be discussed in more detail

below. The generic strategy of the organization is to provide comprehensive treatments (“products”) for couples with infertility in a personalized, caring approach and according to evidence-based practice. The program evolved from a typical “hospital clinic” model and as such, business strategies were not verbalized or written down explicitly. However, by examining the ways the organization delivers its service, it is apparent that the generic strategy is one of differentiation. Similarly, profits are not the emphasis of this model of medical practice which works well in a non-profit setting for services funded by the health care system. Because IVF services are not covered by MSP, management of the clinic as a business has become equally important in order to survive and to compete strategically with private clinics which may select good prognostic patients. Since the program is part of an academic institution, it is expected to take on more difficult cases, including those that the private clinics might not consider. Indirectly, this different casemix of patients, as well as the threshold for recommending IVF, will influence pregnancy rates. Consumers use pregnancy rates initially as a “benchmark” to select IVF clinics. However, when they have an opportunity to experience the different attitudes or philosophy in treatment approaches, they may explore alternative clinics, particularly when they fail to achieve a pregnancy after one or two treatment cycles. Hence, the general perception of the reputation of a clinic by the referring physicians and consumers is important. How to balance a strictly medical model and the consumer/business model (including marketing) has been a struggle among different members, who are essentially academic staff, involved in the management of the program. This will be further discussed below.

3.1.1 Product strategy

The first IVF baby in Canada was conceived in the program, which gave it recognition. Together with a reputation in tubal microsurgery and ovulation-induction, the organization had been an innovator in reproductive medicine in the past. As a rapid follower, ICSI was offered around 1995 to couples with male infertility. However, apart from treatment directed at the underlying cause, empiric fertility-enhancing treatments available in the organization were between fertility pills (least invasive) and IVF treatment (most invasive). Since late 1996, a stepwise approach to fertility-enhancing treatments was introduced by a well-trained new recruit, with each step of the stair representing a treatment option (Figure 1-2). As one goes up each step, the pregnancy success increases but costs, invasiveness and complexity of the treatment, together with emotional stress also increase. External factors that influence the choice are female age, duration of infertility and conditions that preclude other options short of IVF. However, there

was little promotion of these treatment options and slow acceptance by other physicians in the organization. Some consumers, unaware of these product offerings, went to a nearby American clinic for the less invasive treatment of hormone stimulation and IUI instead. The introduction of these new “product offerings”, would rate the organization as a first mover, but delayed adoption and promotion prevented it from having the first mover advantage of drawing attention to its IVF program. In terms of the core product of IVF, the program provides value-added service as differentiation for the same price as competitors’.

The strengths of the program are its objective and comprehensive approach in recommending other treatment options (if appropriate) rather than promoting IVF treatment alone, its client-centred approach, its caring nursing staff, its in-house availability of a clinical psychologist for counselling, and its non-profit university program “brand name”. Although the program is not innovative from the “headline-catching” perspective by not promoting cutting-edge reproductive technology such as *in vitro* oocyte maturation and cytoplasmic/nuclear transfer (as some of these new technologies are, either applicable in very selective situations and/or controversial), it differentiates by providing a caring, and more evidence-based approach. While these features are consistent with the organization’s differentiation strategy, the program’s hesitancy from marketing and promoting these qualities in the past indirectly contributed to the decrease in market share with the arrival of a local competitor.

3.1.2 R&D expenses

The program provides funding for research and laboratory staff to attend national or international scientific meetings; however, it does not provide funding for academic clinicians on a routine basis. There is also funding support for staff to acquire a new skill as when the program first introduced ICSI, and for nursing staff to attend similar meetings or workshops in partnership with pharmaceutical industries within the guidelines set out by medical professional organizations. There are no direct program funds for in-house research, but some scientists or academic clinicians have independent research grants from peer review granting agencies which enhance the program’s reputation. In this regard, the program is a participant in research in ART and related areas in Canada. The research projects of academic clinicians usually examine the claims of new information as they apply to the clinical setting. An example is the claim by some studies that a low percentage of normal sperm morphology (in the absence of other sperm abnormalities) is correlated to low *in vitro* fertilization rates reported; results from the program did not find a strong correlation and helped many couples avoid IVF and ICSI procedures

prematurely. From the business perspective, this may be counterproductive but ultimately, should bring credibility to the program and widen its referral base. Thus, while studies conducted in the organization may fail to generate media hype as compared to stem cell research or create new “product offerings” claiming higher pregnancy rates, they do scrutinize outside studies and their claims to keep the clinical practice of the program current. The organization, therefore, needs to consider allocating a budget to encourage more internal R&D of this nature to provide a better fit with the program’s differentiation strategy.

3.1.3 Structure

Within the whole department, the program is considered to be decentralized because of its unique sub-specialty expertise and self-funding system, but within the organization itself, it is very centralized due to its relatively small size and narrow focus of subspecialty service. While the program can undertake its own promotion and service offerings within the broad guidelines of the department, the university and affiliated hospitals, this applies only to expenses directly related to the operation of the program, not financing and investment activities. Finance and accounting are centralized in the university finance department. Because of the non-profit nature of the entire institution, business planning to improve the program’s return on investment is not the mandate of the university finance and accounting department. Idle funds generated from the program attract no interest in the program’s university account. Hence, the more rigid administration and financial environment does not foster an organizational structure for innovation and growth, and might hinder the program’s ability to compete in the private sector. Some of the important issues on organizational structure will be mentioned below and further discussed in Section 3.4.2.

3.1.4 Decision making

Decision making, both clinical and administrative, was more rigid in the past. Since a change in management in 1999/2000, there has been a major difference in clinical decision making in that decisions are one of consensus, guided by a best practice philosophy. Nursing staff within the clinic rotates through various jobs in the program such as the procedural room, recovery room, ovulation-induction unit and the clinic; similarly, secretarial staff rotates through different areas such as client appointments, surgical bookings, laboratory results and filing. Employees are empowered to act on their own in their areas of responsibility with easy access to corridor consultation with senior management within the program. Weekly IVF team meetings provide a forum to discuss clinical management, teaching, feedback, consultation and

accountability. Recently, the program voluntarily participated in the accreditation process administered by the Canadian Council on Health Services Accreditation (CCHSA). The staff was further empowered and gained a sense of ownership when it was asked to form teams to critically undergo self-evaluation and identify areas of improvement as part of the process.

In contrast, finance and non-clinical administrative decision-making that can impact on the program is made by the division head with the assistance of the nurse coordinator/program director. Although the administrative aspects are an extension of the culture of the larger institution (i.e., the university and affiliated hospitals over which the program has no control), it is also related to the leadership style of senior management. Specifically, the medical director of the program is not officially involved in all administrative and finance decisions affecting the program. As the program is considered part of the organization, it does not have a separate governing body. On the other hand, societal, ethical and commercial concerns surrounding ART have led to a recent call to regulate the IVF industry such that an IVF clinic has become a distinct “organization” when it comes to the important aspect of accreditation, and in the near future, licensing. Hence, the current structure of the program, unlike, say, a private clinic with equal partnership arrangements, is not autonomous in deciding on its finance and investment strategies and is affected by the bureaucracy and inertia of the large institution and senior leadership style.

From the business perspective, the evidence-based approach of clinical practice, when taken to the extreme (particularly in controversial and uncertain areas) without applying wisdom or adjusting for individual differences, can also make the program more rigid and slower to respond to opportunities of innovation and differentiation or threats from competitors. These overcautious and conservative approaches might have contributed to the program’s loss of market share in the recent past with the entry of an aggressive competitor. The bureaucratic administrative approach is also not a good fit with the program’s differentiation strategy.

3.1.5 Manufacturing

Fertility treatments are assembled based on the couple’s characteristics. Treatment is tailored according to individual couples’ underlying cause, age and other relevant factors. IVF service is delivered by a strong team approach involving physicians, nursing and laboratory staff as well as the psychologist and secretarial staff. Many of the complicated treatment regimens and laboratory procedures are embedded into protocols; however, there is some flexibility to tailor the protocol specific to the client’s unique situation. The program will benefit from economies of scale because of high labour and material costs (e.g., culture media and other ingredients have a

limited shelf life) and thus, a further increase in IVF treatment cycles will optimize fixed costs and maximize marginal benefits.

The program has gained from an economy of scope because IVF service is only one of the product offerings in the organization. The clinic provides comprehensive investigation and treatment for couples with infertility. Hence, the program benefits from these services and shares the infrastructure: hormone laboratory service, andrology laboratory service, and nursing and secretarial staff that it contributes. The existing ovulation-induction program is an example, and in fact, provided some of the initial physician expertise, human resources and infrastructure required to develop the IVF program. The availability of an in-house hormone laboratory seven days a week all year round has been a great advantage. This is in contrast to some clinics where treatment cycles have to be batched so that a seven-day laboratory service can be provided for a limited time. The program also benefits from in-house ultrasound equipment for monitoring of treatment response. There is synergy among these various services such that the program is provided with seven-day a week access to hormone laboratory service, ultrasound service, as well as physician and nursing staff without interruption because of weekends or public holidays, except for planned closure in Christmas and New Year. Furthermore, physicians working in the program all have hospital privileges to complete diagnostic or therapeutic operative procedures for infertility and other gynaecological problems, or manage patients in the hospital if the situations arise. Thus, the comprehensive approach of infertility management in the organization provides economies of scope for the IVF program and fits well with its differentiation strategy. (However, an IVF clinic, where physicians do not have hospital privileges, can also have a business advantage by creating a reciprocal referral system through “outsourcing”. While patients may be inconvenienced because they have to be referred (“outsourced”) to other gynaecologists for diagnostic or therapeutic operative procedures, these specialists may appreciate the “business” and in turn, send their own patients to the referring clinic for IVF treatment.)

3.1.6 Labour

The program requires highly skilled personnel who are specifically trained in the area. Counselling, teaching and instruction are provided to couples on a one-on-one basis. Although large-group information sessions will reduce this more labour-intensive approach, the program values the couple’s privacy and individual attention provided. Specialty physicians, nurses, laboratory personnel and psychologists are required to have the appropriate training and skill sets

as well as appropriate personal qualities such as sensitivity and understanding. These intangible assets of the organization provide a good fit for the program.

3.1.7 Marketing

As mentioned earlier, marketing and advertising have been relatively limited in the program's academic and non-profit environment. The service is more a pull strategy, attracting clients by reputation, word of mouth, and recommendation from family physicians or gynaecologists. Some clinics market themselves in cutting-edge technology even though its usefulness in clinical practice still needs to be confirmed. Nevertheless, it is an effective push marketing strategy brought on by media attention. Although there is high involvement and to a certain extent "brand loyalty" after the couples have completed infertility workup and/or gone through other treatment options short of IVF in the clinic, some couples, due to recurrent failure to achieve a pregnancy, may try some other clinics. Some private clinics are located in a more lavish setting in contrast to the program which is located in an old, historic building. However, there are also clients who prefer the more scholarly look (expenses are not wasted in corporate extravagance!). The program should exploit these issues and incorporate them into the marketing strategy. Indeed, a change by the organization to pursue marketing and promotion in more recent years (see section 5.1.2) has heightened awareness and enhanced the reputation of the organization and its IVF program in the community. This will help the program compete more effectively in the private sector.

3.1.8 Risk profile

The program has a low risk profile and is not engaged in speculative practices that draw the media attention but lack substance when evaluated accordingly to standardized criteria. The program also has an endowment fund to support development of new areas as the situation dictates and to sustain it through unexpected events such as the emergence of a competitive private clinic which strategically increased its market share at the program's expense. With recruitment of personnel, formal establishment of the fertility and endocrine clinic, and new management at the department, division, and program levels in 1999/2000, there has been a significant increase in the number of new referrals, providing an important link to its IVF program.

3.1.9 Capital structure

Because the program's business model is within a university and non-profit setting, the capital structure is very conservative with no debts. It receives no operating grants from the university or hospital and operates from self-generated revenue. In a business sense, the program can increase its debt to equity ratio to improve its return on investment. However, as discussed in Section 3.1.3, this would not be in congruence with the institutional bureaucracy in which the program is a small part.

3.1.10 Summary

The program fits the traditional model of a university-affiliated clinic. However, the major difference is that IVF service is not publicly funded and the program receives no direct operating funding from the university, hospital or province. As a result, the program has to compete with commercialization of the service from private clinics but without the freedom to manage its own finance. As a small part of a large bureaucratic institution which has other priorities, there has been little promotion of the program. The lack of modern and adequate operating space is an important issue. Because of separation of finance and accounting from clinical functions, the program cannot be innovative with its free cash flow to improve its return on investment as in a private clinic. These additional sources of funds can provide growth and capital expenses such as relocation to a modern building. Who is going to take on the financial risk? In private clinics, ownership is well-defined and there is every incentive to leverage the capital structure for growth. In the program, such financial incentive is absent. Mired in the bureaucracy of the larger institution, it is not nimble enough to compete head-to-head with private clinics in these management areas of finance and investment, and capital structure for growth.

However, the fact that it is a university-affiliated, non-profit program also has its own advantages, such as the support of the finance department, which handles all the accounting. As a non-profit organization, all revenues can be used for program development. The university name also attracts instant recognition and "brand loyalty". From a clinical perspective, the existing setup is more congruent with an ethical, evidence-based medical practice, and as such, cannot be criticized for being mercenary; it is therefore a good organizational fit. However, to remain competitive by differentiation as a non-profit program for an uninsured medical service, some of the concerns raised will need to be addressed. These issues will be discussed in the next chapter.

3.2 Organizational resources, capabilities and competencies

The organizational competencies lie in its intangible assets of having specialized personnel dedicated to helping infertile couples to achieve a pregnancy. This includes a well-organized, reputable fertility and endocrine clinic (which has recently renamed a centre for reproductive health), a team of knowledgeable, caring and experienced specialist physicians, nurses, embryologists, andrologists, and psychological counsellors that are difficult to duplicate by competitors. The individual reputations of the specialist physicians, many of whom are also academic staff of the university, are the organization's strong assets. Their active roles, both as leaders and participants in professional bodies, and in teaching and research, enhance the reputation of the university department and the organization, but particularly the organization's fertility/endocrine clinic and IVF program. The reputation of the academic staff and the university brand name synergistically enhance the program's reputation. Intangible assets also include key program staff who brings additional skill sets to the clinical and management team. The current medical director and program director were relatively newcomers in the organization's history and were recruited after the private clinic started, initially as a faculty member and nursing coordinator of the program respectively. They are both energetic and have excellent interpersonal skills, attributes that the program much needed, particularly at the time when the program was losing market share and morale was low. The medical director, with a masters' degree in public health, in addition to his medical and specialist credentials, fosters an evidence-based approach with wisdom to individualize treatment. The program director, with her newly acquired masters' degree in business administration (in addition to her nursing background), brings additional management skills.

The above assets are unique as they are based on a special mix of experienced academic, clinical, and laboratory staff loyal to the organization. Although in theory, given the right resource and business opportunities, these personnel can be duplicated, in practice, it is difficult to attract well-qualified staff without the reputation of an academic institution. Indeed, the local competitor has had difficulty in recruiting qualified subspecialists who invariably would want to be affiliated with a university and/or a major teaching hospital.

Although capital equipment is expensive, it is not a unique asset, as competitors can easily purchase similar equipment. However, an endowment fund, created by a previous, visionary department head, is a unique financial resource to buffer the program in the event of financial hardship. Another invaluable physical resource is the gyne-endocrine laboratory, one of the few in Canada, which provides in-house hormone assays that are indispensable in monitoring

women on hormone injections during IVF treatment. This allows a tight quality control that is unparalleled by general pathology laboratories because of the special focus and expertise in reproductive hormone assays. The gyne-endocrine laboratory is managed by an experienced reproductive endocrinologist with a reputation in reproductive hormones, who was also the previous division head and IVF medical director. Even though the program has to pay for the hormone assays, revenues generated by the laboratory are retained within the department. Furthermore, by not outsourcing this service, the organization maintains one of its core competencies as an academic division of reproductive endocrinology and provides a distinct advantage in facilitating academic research that requires hormone assays. As mentioned earlier, the clinic, the IVF team, the ultrasound and hormone assay facilities, and an in-house psychological counselling service, are the program's core competencies and capabilities. They provide a "one-stop" comprehensive service for infertility management and give the organization competitive advantages. The above assets, tangible or intangible, are rare, valuable, costly to imitate and not easily substitutable. Another asset is the hospital site, which can provide emergency support to patients if required. Some of these assets however, are also issues confronting the program and will be discussed in more detail in the next chapter.

3.3 Industry health care value chain

Figure 3-1 shows the health care value chain from the perspectives of suppliers, purchasers and providers. The footprint of the organization is that of a provider, the central role in the health care value chain. This is the core link in the health care value chain between suppliers and payers. Suppliers are drug manufacturers, device manufacturers, medical-surgical suppliers and equipment makers. Purchasers, handlers and distributors provide a link between suppliers and providers. These products are tailored according to the needs of patients as determined by the providers and not uncommonly, are governed by budgetary constraints of "payers/buyers". In Canada, taxpayers are the ultimately "payers/buyers" through a government-administered universal health care system. However, the individual taxpayer does not have any direct voice in setting the overall availability of health care services or products as the government sets policy in this regard. This constitutes the majority of health care delivery. There are selective services that are not part of this system in which users pay out-of-pocket. Some of these services are partly covered by employer-sponsored health care supplementary plans. ART is in this category in which procedural costs and hormones used to stimulate the ovaries are not covered under MSP. While some employer-sponsored medical benefits partly cover the drug costs of the expensive hormones, they rarely cover the procedural fees.

As a health care provider in the IVF industry value chain, the key success factors are those that lead to the achievement of the desired health care outcome, i.e., a healthy baby from a caring, quality provider. These have been summarized in Section 2.9 of Chapter 2.

Suppliers	Purchasers Handlers Distributors	Providers	Insurance Companies	Payers
Drug Manufacturers Device Manufacturers Medical-Surgical Suppliers Equipment Makers	Wholesalers Mail Order Distributors Group Purchasing Organizations	Hospitals Physicians Integrated Delivery Networks Pharmacies	Insurers	Government Employers Individuals

Figure 3-1: Canadian health care value chain

Adapted from Burns, LR et al. *The Health Care Value Chain*. (Jossey-Bass: San Francisco, CA, USA, 2002).

3.4 Organization value chain – patient-oriented

In the health care industry value chain, one can focus on the central function of health care in general and construct a value chain in terms of different aspects that improve health care delivery: public health and education, medical research, medical teaching and training, and patient care. However, in the context of the health care organization under discussion, delivery of patient care alone is considered the primary activity while public health, education, research and training are delegated to supportive activities. The primary activities in Porter’s generic value chain has been specifically modified into pre-service, point-of-service and after-service as a patient goes through the fertility clinic and/or IVF program (Figure 3-2). However, because this is a patient-oriented service value chain, it does not provide enough scope to discuss management of materials and supplies and other ingredients required to provide the clinical service. Hence,

for completeness, a separate value chain using the traditional model will be discussed in Section 3.5.

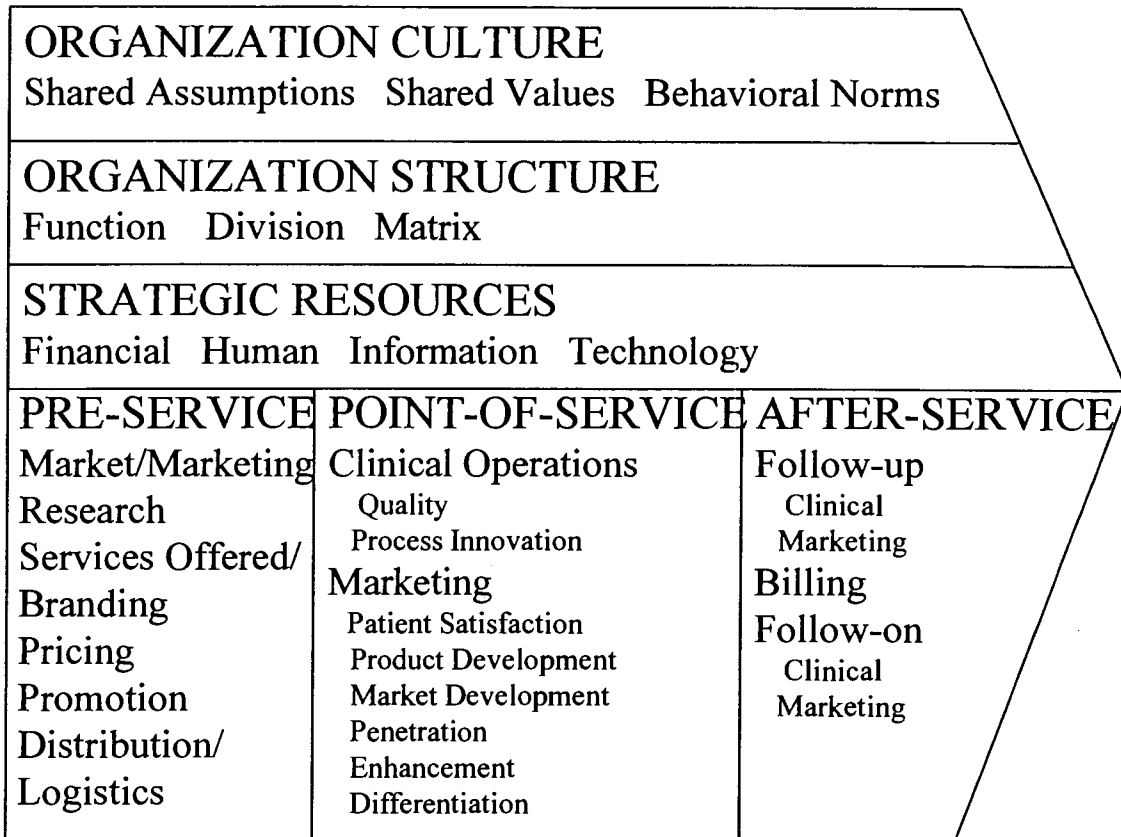


Figure 3-2: Organization value chain - modified for patient service

Adapted from Ginter PM, Swayne LE, Duncan WJ. Strategic management of health care organizations (Oxford: Blackwell Publishers, 2002), p. 141.

3.4.1 Primary activities

Service delivery includes activities in the value chain that are directly involved in ensuring access to fertility investigation and management, access to IVF treatment, provision of IVF treatment and appropriate follow-up. There are numerous opportunities to create value for patients such as efficient appointment systems, courteous doctors and nurses, “patient friendly” billing systems, easy to navigate physical facilities and absence of bureaucratic red tape. All this can greatly increase the ratio of satisfaction to price.

3.4.1.1 Pre-Service

3.4.1.1.1 Market/marketing research

The target market has been defined according to the demographic and specialized facilities and services offered by the organization and its IVF program. This target includes not only couples with infertility, but also referring physicians. Although the program has not specifically conducted any marketing research, qualitative information is available from informal feedback and comments made by clients during contacts with various members of the IVF team. These are discussed in the weekly IVF team meetings. Appropriate marketing research will quantify the needs and wants of clients to better tailor the program's offerings accordingly.

3.4.1.1.2 Branding of services offered

The program has not intentionally set out to create a "brand" in a business sense. However, by focusing and offering comprehensive fertility and IVF services to the province in a non-profit, university-affiliated setting, and, delivering these services with a comprehensive, caring and evidence-based attitude congruent with its mission, the organization has created trust, consistency and a set of expectations in the mind of the customers. This, unintentionally, has created a brand for its IVF program (as well as the fertility and endocrine clinic) under the "university name".

3.4.1.1.3 Pricing

The program has not given a great deal of thought to setting the price of IVF treatment. The price was originally set on a cost-recovery basis with a profit margin for growth and expansion and an adjustment for changes in cost of living. As mentioned, there are no significant differences in the pricing of IVF services among competitors. In contrast to some consumer goods, the perception that "high price means high quality and low price means low quality" is probably more important in health care services. The program excels in quality care at the same price as competitors'.

3.4.1.1.4 Promotion

Marketing and advertising were relatively foreign to the program entrenched in the academic, non-profit setting. Sometimes it is the "fait accompli" attitude since it has no say in deciding on the hospital building for its home. However, with leadership change at the department, division, and program levels within the last few years and competition from a local private clinic, such attitudes are steadily thawing. Promotion has occurred at different levels, examples including presentations on infertility treatment and advances in IVF in the hospital and

other continuous medical education (CME) settings. Academic clinicians will continue to present scientific abstracts in national meetings on reproductive medicine and publish findings in peer review journals to enhance the academic and research reputation of the organization and its program. Staff from the program has also given health talks to the public on infertility, sponsored either by the program itself or in collaboration with local TV stations or the public library. This not only educates the public on infertility and related preventive measures, but also draws attention to the activities of the program and its fertility clinic. The clinic also publicly celebrated its 20th anniversary of having the first baby born by IVF in Canada last year. However, to balance full publicity with the patient confidentiality, the media was not invited to the finale celebration.

A few years ago, the website was considered up-to-date with information on the range and location of available services. For convenience, referral physicians can download referral forms which can be faxed in for appointment requests. Information on fee schedules for available services is also online. Since then, the website has become stagnant relative to available website enhancements and refinements, particularly, considering that more and more potential clients are dependent on the internet for their initial information. Hence, the current website is being updated and will list contents more reflective of the comprehensive services provided by the clinic and the IVF program. More general information relevant to potential clients will be included, as well as links to related sites; online enquiries will be more user-friendly and functional. The website will also look more pleasing and professional.

Due to prior departmental politics, gynaecologists in the program's own department appear to be more supportive of the private clinic. Indirectly, it is the erroneous perception that the private clinic has better pregnancy outcomes. Likely reasons include pre-selection of clients, lower threshold to recommend IVF treatment when other less invasive and less expensive treatments can be tried first, and treatment rejection or cancellation for poor prognostic patients (hence statistics not included in pregnancy outcomes) without taking emotional aspects into consideration. Continuous efforts need to be directed to solve this riddle and diplomatically change these gynaecologists' erroneous perception.

3.4.1.1.5 Distribution/logistics

Efforts are constantly made to reduce wait time from referral to consultation with a gynaecologist in the clinic. Referral system is now much more responsive than a few years ago although it can be improved further. As mentioned, referral forms are downloadable from the website. To facilitate and streamline appointments, a new computer appointment system was installed three years ago. To accommodate clients' appointments and to reduce wait time, a

specific gynaecologist in the clinic may periodically open up an extra day to shorten long wait lists. Most clients can be seen within a month of referral. Another source of information may be pamphlets and brochures, which are being considered in view of the clinic's name change to a centre for reproductive health to mark its 20th anniversary celebration. In the near future, the pre-appointment medical information forms will also be downloadable from the website to facilitate clients who have misplaced any forms previously received in the mail. Further improvement can be made on the existing phone system; the current messaging system is excellent but could be further improved with direct person-to-person contact. However, shortage of staff remains a limitation. Friendly phone manners are important and secretarial staff has done well in this regard. There is also prompt reply to enquiries and appointment booking.

In the past, there has been occasional delay at the reception area; however, currently, there is prompt, courteous service upon arrival at the reception desk. For new patients, the nursing staff will check their weight and height as well as blood pressure and pulse. At times, there can be undue delay due to nursing staff shortage or processing delay when clients arrive for appointments with the various gynaecologists at the same time. This is particularly critical for IVF patients who initially have counselling with the nurse, watch an information video and then have blood tests on-site before seeing the physician. If a check-in is delayed, all patients in the subsequent appointment schedule are affected. To overcome this, a secretary has recently been moved from another area within the program to replace the existing receptionist, who in turn, because of her nursing background, has become the triage person to facilitate blood pressure, weight and height measurements, direct patients to the various parts of the facilities or prepare them in the ultrasound room for assessment without delay. As the triage person has also been the receptionist, she is particularly aware of the above logistics, and is able to recognize them early and deal with them appropriately. An additional large window has also been created in the wall that separates the reception area from the waiting room. This arrangement facilitates one receptionist to register patients as they arrive, while allowing another secretary to use the other window to process patients' billing or attend to patients' enquires. These improvements have relieved the delay in patient flow. Further improvement would include keeping physicians on time, ensuring that patients, who have been asked to come early, have been pre-registered accordingly before seeing the physician.

3.4.1.2 Point-of-service

3.4.1.2.1 Clinical operations

3.4.1.2.1.1 Consultations, counselling and phone enquiries

Even though a physician may be behind in his patient appointment schedules, consultations are always comprehensive rather than short and hurried. Examination rooms are not cluttered although the ultrasound room is slightly small. Investigation is thorough and management is comprehensive without pushing IVF treatment as the only option. Patients are provided information on possible side-effects of medications; nursing staff reviews information with them in detail and provides one-on-one instruction on hormone injection techniques. Actual IVF treatment is well planned and executed, with a team approach involving the physicians, program and procedural nurses, gamete laboratory staff, and the psychologist. There is detailed counselling at the level of the physician, nurse and psychologist, emphasizing complementary aspects of treatment. Patients have ample opportunity to ask questions and do not feel that they are being rushed. The treatment schedule is mapped out on an individual calendar with further reinforcement by phone and/or face-to-face contact after each encounter during treatment monitoring. Each day, by noon, the ultrasound and blood results will be compiled on the worksheet for the on-call physician to review. Patients are asked to phone at noon for injection instruction based on their hormone and ultrasound results. Phone enquiries on other test results are given through a “result” phone line handled by a specific secretary once approved by the physicians. Medical phone enquires are routed to the nurses who will direct them to the patient’s physician if necessary.

3.4.1.2.1.2 Monitoring of hormone response

For IVF patients, the response of their ovaries to hormone injections is monitored by blood tests and vaginal ultrasound assessment over an average period of 10-14 days before the women are ready for the egg retrieval procedure. IVF patients arrive at 8 a.m. in the clinic’s on-site hormone laboratory according to their response and, if appropriate, have on-site vaginal ultrasound assessment of the ovaries and lining of the womb. This has been a major improvement compared to two years ago when ultrasound scans were performed by radiologists at a different site of the hospital, incurring extra inconvenience and wait time. Furthermore, patients had to deal with additional personnel who were not directly involved in their care and were not familiar with their treatment, short of the ultrasound examination. With this change, all patients appreciate having the ultrasound examination on-site by physicians in the IVF team. The program also saves some money by not having to pay the radiology department for the service.

However, delays between blood tests and ultrasound assessments are still possible despite this arrangement as the physician who does the ultrasound is also the on-call physician for IVF procedures (egg retrieval and/or embryo transfer). Unlike the arrangement with the radiology department, on-call physicians in the program are paid by sessions and not by the number of procedures. The numbers of egg retrieval, embryo transfer and/or ultrasound procedures vary and cannot be scheduled well in advance. Hence, high costs prevent having two separate physicians involved for ultrasound and IVF procedures respectively. While patients are waiting for their ultrasound examination, the clinic makes them feel comfortable by providing refreshments and reading materials. Quite often, the patients strike conversation with one another and share their experience.

3.4.1.2.1.3 Egg retrieval

On the day of procedure for egg retrieval, the partner is encouraged to attend and provide emotional support. The procedure is done under conscious sedation with local anaesthetics and some medications to reduce anxiety. For each procedure, there are at least two nursing staff involved, one monitors the patient's vital signs and provides intermittent intravenous medications for pain relief, if required, as well as support for the patient; another assists the physician during ultrasound-guided egg retrieval. This arrangement provides superb quality care; the staff is courteous and caring. After the procedure, the patient is observed for a short while and offered some refreshment before discharge. On the same day of egg retrieval, the partner provides a semen sample for *in vitro* fertilisation. The room for semen collection, while adequate, is relatively small because of space limitation. A larger room with a warmer environment would be ideal.

3.4.1.2.1.4 Embryo transfer

Three days later, the patient returns for embryo transfer. In the days between egg retrieval and embryo transfer, the couple communicates closely with the program's nursing staff to find out the number of eggs fertilized. The couple is usually quite anxious during this time and close liaison with nursing staff provides clients with support and reassurance. As for the egg retrieval procedure, the partner usually accompanies the patient on the day of embryo transfer since this is a very emotional and anxious time for the couple. The IVF team members are experienced and are sensitive to their concern. A written "score-sheet", detailing the number of eggs, the number fertilized, the number of embryos transferred and the number of any cryopreserved, is given to the couple for reference.

3.4.1.2.1.5 Individual versus team approach

There had been occasional complaints from patients on the insensitivity of one of the physicians in the IVF team. Like some physicians in the IVF program, this physician worked in different areas with an academic rank and affiliations that were outside the program's authority. Hence, it was awkward for the program to deal with this sensitive issue. This physician has since relocated after accepting an academic appointment in another institution. Because of the team approach, minor disagreement in management (e.g., hormone dosing and treatment duration prior to egg retrieval) may arise from time to time. Generally, these differences are inconsequential and merely represent the preference of each physician. However, in some difficult clinical situations, these different approaches could influence the number of "mature" follicles available, hence the number of oocytes retrieved, and/or treatment cancellation. Developing some consensus guidelines would provide a balance between the individual and the team approach.

There is another management issue to the team approach. While the team approach is indispensable, it is less than ideal for some couples who expect their own physician (who has been managing their infertility problems until IVF treatment) to perform the procedure. Because the precise dates of egg retrieval and subsequent embryo transfer are not pre-determined but based on the woman's ovarian response to hormone injections (which vary from 10-14 days on average), it is difficult for each physician to be responsible for his or her own patient from the beginning to the end of a treatment cycle. With the team approach, this particular physician might not necessarily be the on-call physician for IVF procedures. The solution is to emphasize this team approach at the onset and that each team member is professional and well-trained. Indirectly, having IVF physicians perform the ultrasound monitoring as outlined earlier has also provided an opportunity for patients to meet with the potential physician who will be doing their egg retrieval and/or embryo transfer.

3.4.1.2.1.6 Hormone medications

Another potential area of improvement is to have an on-site pharmacy that carries the expensive hormone medications which are not routinely stocked by most pharmacies. Although they are currently available within walking distance, the particular pharmacy is located in the same building as the program's local competitor.

3.4.1.2.1.7 Parking

Parking remains a concern around the hospital area. Negotiating parking discounts with parking lot owners, while being a good gesture, would unlikely be successful due to the high demand by patients attending other services in the hospital.

3.4.1.2.1.8 Customization

Fertility treatments are tailored according to individual couples' underlying cause, age and other relevant factors. This has been detailed in Sections 3.1.1 and 3.1.5.

3.4.1.2.2 Marketing

3.4.1.2.2.1 Patient satisfaction

In giving quality service, the program is enhancing patient satisfaction and self-promoting its program. Activities and systems that facilitate patients into the service delivery system and enhance client-nurse/physician communication (discussed under pre-service distribution and logistics) apply equally well here. The patient's current wait time for ultrasound assessment on some busy days can be improved. For example, if the clinical situations permit, ultrasound assessments can be delayed by a day to make allowances for the number of egg retrieval and/or embryo transfer procedures that have been scheduled. This should be conveyed to the physicians ordering ultrasound scans. Making the wait area as comfortable as possible also helps as discussed previously. Informing clients of this possibility and the reasons for it also shows respect for their time. For "out-of-town" patients, the program facilitates their initial blood tests and ultrasound assessments in their hometown, if they are available, to reduce their time away from home by four days.

3.4.1.2.2.2 Product development, enhancement and differentiation

The new website will provide a portal to the comprehensive services offered by the organisation. When appropriate, couples are also offered some of the fertility options available in the clinic before or after IVF treatment. Enhancement of service includes in-house availability of a psychological counsellor (at no cost to the clients for up to three hours), in-house blood collection at the organization's gyne-endocrine laboratory and in-house ultrasound scanning in the clinic area. All these, together with the comprehensive, caring and evidence-based approach by a dedicated team, provide a differentiated service at the same costs as competitors'. In the future, the program should integrate new technologies of value such as pre-implantation diagnosis (PGD) and cryopreservation of ovarian tissues into its product offerings.

3.4.1.2.2.3 Market penetration and development

All the factors discussed above should, directly or indirectly, improve the program's revenues and market share as do promotional activities discussed earlier (Section 3.4.1.1.4). As a strategy to increase market share, there has been preliminary internal discussion in developing outreach programs to service growing populations in the interior of the province.

3.4.1.3 *After-service*

3.4.1.3.1 Clinical follow-up

As mentioned, IVF treatment is a very emotional process with no guarantee of success. It is expensive and patients generally have to pay out-of-pocket. Because the success rate is under 50% even in good prognostic patients, it is extremely taxing for the couple when they fail to achieve a pregnancy. Hence, having a “rewarding” experience emotionally despite failure to achieve a pregnancy is a compliment to the program. This is an important issue and some patients do give such feedback to the program. While continuing to maintain excellent pregnancy results, it is also important to consider the couple’s psychological and “spiritual” dimensions that may impact on their IVF outcome and how they cope after IVF failure. Friendly follow-up calls from one of the nursing staff in a week or so following a negative pregnancy outcome are thoughtful gestures and patients do appreciate these calls. This more holistic approach is an unspoken philosophy of the program. How to “market” this without losing the program’s genuine and caring attitude is a delicate issue. Other things that facilitate a good experience include assistance in completing “time-off” medical applications, sick-leave claims and other insurance papers. Further areas of improvement could include a follow-up call the next day after egg retrieval to ensure that the client has no adverse side-effects from the procedure.

3.4.1.3.2 Marketing follow-up

While clients are given satisfaction feedback forms routinely, the return rate is relatively low. The program should encourage all patients to provide their feedback, both to remind consumers of the outstanding care received, but importantly, to provide comments on possible improvement.

3.4.1.3.3 Billing

Accepting payments by credit cards as well as having an efficient system to receive cash and cashier checks offer convenience. There is prompt reimbursement of funds for procedures that clients never go through because their treatment is cancelled by a suboptimal response to hormone injections. On a few occasions, clients, who have less than optimal outcomes due to unforeseeable circumstances, are given free treatment in their next cycle on compassionate grounds. This maintains good public relations and attests to the program’s commitment to quality care. The program has also initiated a compassionate program to provide funds for those who cannot afford IVF treatment and has plans for fundraising later in the year.

3.4.1.3.4 Follow-on

The follow-up calls by nursing staff to clients after a negative pregnancy outcome (Section 3.4.1.3.1) also serve as follow-on calls as not uncommonly, appointments are arranged for these clients to see their physicians for review. The clients return to discuss their next step, whether it is to plan another IVF treatment cycle (hence, re-enter another patient value chain) or an alternative option (a different activity of the patient value chain). The program also assists patients to see other health care providers in the care continuum if they have other medical problems. For clients who are pregnant, there are follow-on pregnancy blood tests and a pelvic ultrasound arrangement to confirm a viable pregnancy and to rule out multiple pregnancies. The clients return to discuss the findings with their physicians who arrange a follow-on appointment to their physician for obstetric care.

3.4.2 *Supportive activities*

3.4.2.1 *Organization culture*

The program's core strategy is shaped by the shared values of an academic and evidence-based setting. As such, there is a strict code of ethics in all aspects of the program's operations and indeed, clients are sometimes advised against the need for IVF treatment. From a business perspective, this would seem counterproductive to the program's viability, but long-term, it will bring credibility and greater return.

As mentioned in Sections 3.1.3 and 3.1.4, there are differences in decision making between the clinical and administrative functions of the program. In contrast to the widely shared approach of clinical management in the program, finance and non-clinical administrative information that can impact the program are not shared. For example, there has been no official announcement of the proposed change in the organizational structure outlined below. Key people involved in program management or those affected by the change were not actively involved in the proposal. Specifically, the IVF medical director was not officially involved in all finance and non-clinical administrative decisions related to the program. As mentioned, from the perspective of accreditation and licensing, an IVF clinic is considered a distinct "organization". In fact, in the program's recent accreditation, the Canadian Council on Hospital Services Accreditation criticized the program for not having a cohesive, governing body and by-laws. They recommended "accredited" status for the program contingent upon the formation of such a governing body as one of the requirements. In view of this recommendation, removing

administrative and finance responsibilities from the IVF medical director will hinder effective management of the program.

3.4.2.2 Organizational structure

From the administrative and finance perspective, the program belongs to a functional structure which parallels the hierarchal university structure (e.g., faculty of medicine, finance, human resource). In 2003, the academic division head, together with the clinic's nurse co-ordinator, formalized the segregation of clinical function from administrative function by proposing a matrix structure as an alternative to its historical structure. The historical structure (Figure 3-3) evolved from the university model and was simplified by the fact that the division head was also the IVF medical director as well as the gyne-endocrine laboratory director. Following this change, the position of nurse co-ordinator has been replaced by the administrative program director. While the proposed organization is named "matrix" (Figure 3-4), this is not really appropriate for it is still a functional structure. The only distinction is the redistribution of the IVF clinical unit and the nursing unit; each director does not interact with the director of business and finance. As mentioned in Section 3.4.2.1, according to this proposal, a major weakness is the lack of direct official involvement of the other directors but particularly the medical director, in the business and finance management of the program. The lack of a direct official chain of command from the IVF medical director to the gamete laboratory, an integral part of the IVF program, is another major weakness. Irrespective of the title or structure change, proposed or partly implemented, it is important to have ongoing, official inputs on the administrative and finance aspects from key people closely involved in the clinical management of the IVF program. In such a small organization, particularly when the academic clinicians who work there can pursue other roles and do not depend on the program to advance their career, there should be less attention to rank and position and more on the organization's mission, facilitated by effective communication and a culture of trust and team work.

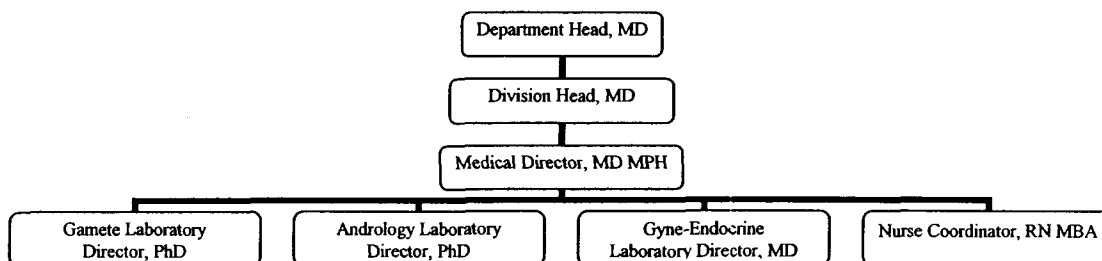


Figure 3-3: Historical organization structure

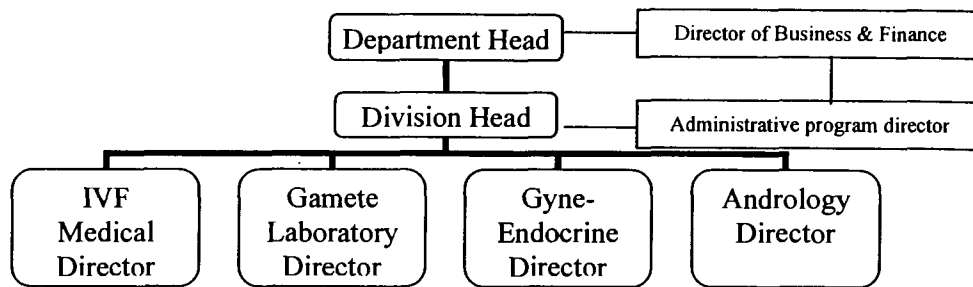


Figure 3-4: Proposed organization “matrix” structure

The program has gained from an economy of scope because IVF service is only one of the product offerings in the clinic. Because the clinic provides comprehensive investigation and treatment for couples with infertility, the program benefits from these services and shares the infrastructure: hormone laboratory service, andrology laboratory service, and nursing and secretarial staff. This has been detailed in Section 3.1.5.

3.4.2.3 Strategic resources

As mentioned previously, the clinic installed a new appointment system (based on the PC version of 4-Dimensions) that can include physician billing of MSP. This has certainly made booking patient appointments and scheduling team meetings more efficient. As for MSP billing, this is not used by all physicians in the clinic. Unfortunately, the introduction of this system did not take into consideration the existing system (based on FoxPro) used to store clinical IVF data and did not take advantage of the fact that each office computer installed in the clinic had the Microsoft Office Suite. It would have made sense to use Microsoft Access as the unified system both for future software upgrade and support and Access’s user-friendly features. Converting existing clinical data from FoxPro to 4-Dimensions has been attempted but the authenticity of data conversion cannot be validated, not to mention that this would introduce another database system for the busy medical director to learn. Hence, the conversion project has been abandoned. Despite these shortcomings, the day-to-day function of the clinic has been significantly enhanced by the 4-Dimensions appointment system.

The program has recently updated its cryopreservation equipment and special liquid nitrogen (“vapour lock”) storage device to prevent the remote possibility of cross contamination of frozen embryos. It has also repaired the gamete micromanipulator used for the ICSI procedure and has plans to purchase another system. It is requesting extra space from the hospital to

accommodate additional laboratory staff and storage. The program has also acquired two modern ultrasound machines within the last two years. Although the clinic is located in an old building of the hospital, extensive renovation has been undertaken both inside and outside the building. Work has also been started to replace the building's two outdated elevators. The clinic itself looks modern, professional, clean and well-maintained. Medical records are up-to-date, including correspondence to referral doctors. This reflects the clinic's quality of care provided by ensuring continuity of care. Resources regarding R&D and training have been addressed in detail in Section 3.1.2. Similarly, important resources, tangible and intangible, have also been discussed in detail in Section 3.2.

3.4.3 Summary

This patient value chain analysis has provided the program with a tool to identify some of its strengths and weaknesses. By scoring each of these factors on whether it is valuable, rare, imitable and sustainable according to resources, competency or capability, strategies can be prioritised and plans implemented accordingly to allow the program to effectively compete with competitors and deliver quality care. Indeed, the setup of the clinic leads to increased efficiency in directing infertile patients through appropriate treatment options including fee-for-service IVF treatment (forward vertical integration). It also facilitates patients who are initially referred for IVF but during assessment, are considered more suited for one of the steps listed in Figure 1-2, and are thus advised to proceed with one of these options before IVF treatment (backward vertical integration). Some of the key issues from this analysis will be discussed further in the next chapter.

3.5 "Materials" value chain

The physical materials and labour supplies required for clinical services are examined at the relevant links of the traditional value chain (Figure 3-5) for manufacturing companies. These inbound logistics, operations and outbound logistics for laboratory, clinical (including pharmaceutical) and office supplies and their relationships to suppliers are arranged by functional units: the laboratory staff, nursing staff and secretarial staff respectively, all of whom are salaried. The hospital (where the organization with its clinic and IVF program are located) and the physicians who work in the program are also "suppliers". This value chain subserves the patient-oriented value chain discussed earlier and represents the "ingredients" required to provide patient service. Marketing and sales, service, and support activities related to the organization have been discussed in detail under the patient-oriented value chain (Section 3.4).

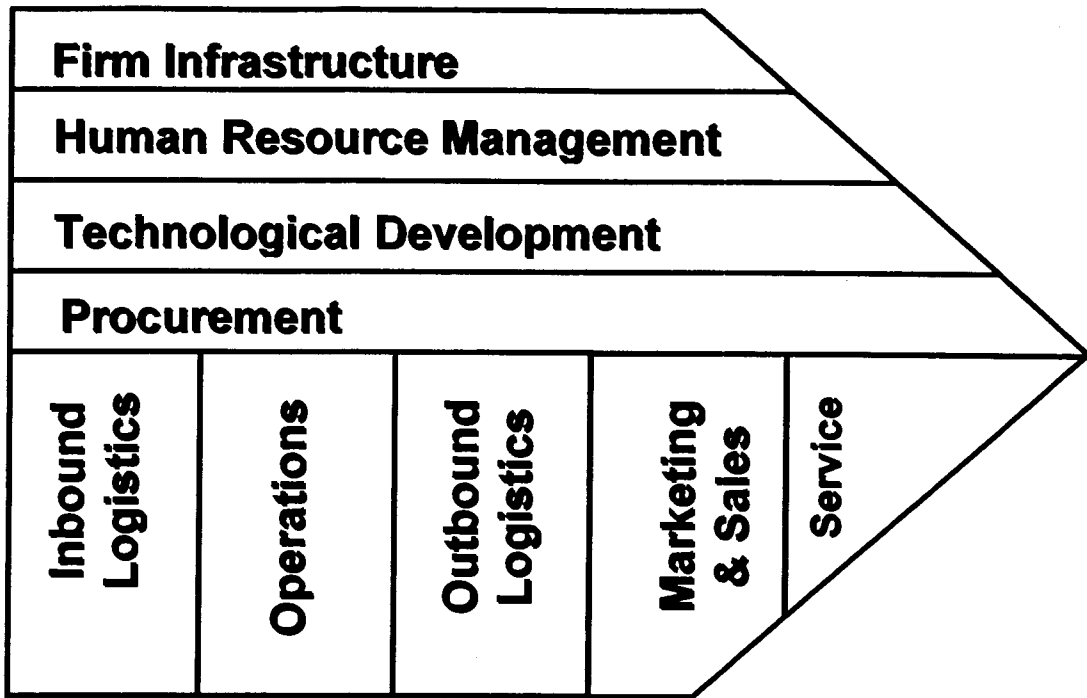


Figure 3-5: "Materials" value chain

There are three important sources of suppliers in this regard: laboratory, clinical (including pharmaceutical) and office suppliers. Laboratory supplies are a major expense of the organization and include disposables such as culture media, Petri dish, test tubes, liquid nitrogen and pipettes, and laboratory equipment. Clinical supplies include clinical instruments and disposables such as surgical drapes, linen, ultrasound printer papers, and sterile solution as well as pharmaceutical supplies required for delivering IVF service. Office supplies include items such as copying machines, computers and other accessories, stationery, folders and labels.

In all three areas, maintenance service for relevant equipment is also a major component. For example, laboratory maintenance and repair, as well as availability of parts for special equipment are critical to day-to-day function. In clinical activities, maintenance and repair of ultrasound machines and sterilization of instruments to meet stringent guidelines are critical. Availability and timely delivery of medications from the hospital pharmacy to the procedural room is equally important. In office activities, flawless function of the computer network system is required for the distribution and logistics activities of registering patients and scheduling patient appointments.

3.5.1 Supplier relationships

The program has the advantage of being part of two larger organizations that have high negotiation power, the university and hospital. Hence, purchasing processes are quite standardized. The university and hospital have vendors that provide competitive pricing. For equipment over \$10,000 for example, the university stipulates that a tender has to be made to seek the best value according to specifications required. In general, this does not pose any problems but rarely, a delay may occur if something more urgent is required. Some of the stipulated vendors might not necessarily have better pricing but have other values such as reliability or reputation that the larger organizations prefer. In the purchase of computers, the hospital has a contract with Compaq (now merged with Hewlett-Packard) so that system-wide compatibility (equipment accessories and servicing convenience) can be achieved. While the clinic's network is considered to be part of the hospital system and support, acquisition of computers is not, as the program belongs to the university but is located in the hospital. In terms of network maintenance, there can be a delay due to a more bureaucratic, hospital IT service. As for computer acquisition, the program has purchased computer systems with better value from generic computer stores or from DELL online.

Some of the disposables, particularly expensive culture media, are volume dependent. While the hospital or university may be able to negotiate a volume discount in more generic laboratory supplies, there is usually no advantage in speciality areas like IVF. A private IVF clinic doing more cycles may achieve a better volume discount in this regard. On the other hand, these suppliers may still provide competitive pricing to a small start-up clinic, in order to compete with the few (if any) competitors in the field, knowing that the clinic has the potential to grow. Although the disposable embryo transfer catheters used by the program are much more expensive than those used by competitors, (say, \$60 versus \$5 per catheter), the program perceives this as a crucial factor for the markedly improved pregnancy rates. In addition, because physicians are already accustomed to this catheter after switching from the more rigid one used previously, it is a price premium recognized and accepted as well spent; however, the program should try to negotiate a better price with the supplier. As discussed in the last chapter (Section 2.7.5), these specialty manufacturing companies know that there are few substitutes and few suppliers, and are charging a premium price. The program may want to find out what these companies are charging other clinics.

3.5.2 Hospital as supplier for space and facilities

The organization and its clinic and IVF program is a university unit with academic staff engaged in teaching and research activities in addition to their clinical practice. Hence, the space occupied by the clinic (including the gamete and andrology laboratories) is supplied by the hospital at a nominal price negotiated by the department. It is a resource advantage that is costly to duplicate. The hospital provides maintenance of the building as well as the gamete laboratory and the procedural room according to the special specifications required. The procedural room itself belongs to the hospital and nursing support specifically for egg retrieval in the procedural room is provided by the hospital at a fee negotiated with the program. This “daycare” fee has recently increased from \$350 to \$400. Related procedural supplies such as surgical drapes and linen and sterilization of general instruments are included in the daycare fee. However, specialized IVF equipment, such as the ultrasound guide and aspiration needles for egg retrieval is the program’s responsibility. The nursing hour units provided by the hospital in return for the daycare fee are not earmarked for a particular nursing employee but the procedure itself. Having nursing hours by procedures rather than by sessions should save idle labour cost if there are no procedures booked on a particular session. Irrespective of cost-saving, there is definitely a value-added advantage to clients in terms of nursing support. The latter makes it possible to have two nurses routinely during the egg retrieval procedure, providing additional safety, patient support, and quality care. This resource advantage is rare, valuable, costly to imitate and not substitutable, and is available because the program is part of the two large non-profit organizations. The disadvantages are the lack of site selection and whether this is sustainable long-term because relative to other programs in a large general hospital complex, it is not considered a priority program. Hence, there is always the concern that the program may be asked to move to make room for other programs. There is discussion that it might be more appropriate for the program and the organization to return to its previous site to be under the same roof as the department. This issue will be discussed further in the next chapter.

3.5.3 Physicians as suppliers

Because of the core competencies required for IVF service, physicians who work in the IVF program should be, and are integrated into the program and organization, rather than as “suppliers” in Porter’s five forces model. However, in value chain analysis, they do supply an important service to the program and they are unique because they are not salaried by the program. Their reimbursement is by sessions rather than by procedures, independent of whether

there are any ultrasound scans, egg retrieval or embryo transfer procedures. IVF-related procedures (ultrasound scanning, egg retrieval and embryo transfer) form only one expertise of these specialists' "portfolios". A physician has to book off her practice schedule for the session. For her to run her practice efficiently, she has to be compensated, even if there are no IVF cases on a particular session. These fixed labour costs contribute to the high number of IVF cycles the program has to perform in order to break even or to achieve a profit.

3.5.4 Materials and supplies

3.5.4.1 Laboratory supplies

The laboratory has the option of either preparing micropipettes specifically for ICSI or buying them. Although it might be less expensive to "pull" pipettes with specialized machines already acquired by the program, it is labour intensive and requires consistency. It is not considered a core competency at this point and is therefore "outsourced". Eventually, with volume increase, it might be worthwhile revisiting if in-house pulling pipettes can save cost. Warehousing or storage is neutral in terms of competitiveness as many disposables such as culture media have a limited shelf live. Although there are other potential areas of cost-saving in the laboratory, the focus has been dedicated to improving laboratory protocols and techniques to further increase pregnancy success. Hence, costs in acquiring essential disposables are accepted as part of doing business. As volume increases and pregnancy rates continue to improve, the program should revisit these issues.

3.5.4.2 Clinical supplies

In terms of clinic supplies, the use of linen drapes rather than disposable ones is a potential issue. However, as the former is part of the hospital supply system, it is sustainable as opposed to a private clinic setting where paper drapes would be favoured. It is common practice in the program to "sound" the uterus in the clinic well before embryo transfer. This is to ensure that the catheter can enter the cavity of the womb for embryo transfer. To do this, a fine catheter used for intrauterine insemination (IUI) is passed through the neck of the womb into the cavity and to measure its length. The IUI catheter averages 6-7 dollars each. A trial use of a low-priced alternative catheter unfortunately proved to be inconsistently useful. This will be reviewed in the near future.

3.5.4.3 Pharmaceutical supplies

Pharmaceutical suppliers for hormone medications are limited as discussed in Section 2.7.5. There are only two major suppliers of hormones manufactured using DNA technology. The pricing from both companies are global with strong rivalry and comparable pricing. However, the challenger has gained advantage in ease of self-administration after introducing a convenient hormone delivery system. The two companies are keen to gain market shares and frequently provide educational and other support activities to IVF clinics in Canada. Previously, a more traditional view of segregating pharmaceutical companies from the academic program created a more distant relationship with these important partners. Currently, there is stronger alliance with these pharmaceutical companies in medical education and other patient support activities in accordance with guidelines of the medical professional bodies.

Some private clinics may obtain the hormone medications from these companies and sell them to patients, eliminating the pharmacist as the middle person. The program has decided against such arrangement, balancing some additional revenues against potential liability and the perception of its reputation. As this is not the program's core competency, it is appropriately "outsourced" to pharmacies. In terms of medications required for egg retrieval procedure (performed under conscious sedation), the appropriate medications are provided by the hospital (Section 3.5.2) in a timely and safe manner.

3.5.4.4 Office supplies

In the office supply section, charts are prepared, and appointments are made through a referral system – the website, downloadable referral form, phone as well as IVF information pamphlets and packages. Day-to-day copying is done in house, small to medium sized jobs are done in the hospital printing press but large printing projects are outsourced. Currently, secretaries in the program do not provide transcription of consultation dictations. The latter is the responsibility of the individual physician. Two physicians use their own database to generate consultation letters. One physician types his own letters but his patient volume is small. The remaining physicians outsource transcription of their dictations. For IVF consultation specifically, the existing IVF database can generate a formed letter. However, physicians do not like this generic letter which does not provide relevant information. The existing clinical IVF database is currently being overhauled. The maintenance of this database is appropriately outsourced, which the program has done for over a decade. The plan is to revise the fields in the database with the letter updated accordingly. This should save physicians' time from having to do a separate consultation summary.

3.6 Technological changes

Currently, the program does not have an in-house service for pre-implantation diagnosis (PGD) in its IVF program. The program has just initiated a collaborative arrangement with an American university program where cells obtained from embryo biopsy are sent to the American unit for genetic testing. As an academic centre, the program needs to establish PGD fully and acquire this technology as one of its core competencies in the future.

3.7 Financial performance

Table 3-2 shows the yearly revenues, expenses and net income/loss from 1997 to 2003. The financial year is from April 1 to March 31. The numbers in Table 3-2 are only approximate but the actual trend from March 31, 1997 to April, 2004 is identical. The organization has no debts in its capital structure. Revenues are from fees-for-service activities, with approximately 80% of the revenues generated from IVF, and the remaining 20% in descending order, from nurse counselling fees for superovulation or ovulation-induction unrelated to IVF treatment, sperm preparation for IUI, nurse counselling fees for therapeutic donor insemination, and others. Expenses include staff salaries and supplies for all clinic activities and are not restricted to IVF. As mentioned, the number of IVF treatment cycles reached a nadir in 1999 (Figure 1-1). Correspondingly, financial recovery started around year 2000. The increases in expenses for 2002-2003 and 2003-2004 were due to the acquisition costs of ultrasound machines, and marketing and promotional costs for the 20th anniversary celebration respectively. Revenues from the gyne-endocrine and the andrology laboratories are separate from those of the clinic.

Year	1997-	1998-	1999-	2000-	2001-	2002-	2003-
	\$	\$	\$	\$	\$	\$	\$
Revenues	997,562	1,057,351	1,017,898	1,227,692	1,516,116	1,676,188	2,026,469
Expenses							
Salaries	841,182	698,260	658,844	822,280	973,728	1,160,589	1,186,114
Supplies	263,424	258,971	373,253	397,779	516,825	514,058	671,246
Capital	-	56,665	18,219	16,778	13,157	61,963	11,284
Total	1,104,606	1,013,896	1,050,316	1,236,837	1,503,710	1,736,610	1,868,643
Net income/loss	(107,044)	(43,455)	(32,418)	(9,145)	12,406	(60,423)	157,826

Table 3-2: Yearly revenues, expenses and net income/loss for fees-for-service in the clinic (Numbers are only approximate to show the trend. Supplies include all miscellaneous expenses)

3.8 Conclusion

3.8.1 Organizational fit

That the program provides IVF service with a comprehensive, personalized, caring approach and according to evidence-based practice is a differentiation strategy consistent with the organization's mission. This differentiation strategy is supported by the organization's core competencies of having a clinic with comprehensive services in reproductive medicine, an experienced, caring IVF team, in-house ultrasound and hormone assay facilities available seven days a week, and an in-house psychological counselling service. These are also some of the key success factors discussed earlier (Section 2.9). All these add value to the service provided to customers but at similar costs to competitors'. However, although an evidence-based practice is an important feature of differentiation, excessive adherence to this approach in medical areas that are controversial or uncertain can also stifle innovation and differentiation by becoming too rigid and slow to respond to technological advances, new opportunities provided by controversial or uncertain areas, and threats from competitors. The hierarchal organizational structure that segregates rather than integrates clinical and administrative (including finance) functions and a more cautious leadership style excludes inputs from middle management who are close to customers, and is not an organizational fit for a differentiation strategy. Unlike a private clinic with equal partnership arrangements, the program is not autonomous in deciding on finance and investment strategies and is affected by the bureaucracy and inertia of the large institution and senior leadership style. In a business sense, the program can increase its debt to equity ratio to improve its return on investment but this will not be in congruence with the institutional bureaucracy of which the program is a small part. There is no budget allocated for R&D in services provided although this is partly compensated for by peer review grants obtained by academic clinicians and scientists working in the organization. From the clinical perspective, the program's existing setup and strategy is a good organizational fit. However, to sustain a differentiation leadership and to maintain its accredited status and prepare for future licensing, the organization will need to review some of the concerns raised in this value chain analysis.

3.8.2 Program's strengths and weaknesses in key success factors for IVF industry

The program has many of the key success factors in the IVF industry (Section 2.9). Its current pregnancy rates exceed national average figures. The program has a historical reputation and passed the learning curve stage many years ago. It has economies of scope by having a comprehensive portfolio of infertility treatments. Recently, it has regained its economies of scale

following an increase in IVF volume through marketing and promotion. The strengths and weaknesses are identical to those that provide or do not provide a good organizational fit discussed in the last section. Thus, the program's strengths lie in its team of caring and experienced professionals who deliver quality IVF service and the unique infrastructure, both tangible and intangible that supports it. These combined assets are rare, valuable to clients, costly to imitate by competitors and sustainable. The program's weaknesses lie in its hierarchal, organizational structure in finance and administration, more cautious leadership style and excessive adherence to an evidence-based approach in controversial and uncertain areas. As mentioned before, these weaknesses combined, make the program more rigid and slow to gain a market edge. However, the positive aspects of these "weaknesses" are consistency, reliability and evidence-based. Although this approach worked well in the past when the program was a "monopoly" in the province, this is no longer the case after entry of an aggressive challenger, particularly, when the industry is also maturing from a combination of demographic changes, economic downturn and a slower pace in technological advancements. Indeed, these weaknesses were some factors that led the program to lose its market leadership after a competitor entered the local market in 1995. The next chapter will outline some of the issues facing the organization.

4 ISSUES

This chapter will summarize the key issues facing the organization identified from the situational analysis of the external and internal environment in the last two chapters. Many of these issues have been mentioned in earlier chapters but will be reiterated here for completeness. They will be listed in the order of priority and the degree that the organization can implement.

4.1 Achieving objectives and goals

As discussed in Section 1.8, the organization included three main objectives in its strategic plan in 2003 which were to increase market share, expand service and enhance research activities. The measurable outcomes of the first two objectives are an increase in clinic referrals, an increase in patients receiving IVF treatment and an increase in revenues. Research activities will be measured by an increase in research funding, scientific abstracts presented in national and international professional meetings, and papers published in trade journals. The goals associated with these objectives are to maintain quality of service, regain leadership market position, and gain recognition as a centre of excellence for reproductive medicine. How to achieve these objectives and goals are the main issues facing the organization.

4.2 Decreased market share and local competition

The program suffered a marked decrease in market share after the private clinic entered the local market in 1995 during which the local competitor did a successful marketing and politicking campaign. As a result, most gynaecologists from the program's department were referring patients to the private clinic instead. During this transition period, the morale of the program was low and manpower was down; its IVF market share dropped to a nadir in 1999. Until recently, the decreased market share and revenues have been the main issues, threatening survival of the program.

The IVF program is a key unit of the organization and provides it with a number of important functions. The IVF program is self-funded and is able to generate revenues to support the infrastructure of the fertility and endocrine clinic, including salaries to nursing, laboratory and secretarial staff and honoraria for physicians. Indirectly, it also generates revenues for the gyne-endocrine laboratory. Without the program, these strategic resources and core competencies will contract. This not only will severely affect the organization's comprehensive service in reproductive medicine, but the organization's other important functions.

The organization is the main resource in reproductive endocrinology and infertility (REI) for specialty residency training. Together with the IVF program, it is also an important centre for

high-level, subspecialty fellowship training in REI. The clinical and laboratory activities are crucial for clinical and basic research. All these activities are the organization's mission and roles which also enhance the organization's reputation across Canada. These diverse clinical and research activities make the organization a top REI training program in Canada and one of the few approved by the Royal College of Physicians and Surgeons of Canada. Hence, revenues aside, there are many intangible assets, resources, competencies and capabilities that depend on the program. Market share is also important to achieve economies of scale because of the high fixed operating costs in labour and supplies.

Market share and perceived reputation are linked. As IVF and other areas of ART are at the cutting edge of technology, the intangible asset of reputation is paramount which in turn, determines market share. The question is how the program could further increase its market share and differentiate itself by its research and teaching functions as an academic centre. Another important issue is how the program could fulfill its mandate in providing REI subspecialty training yet minimize subspecialists that it produces from becoming potential competitors in the future.

4.3 Perception and image

As mentioned, decreased market share reflects a change in the perception and image of the program. The first successful baby born by IVF in the world took place in 1978 in England and thus, when the program started in Canada 1981, IVF was still in its infancy. The program has a history of being a pioneer in the field of assisted reproduction and helped produce the first IVF baby in Canada in 1983. The organization was also a leader in reproductive medicine in the 1980s and early 1990s with a reputation in tubal microsurgery, ovulation-induction and IVF.

Due to a monopoly of the market until 1995, the program had a long wait list for its IVF service. Because physicians affiliated with the program work in multiple capacities, in which IVF service is only one of their many portfolios, not all of them, including senior management, have time to focus on IVF alone. Academic clinicians with teaching and research commitments, or physicians with busy private practice, have insufficient time to be proactive in business planning or strategizing to expand services. Recruiting additional specialists would also create bureaucratic obstacles; even if a potential candidate was a subspecialist in REI, regional manpower planning would consider him an additional obstetrician and gynaecologist who could impact on the global MSP budget. To circumvent this, the program enlisted and trained some existing gynaecologists of the department in private practice to help out in its IVF service. In

fact, the medical director of the new private clinic in the second city of the province was working for the organization in such a capacity.

The program was also caught in hospital politics when it had to relocate to its new site which separated geographically the REI division from the general obstetrics and gynaecology section of the department. In addition, internal organizational conflict led to departure of a key IVF specialist who, together with a high-profile specialist from the east, was instrumental in setting up the local private clinic, taking some of the nursing and laboratory personnel from the program. With the market potential available, the new competitor quickly changed its market position from “challenger” to “leader” through active marketing and well-executed politicking among local gynaecologists and physicians as well as within the field of reproductive medicine across Canada. The program’s pre-existing image of an “ivory tower” and a monopoly did not help and indeed, rumours surfaced that the program was downsizing or closing down. The program’s complacency and naivety in business strategies when there was a high demand for its IVF service were a costly error. A corresponding vacuum in manpower before new recruits arrived compounded by a fatigued leadership caught in hospital politics and internal organization conflicts were contributing factors. The program’s market share plummeted from 90% initially to 23% by 1999, with a significant loss in revenue and reputation. The unspoken “strategy” adopted at the time was one of survival.

Low pregnancy rates were another important public perception of the program and as discussed earlier, the local competitor was perceived to have better pregnancy rates. Unfortunately, important factors in interpreting such rates are too complicated to be quickly explained to consumers or busy gynaecologists in private practice.

The perception and image of the program from a combination of hospital politics, department politics and conflicts, successful business strategies of competitors, and ivory tower mentality and business naivety of the organization are some potential reasons why many local gynaecologists have preferred to send their patients to the private clinic for IVF treatment. In addition, there is the perception that a private clinic provides more personalized care than a university/hospital program (Section 2.5.2). Currently, the major referrals to the IVF program are from family physicians and patients of the organization’s clinic physicians, who require IVF after having gone through other treatments in the organization. While the program has been steadily regaining some of its market share since 1999, how to recapture more of the referrals from local gynaecologists remains a major issue.

As a non-profit academic unit, the program practices a differentiation strategy of providing comprehensive, caring and evidence-based treatments for infertility. The program, however, has not specifically marketed or promoted itself because it is an academic program and is generally assumed to have the brand name. However, consumers, both patients and referring physicians, are becoming more astute shoppers. With internet information widely available, many customers will do their own research. Even though the program has such rich competencies and capabilities, it is not as widely known as expected. The name is also confusing for some customers, not only the patients but also the referring physicians, as the program carries the university name, yet is located in a major teaching hospital that bears a different name. Nor is it located in a women's hospital, as some physicians or patients would expect. In fact, there have been instances when an outside physician referred a patient to one of the specialists in the organization but used the clinic name of the local competitor. Thus, further enhancing the reputation and image of the program is a priority issue.

4.4 Organization culture and structure

As discussed previously, the program has been moulded by rigidity of the organization structure and the academic culture, hospital politics, internal conflicts and leadership style. The program failed to take advantage of its monopoly position, and did not anticipate competition through the various factors discussed earlier. The organization finally grasped the magnitude of the external threats and recognized its internal weaknesses in 1995. Since then, it has successfully rebuilt, following the recruitment of well-qualified personnel, formal establishment of the fertility and endocrine clinic, and new management in the department, division and program. Indeed, there has been an exponential increase in the number of new referrals, providing an important link to its IVF program (Figure 1-1).

There have also been marked improvements in decision-making of the program's clinical function. On the clinical side, there are academic clinicians with different ranks working in the IVF program, who in theory, can interfere with the official chain of command. In practice, this has not been a real problem as clinical decision-making is governed by an evidence-based and a more communitarian approach as in many academic, non-profit organizations. In contrast, if senior management of the organization considers administration of the program as part of the management of an academic unit, unspoken rank-and-file can inadvertently exclude key people from the decision-making process. Indeed, at present, senior management excludes the medical director from the administrative and finance half of the program, as discussed in Sections 3.1 and 3.4.2.

Hence, a major weakness of the current organization structure is that administration is detached from clinical function which does not allow brainstorming of ideas by key personnel and does not foster innovations at the level of business planning and strategy. In 2003, the academic division head, together with the clinic's nurse co-ordinator formalized the segregation of clinical function from administrative function by proposing a matrix structure to replace its historical, more hierarchal structure (Figure 3-3). The proposed organization is termed "matrix" (Figure 3-4), but this is not really appropriate for it is still a functional structure. The only distinction is the redistribution of the IVF clinical unit and the nursing unit; each director does not interact with the director of business and finance. In fact, a major weakness of this proposal is the lack of direct official involvement between the other directors but particularly the medical director, in all business and finance management of the program. The lack of a direct official chain of command from the IVF medical director to the gamete laboratory, an integral part of the IVF program, is another major weakness. Irrespective of the title or structure change, proposed or partly implemented, it is important to have ongoing, official inputs on the administrative and finance aspects from the medical director and other key personnel closely involved in the clinical management of the IVF program.

Within the whole department, the program is considered to be decentralized, where its unique sub-specialty expertise and self-funding system create autonomy. Hence, the program can undertake its own "business" strategies in marketing and service offerings within the broad guidelines of the department, the university and affiliated hospitals. Within the division itself, it is very centralized due to its relatively small size and narrow focus of subspecialty service. Finance and accounting is extremely centralized in the university finance department. Together with the non-profit nature of the entire institution, finance planning to improve the program's return on investment is not the mandate of the university finance and accounting department whose main role is that of a comptroller. Idle funds generated from the program attract no interest in its university account. Hence, the more rigid administrative and financial environment does not foster an organizational structure for innovation and differentiation.

As the program's business model is within a university and non-profit setting, the capital structure is very conservative with no debts. It receives no operating grants from the university or hospital and operates from self-generated revenues. In a business sense, the program could increase its debt to equity ratio to improve its return on investment. However, this would not be in congruence with institutional bureaucracy and the organizational culture of an academic, non-profit unit. The endowment fund, when first established, was a relatively sizeable sum, but

unfortunately, the interest earned apparently has been used by the department for other purposes with no reinvestment. Hence, the actual sum in real terms has actually been dwindling according to the time value of money.

The program has a team of highly trained, experienced and caring staff. However, physicians affiliated with the IVF program work in multiple capacities, some clinical, and some both clinical and academic, with competing commitments in research, teaching, and running their own medical practices. Because of these multiple roles in both an academic setting and private medical practice, the physicians are not focused on the IVF program as a “business”. Unlike private clinics where physicians are owners of the IVF clinic, there is no ownership by the physicians who work in the program. From a business perspective, there is no bonus or financial incentive to influence staff performance, and instead, is governed by a communitarian, and to a lesser extent, regulatory, approach in the traditional, hospital/university clinic model. However, to survive and compete with private IVF clinics for unfunded services, this might not be enough to have a competitive advantage. The lack of ownership was reflected in the program’s recent accreditation in which some clinic physicians were too busy with their medical practice to actively participate in the process. Should the program become a private clinic? If not, what should it do to optimize its competitiveness? In this regard, the IVF industry provides an opportunity to study business strategies for a non-profit, academic provider of uninsured medical services under competitive pressure in the private sector.

4.5 Technology

The organization has a long history of being a pioneer in assisted reproduction. However, over the last seven to eight years, it has become relatively slow to adopt new approaches and technology. In part, this is related to the survival mode that the program was experiencing since the entry of the local competitor. In part, this is also due to the conservative culture of the program. As mentioned, if an evidence-based approach is carried to its extremes, even in controversial or uncertain areas, the program will miss opportunities to innovate or develop new “products” from the business and R&D perspectives. Hence, an important issue is how to continue to differentiate by practicing evidence-based medicine without being hampered by the scientific vigour required of an evidence-based approach before introducing new technology in clinical practice.

4.6 Lack of entrepreneurship

The organization's academic and non-profit background creates a communitarian atmosphere typified by much discussion but little action due partly to a lack of consensus on issues that do not fit the common values of the organization. There is also an ivory tower mentality carried over from the monopoly years. Over the last ten years, the program has been periodically contacted by entrepreneurial physicians or IVF laboratory scientists wanting to set up a private clinic. As an academic, non-profit unit, senior management does not see this as relevant but also does not anticipate its potential threats. Also, individual program physicians with academic rank risk losing their university appointment and membership in the division should they join venture in the private setting. As recent as the last two years, senior management of the program ignored such overture from an entrepreneurial IVF scientist before he helped set up the private IVF clinic in the second city in the province last year. The academic "ivory tower" attitude again failed to recognize this opportunity to market the university expertise and in the process, lost the potential for market development. Entrepreneurship is not a concept that sits well in a traditional academic, non-profit organization. Should the organization involve in such enterprises and if so, in what capacity in relation to its mission and values are important issues which are linked to organization culture and structure.

4.7 Physical resources

4.7.1 Site/location

The current site of the clinic and the IVF program is located in an old hospital building. However, both the exterior and the interior of the building have undergone extensive renovations and are clean and professional. Nevertheless, it is not an air-conditioned building and resembles a museum with outdated, manual elevators, giving new clients the wrong impression on the facilities inside. The organization is part of a university department and its IVF program is owned by the university and bears its name, yet it is located in a major teaching hospital complex with a different name and with priority other than reproductive health. With competing programs for resources and space, there is always the concern that the clinic and its program may be asked to move to another site, thus losing its existing valuable, nominally priced premise from the hospital, as well as the use of the procedural room and nursing hours provided by the hospital at a daycare fee agreed upon. In addition, within the department, the physical separation of the organization from the women's hospital has been an issue. There have been talks to bring the

organization under the same roof as the department. While this is a good idea on principle, there are broader issues involved.

For over a decade, there has been a movement to bring any free-standing maternity hospital under the same complex as a general hospital. For safety reasons, this arrangement makes adult medical and surgical specialties available to pregnant women who have pregnancy-related medical or surgical illness. Similarly, these multidisciplinary facilities provide the expertise of an obstetrician to a pregnant woman who presents to the general hospital with a medical or surgical problem unrelated to the pregnancy. The relocation of the organization from a general hospital into a women's and children's hospital is counter to this general trend. For example, a woman who is 27-week pregnant with a foot fracture requiring surgery arriving at the maternity hospital would have to be transferred to a general hospital. Yet in the general hospital without an obstetric and neonatal unit, there would be no obstetrician backup in the event of premature delivery during the peri-operative period. In the case of IVF patients, a potentially serious side-effect from over stimulation of the ovaries would put these patients at a disadvantage in being in a maternity hospital without the support of adult medical specialities. Therefore, until this issue is resolved, such relocation would not be ideal for the program.

In addition, there is the concern, both for some clients and staff, of having an abortion clinic under the same roof as a fertility clinic and IVF program. The psychological impact of having an obstetric unit and a nursery adjacent to a fertility clinic would also be insensitive and inappropriate. Another disadvantage for the women's hospital site is that hospital privileges are shared by physicians from the rival clinic. The major advantage is that a women's hospital would consider a fertility and IVF clinic as priority programs.

4.7.2 Gyne-endocrine laboratory

Another concern is that the gyne-endocrine laboratory, which is unique in its sole control by the organization, has been subjected to periodic attempts by appropriate authorities to dismantle it and absorb its service into the general laboratory and pathology department. The next cycle of accreditation of the gyne-endocrine laboratory will re-open this challenge. In addition, as hormone assay equipment decreases in price and becomes more automated, private pathology laboratories, may be able to compete with the gyne-endocrine laboratory by delivering a service at the same turnaround time of 3-4 hours as required for the program's IVF service.

4.8 Summary

This chapter has highlighted the main issues facing the organization. The next chapter will provide corresponding recommendations that the organization can implement.

5 RECOMMENDATIONS

This final chapter will highlight some general recommendations directly relating to the organization's main objectives and goals. It will then describe more specific recommendations to the issues facing the organization in the same order as presented in Chapter 4. The key recommendations commented in previous chapters will be summarized below.

5.1 Achieving objectives and goals

To compete effectively, the organization needs to revisit its directional strategies according to its mission. In relation to its objectives and goals, the organization needs to continue to promote its differentiation features and increase public awareness of its comprehensive, evidence-based and caring approach. It needs to formally involve key personnel in the program, particularly the IVF medical director, in business and finance planning assumed by the division head and program director alone, and increase communication to key stakeholders in this regard. Apart from continuing to focus on marketing and promotion, it should also concentrate on developing underserved market segments, and new products to achieve market penetration. Finally, it should actively expand its IVF research, both in academic research and R&D in services offered. Many of the recommendations below are closely inter-related, for example, encouraging research will push the program to leading-edge technology and simultaneously will enhance its reputation and image which in turn, will lead to an increase in market share.

5.1.1 *Non-profit vs. private*

Although one way of competing in the private sector is for the program to incorporate as a private clinic, thus overcoming factors such as control of its own finance for capital development, R&D and incentive of ownership as discussed previously, it would not be congruent with the organization's mission as a non-profit, academic centre. This strategy will also require individual physicians to assume ownership of the program, with or without the university, and to accept the associated financial risk. The disadvantages are that existing valuable resources from the hospital and university will be removed from the clinic and it will lose its non-profit status. Further, if the program is bringing in revenue, why would the organization want to forego the program? If the program is losing money, who would like to take on the risk? Such incorporation might also lead to separation of power which would not be acceptable to senior management; as well, the reputation and image would be different without the organization trade mark and vice versa. Hence, it is a theoretical option only although it has

been successfully implemented in another province. Accepting that the program is to remain a non-profit, academic centre, the organization should promote this non-profit, academic profile as one of its differentiation features. It is equally important for management to shed its mindset that a non-profit organization should not pursue entrepreneurial opportunities that could advance or promote its mission (see Section 5.6).

5.1.2 Leading-edge IVF program vs. routine IVF service

As an academic centre and a pioneer in reproductive medicine in the past, the program should rekindle its enquiry spirit and continue to differentiate itself in leading-edge academic research, particularly now that it has rebuilt its internal strengths. By doing this, it will provide valuable information for evidence-based practice, its other feature of differentiation, and further distinguish it from some private clinics providing routine, high-volume IVF service like a factory. The organization, with departmental support, should provide seed money to academic clinicians for pilot research projects in ART so that they can generate preliminary data to successfully compete for peer-reviewed funds from national granting agencies. Having peer-reviewed research grants will enhance the reputation of the program and the organization, and attract market share in addition to providing the research data for evidence-based practice. Any new methods of delivering IVF service will likely affect existing pregnancy rates. Hence, to overcome inappropriate reporting of pregnancy statistics, the program should push for changes in reporting IVF pregnancy outcomes to the Canadian ART Registry, taking into account the research components that might influence pregnancy outcomes which should be analyzed separately from those of routine clinical care. Concurrently, it should report pregnancy rates to clients, referring physicians and the public in a similar manner.

5.1.3 Market development /penetration and product development

The current IVF industry is in the mature phase of its life cycle locally, however, there are underserved areas in the province (Section 3.4.1.2.2.3). Expanding services of the clinic to these areas would provide economies of scale. It would require establishing mobile, “satellite” clinics in the province to provide outreach services for communities that do not have easy access to IVF treatment. As the infrastructure and knowledge base of the IVF program are well established, such outreach services are feasible and would not require a large capital investment. In addition to market development and fostering academic research, the program should invest in R&D to further increase its pregnancy rates which are directly related to services offered. It should also acquire expertise in established or promising technology such as PGD (Section

3.4.1.2.2.2). Although PGD serves only a very specific population, the reputation, clinical and research activities associated with it, should enhance the program's profile, attract clients to its service and fulfill the organization's role as a tertiary referral centre.

5.1.4 Marketing and promotion

To achieve its objectives and goals, the organization is already engaged in promotion to create awareness of the comprehensive services that it offers to infertile couples. In 2003, it took a unique market promotion opportunity to mark its 20th anniversary of the first baby born from IVF treatment in the program and in Canada. All clients, researchers and health care providers involved in IVF since 1983 were invited. Individual invitations were sent out to over 4,000 invitees and the event was also advertised in all major newspapers of the main geographical areas served by the organization. In conjunction with the anniversary celebration, a new magazine, which was launched and published two weeks prior to the event, chose to feature the clinic and its IVF program. The magazine was distributed to 40,000 subscribers of one of the city's newspaper. In addition, the article on the organization was posted as a PDF file on the clinic's website. As part of its educational mandate, staff from the organization, in partnership with a local TV station and the public library, gave a series of public talks earlier this year on infertility which heightened awareness of issues surrounding infertility, as well as the organization and its IVF program. The organization is also holding a fundraising campaign for a fund it established last year to assist couples who could not afford IVF treatment. This will not only benefit those in need of assistance but will further raise awareness of infertility, infertility treatment, and the organization.

The recommendation is to further showcase its comprehensive service, philosophy and experienced, committed staff in a non-profit, academic setting, and to promote these features in underserved segments of the province (Section 3.4.1.2.2.3). It should also promote itself in market segments that are currently served predominantly by its competitor, specifically, gynaecologists in at least three regional hospitals who have referred their patients mainly to the program's local competitor (Section 2.5). Presenting CME and information rounds related to infertility in these hospitals would provide opportunities for physicians who work there to have first hand contact with staff from the organization and its IVF program. Development of CME conferences for other health care professionals would further enhance the organization profile and provide another source of revenue for the organization. This would also meet the mandate of the organization to provide outreach education to health care professionals.

Another important recommendation for the organization is not to neglect internal marketing and promotion of its value to senior management of its department, university and hospital. This would help senior management appreciate its valuable services for patients in the province, its teaching and training roles for specialty residents and subspecialty fellows, its academic research that enhances the institution's reputation, as well as its challenges and the corresponding support required.

5.2 Decreased market share and local competition

The above recommendations are all part of the strategy to increase the program's market share. With internal strengths re-established, the program's adaptive strategy should be one of expansion, including market development and penetration and product development as outlined. In its marketing and promotional activities, the organization needs to focus on its differentiation features detailed earlier. The organization should take pride in its resources, tangible and intangible, its competencies and capabilities, and pay attention to external factors including demographics. Specifically, it should dispatch its resources and competencies to develop new markets and/or products as outlined (Section 5.1.3) to achieve competitive advantages. It is also important to study the local competitor's strengths and weaknesses (Section 2.5.2).

5.3 Perception and image

Many of the recommendations discussed earlier will also raise the program's perception and image. The organization is correct in increasing its activities on marketing and promotion, including website updates to truly reflect its resources, core competencies and capabilities. Currently, the updating process has been slowed down by busy physician staff who has other commitments. However, updating the website is a high priority for the program to market and promote its pregnancy rates and provide educational information to correctly interpret pregnancy rates. It is recommended that the organization completes this project without further delay.

The organization should also educate specialty trainees rotating through the fertility/endocrine clinic on factors that influence IVF success. By being exemplary in counselling infertile couples, it could influence the next generation of gynaecologists on the evidence-based approach to infertility management who as a result, may appreciate the program's approach and recommend their patients to the university program. Recruiting subspecialists that the organization has trained will minimize potential competition in the future. This indeed was the case with a local trainee in the past. The recent trainee came from another province and had subsequently returned to his home province to practice after completing his REI training.

However, it is a sensitive area that the organization needs to pay special attention to as the situation arises.

To further enhance its perception and image, the organization should form closer alliances with all stakeholders and partners. For example, alliances with pharmaceutical companies (Section 3.5.4.3) in sponsoring education, research and a fertility fund to assist couples who cannot afford IVF treatment are worthwhile cause. By involving both pharmaceutical companies and other relevant partners, the organization mitigates any potential conflict of interest. The organization should formalize collaboration with the genetic department within its own university to develop the PGD program rather than with the American university (Section 3.6) long-term. Such action should be mutually beneficial and further enhance not only the program's reputation, but that of the genetic department and the two units' own university.

5.4 Organization culture and structure

To survive and compete with private clinics in IVF services, the program would benefit from increased autonomy, both administratively and financially, given by senior management of the department and university. From a strictly business model, academic rank-and-file structure should have no bearing on seniority in the administration and finance management of the program. Further, as mentioned previously, an IVF clinic is considered to be a distinct entity for accreditation, and in the near future, licensing. The organization should therefore, establish a governing body that includes the department head, the division head, the IVF medical director, the program director, and other appropriate members with clinical, administrative, business, and finance expertise.

By involving the department head, it helps him understand the issues faced by the program who will therefore, be more supportive of a management model with increased autonomy in administration and finance management, including access to private capital markets, and increased capacity and freedom to network and form joint ventures. This body can then develop effective strategies that apply equally well to the program as a clinic and business, while allowing the program to compete successfully in the private sector, and in congruence with the organization's mission. The program should consult with the university industry-liaison office which provides appropriate guidelines and assists many academic investigators to commercialize their university research. A similar contract can be modeled for the program to "franchise" its IVF expertise should such an opportunity arise. To overcome the lack of ownership, the organization needs to consider ways to compensate physicians, including a periodic increase of the sessional fees according to the performance of the program. From a business perspective, the

organization needs to engage in regular business meetings to plan and review the program's business strategies as a team, particularly involving the medical director, who is directly involved in running the program.

5.5 Technology

Now that the program has regained its strengths and its market share, it should reinvest in R&D. This has already been discussed earlier but is summarized here for completeness. Although the organization is moving in the right direction by forming an alliance with an American university program in pre-implantation diagnosis (PGD), outsourcing PGD should be a temporary solution only. As mentioned, the organization should enlist the expertise of the genetic department within the same institution to further develop the infrastructure required to provide a full PGD service which should be part of the program's core competencies. While the demand for PGD might not be high initially, the reputation that it would bring should attract more clients and the infrastructure that it would establish should promote academic research. Other areas that have research and market potential are cryopreservation of ovarian tissues and oocytes as well as innovations to simplify IVF treatment and increase pregnancy rates. These should be part of the program's R&D for they not only fulfill the organization's mission, but also allow the program to penetrate the market.

5.6 Lack of entrepreneurship

Entrepreneurship, if integrated appropriately, could actually facilitate the mission of the non-profit, academic organization by providing the needed resources. The program needs to reinvent itself with a governance structure that would allow it to compete effectively with the private sector. Indeed, the governing body recommended in Section 5.4 should revisit the program's policies on business ventures that provide good business opportunities and fulfill its mission concurrently. The organization should not shy away from joint partnerships that expand its IVF service but should embrace growth potential congruent with its objectives and goals to limit mounting competition. A mutually agreed upon financial arrangement could be established for all stakeholders, with assistance from the university industry-liaison office. The organization could gain reputation as well as market penetration and meanwhile, still influence the management of the new clinic. As the program is competing with private clinics, changes, including methods of operation, may be needed to ensure its survival and ability to fulfill its mission.

5.7 Physical resources

5.7.1 Site/location

The future site of the organization and program is not an immediate concern but is an issue for long-term planning. While the long term goal is to bring the maternity and children's hospital under the same general adult hospital complex, this is unlikely in the near future. For the time being, the program will continue to lobby for more space and increase its profile in the hospital as it has been doing recently. This has already raised its profile in the community and the hospital may see the advantage of keeping the organization at its site. Indeed, work has already started to replace the building's two outdated elevators.

5.7.2 Gyne-endocrine laboratory

There is little that can be done about the gyne-endocrine laboratory, because in Canada, the specialty of laboratory medicine is separate even though reproductive endocrinologists have a long history of pioneering hormone research and who have brought particular hormone assays into clinical practice. However, the organization will continue to argue cogently and legitimately in the next accreditation process, that its expertise and high standard of quality control in reproductive hormone assays have been critical in achieving extremely low complication rates among its IVF patients over the years.

5.8 Conclusion

The generic strategy of the program is one of differentiation whereby IVF service is provided in a personalized, caring, ethical and evidence-based manner in an academic, non-profit clinic with comprehensive treatments for infertile couples. To maintain and further increase its market share and to strengthen its competitiveness to regain market leadership and recognition as a centre of excellence for reproductive medicine, the organization needs to appreciate and promote its differentiation features and develop underserved market segments and new products. It needs to rekindle its strong enquiry and pioneer spirit by engaging in academic research in both leading-edge basic sciences studies and evidence-based clinical trials. From a business development perspective, it needs to promote R&D to develop and enhance services offered. It needs the support of senior management to establish a governing body with sufficient autonomy in administration and finance management to compete favourably in the private sector. This includes access to private capital markets, increased capacity and freedom to network and form joint ventures that are congruent with its mission and values. The IVF industry also provides an

opportunity to study business strategies for a non-profit, academic provider of uninsured medical services under competitive pressure in the private sector.

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